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NATIONAL SHIPPING BOARD

MINISTRY OF PORTS, SHIPPING AND WATERWAYS

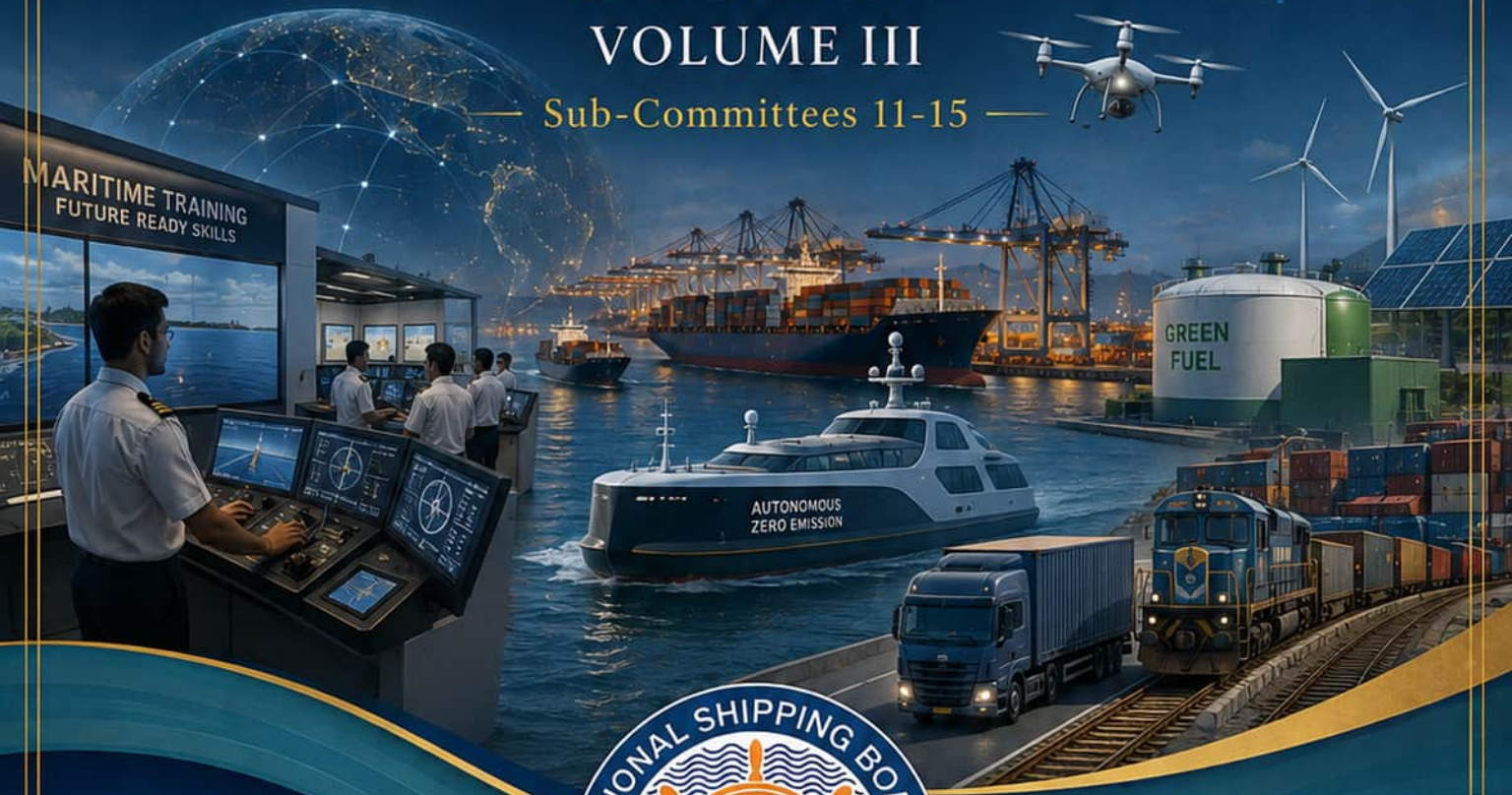
GOVERNMENT OF INDIA

REPORTS OF THE SUB COMMITTEES

— 2025-26 —

VOLUME III

— Sub-Committees 11-15 —



WISDOM IN THE OCEAN, PROGRESS IN THE NATION



SKILLING



MARITIME HUBS



EMERGING
TECHNOLOGIES



LOGISTICS
REFORMS



TAXATION
REFORMS



पत्तन, पोत परिवहन
एवं जलमार्ग मंत्रालय
MINISTRY OF
**PORTS, SHIPPING
AND WATERWAYS**

सत्यमेव जयते

**NATIONAL SHIPPING BOARD
ANNUAL REPORT
OF THE
SUB-COMMITTEES OF THE NSB
2025-26
Volume III**

Submitted
under
“Rule 10 of Procedure of National Shipping Board”
as specified under
Schedule II
of the
“National Shipping Board Rules, 2026”



WISDOM IN THE OCEAN, PROGRESS IN THE NATION

Attribution – Please cite the work as follows:

National Shipping Board (NSB) (2026). Annual Report of the Sub-committees of the NSB 2025-26. New Delhi: National Shipping Board, Ministry of Ports, Shipping and Waterways, Government of India, New Delhi.

Publication No.-NSB/2026/014/Annual Report of the Sub-committees of the NSB 2025-26/Vol III

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**NATIONAL SHIPPING BOARD
MINISTRY OF PORTS, SHIPPING AND WATERWAYS
GOVERNMENT OF INDIA
NATIONAL SHIPPING BOARD
ANNUAL REPORT
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Published by



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Sub-Committee No. 11

Title:

To prepare a roadmap for development of Skilling eco-system for future ready shipping sector (ship building, ship repairs, and ship recycling) to achieve MAKV-2047 Goals

Chairperson: Shri Arun Sharma

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PREFACE BY THE CHAIRMAN OF THE SUB-COMMITTEE



Arun Sharma Executive Chairman IRS

The Maritime Amrit Kaal Vision 2047 places before India an ambitious set of goals for its shipbuilding, ship repair, and ship recycling sector. Central to achieving those goals is a question that does not always receive the attention it deserves - whether India will have the skilled workforce to build the ships it aspires to build, repair the vessels it seeks to service, and recycle at the scale it intends to lead.

This report is the product of structured consultation with shipyards across India, analysis of the data they shared, and research into national and international practices that are relevant to India's context. We have tried to be factual, to be clear about the limitations of the data available to us, and to offer recommendations that are practical rather than merely aspirational.

We are grateful to the shipyards, recycling facilities, and industry associations that participated in the data collection process. Their willingness to share ground-level realities has made this a more useful document.

It is our hope that this report serves as a constructive contribution to the national effort to build a world-class maritime workforce - and that it supports the Ministry of Ports, Shipping & Waterways and the National Board of Shipping in shaping policy that is both effective and enduring.

**Arun Sharma,
Chairman Subcommittee on Skilling
National Shipping Board**

ACKNOWLEDGEMENTS

The Sub-Committee wishes to thank all shipyards, recycling facilities and maritime associations that submitted data and participated in consultations, including Garden Reach Shipbuilders and Engineers Ltd. (GRSE), Goa Shipyard Limited (GSL), Hindustan Shipyard Limited (HSL), Cochin Shipyard Limited (CSL), Shoft Shipyard, Titagarh Rail Systems Limited (Shipbuilding Division), Jaliyan Sustainable Ship Recycling Pvt. Ltd., Sagar Laxmi Ship Breakers and Federation of All India Sailing Vessels Industry Association of India.

The Sub-Committee also acknowledges the guidance provided by the National Shipping Board Secretariat and the Ministry of Ports, Shipping and Waterways.

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LIST OF ABBREVIATIONS

CEMS	Centre of Excellence in Maritime & Shipbuilding
CoE	Centre of Excellence
CSL	Cochin Shipyard Limited
FCAW	Flux-Cored Arc Welding
GRSE	Garden Reach Shipbuilders and Engineers Limited
GSL	Goa Shipyard Limited
HKC	Hong Kong Convention
HSL	Hindustan Shipyard Limited
IHM	Inventory of Hazardous Materials
IMU	Indian Maritime University
IRS	Indian Register of Shipping
ISTC	Indian Ship Technology Centre
ITI	Industrial Training Institute
LDT	Light Displacement Tonnage
LSC	Logistics Sector Skill Council
MAKV 2047	Maritime Amrit Kaal Vision 2047
MKC	Maritime Knowledge Cluster
MoPSW	Ministry of Ports, Shipping and Waterways
MSDE	Ministry of Skill Development and Entrepreneurship
NCVET	National Council for Vocational Education and Training
NDT	Non-Destructive Testing
NITTTR	National Institute of Technical Teachers' Training and Research
NOS	National Occupational Standards
NSB	National Shipping Board
NSDC	National Skill Development Corporation
NSQF	National Skills Qualifications Framework

OJT	On-the-Job Training
QP	Qualification Pack
RPL	Recognition of Prior Learning
SRIA	Ship Recycling Industries Association (India)
SSC	Sector Skill Council
SMAW	Shielded Metal Arc Welding

EXECUTIVE SUMMARY

Aligned with the Maritime Amrit Kaal Vision (MAKV) 2047, India aims to become a top-five global shipbuilding nation, the largest ship recycling hub, and a leader in high-value ship repair. Drawing on comprehensive stakeholder consultations, benchmarking, and primary data from participating yards and recycling facilities, this report presents a practical Skilling Roadmap to build the necessary future-ready workforce for Shipbuilding, Ship Repair and Ship Recycling sector.

The industry data reveals a sector under visible stress, marked by critical trade shortages, a lack of formal training pathways, high overseas attrition, and a training ecosystem unprepared for immediate demands like digital design, automation, and green propulsion. To bridge these gaps, the roadmap proposes a three-horizon strategy: stabilizing the training foundation and scaling Recognition of Prior Learning in the short term; building scale through regional infrastructure and apprenticeships in the medium term; and positioning India as a premier regional maritime training hub in the long term.

With strong government policy momentum, capturing this opportunity requires immediate, coordinated action across government, industry, and training institutions to treat workforce development as a strategic priority.

Suggested Policies

Based on the evidence gathered through the data collection exercise and stakeholder consultations, the Sub-Committee proposes the following policy directions. These are framed as suggestions for the Government's consideration and are intended to be refined through further stakeholder engagement before formal adoption.

- Consideration may be given to establishing a dedicated Maritime and Shipbuilding Sector Skill Council under NSDC - or, as an interim measure pending formal SSC constitution, to formalizing a Joint Maritime Skills Sub-Committee comprising nominated representatives of LSC and SMSSC, convened and chaired by MoPSW. Such a body could be assigned a clear mandate over QP development, NOS revision, and assessor certification for shipbuilding, ship repair, and ship recycling trades. The current administrative split between LSC and SMSSC, while logical at the

time of their constitution, may not adequately serve an industry of the scale and specificity demanded by MAKV 2047. A consolidated institutional voice - whether as a new SSC or a formally chartered sub-committee - would serve as a foundational precondition for coherent, industry-responsive standard-setting.

- NCVET-certified Qualification Packs for all critical shipyard trades that currently lack formal coverage may be developed and fast-tracked - including Marine Rigger, HVAC Duct Fitter (Marine), EOT Crane Operator (Shipyard), Marine Electrician, Instrument Mechanic (Marine), and Scaffolder (Shipyard). It is suggested that the designated SSC or sub-committee engage directly with at least five major yards through the development process, so that the resulting standards reflect operational realities rather than notional trade descriptions.
- A formal coordination mechanism between MoPSW and the Directorate General of Training (MSDE) may be considered - preferably formalized through an MoU with defined deliverables and a review calendar - to systematically integrate shipbuilding and maritime sector needs into ITI curriculum revision cycles, NCVT assessment reforms, and trainer certification programs. Such a mechanism would help ensure that national vocational training policy is meaningfully responsive to one of India's most strategically significant industrial sectors.
- Beyond the operationalization of CEMS, it may be worthwhile to consider establishing at least three additional regional maritime skilling hubs - situated at or near Visakhapatnam, Alang-Bhavnagar, and the Kolkata–Diamond Harbor belt - to ensure that geographic coverage of quality maritime training infrastructure is broadly commensurate with the distribution of yards and workforce across the country.
- A formalized 'Professor of Practice' appointment framework - with clearly defined eligibility criteria, simplified administrative processes, and competitive honoraria - may be considered for trial at CEMS before being extended progressively to all maritime training institutions. This mechanism would draw on the deep domain expertise of retired shipyard

professionals, classification society surveyors, and senior mariners, and convert that experience into a sustained institutional training asset.

- Structured on-the-job training, supported by standardized competency checklists and independent third-party assessment, may be encouraged as the minimum training standard for all yards employing more than 200 contract or hired workers. MoPSW could usefully develop and circulate a model OJT framework to assist yards - particularly smaller private yards - in implementing this in a practical and cost-effective manner.
- A large-scale RPL campaign for the ship recycling sector may be operationalized, targeting the substantial existing workforce at the Alang and Kolkata breaking yards, with certification structured against HKC-relevant occupational standards. Such a campaign would not only formalize the competencies of thousands of experienced workers but would also position Indian recycling yards more competitively for compliant business from international clients operating under Hong Kong Convention requirements.
- Financial incentives for private sector yards that demonstrate certified training programs may be explored - such incentives would help shift the cost-benefit calculus for private yards toward sustained investment in structured workforce development. Competitive wages, performance-based bonuses, and comprehensive benefits including health insurance, retirement plans, and family leave are consistently cited as the most effective retention levers in the maritime sector. Long-term service bonuses, in particular, can foster loyalty by rewarding workers who stay.
- An industry-academia collaboration framework may be developed that brings major public sector shipyards into structured formal partnerships with IMU, IITs in coastal states, and state polytechnic systems - with defined jointly-run programs, infrastructure-sharing arrangements, and faculty exchange mechanisms. This would help close the gap between academic curricula and yard-floor realities, while also expanding the research and innovation capacity of participating institutions.

- A dedicated marine HVAC module may be designed and delivered through CEMS and its regional training partners, specifically addressing the skills gap in this area that was explicitly identified through the data template submissions received from industry during Phase 2 of this exercise. Its inclusion in the CEMS curriculum would also signal the institution's responsiveness to granular industry feedback.
- A dedicated Green and Future Technologies Maritime Skilling Program - time-bound and supported by MSDE - may be considered, covering electric propulsion systems, alternative marine fuels (LNG, methanol, ammonia, and hydrogen/fuel cell technologies), autonomous and unmanned vessel operations, digital twin technology, and IoT-based ship systems. This program could be structured as a post-diploma or post-ITI short course, delivered through CEMS and the proposed regional maritime skilling hubs, and developed in partnership with classification societies, propulsion OEMs, and relevant public sector yards. The MAKV 2047 mandate for a Marine Fuel and Lubricant Research Laboratory and an Advanced Nautical Studies Centre may appropriately be treated as the institutional backbone for this program, ensuring alignment between infrastructure investment and training outcomes.
- A centralized online labor market intelligence platform may be developed and hosted by MoPSW or a designated agency, designed to track skilled worker availability by trade and location, live vacancy positions at participating yards, and training program availability across the country. Making this platform accessible simultaneously to job-seekers, yards, and training providers would significantly improve market transparency, reduce hiring friction, and enable more responsive planning - both at the yard level and at the national policy level.

CHAPTER I: INTRODUCTION

The Indian maritime sector occupies a position of growing strategic and economic significance. As a peninsular nation with a coastline extending over 11,000 kilometers and a tradition of seafaring that predates modern industrial history, India's relationship with the sea has always been deep. What is changing now is the scale and ambition with which the country is seeking to assert itself in the global maritime economy - and that ambition is most clearly articulated in the Maritime Amrit Kaal Vision 2047 (MAKV 2047), the Government of India's long-range blueprint for the sector.

Among the many pillars that MAKV 2047 rests upon, human capital is arguably the most foundational. Ships are designed, built, repaired, and eventually recycled by people. No amount of policy incentive, infrastructure investment, or fiscal support can substitute for a workforce that is adequately skilled, safely trained, and continuously upgraded.

Sub-Committee 11 was mandated to develop a policy roadmap for skilling and skill-building across the three verticals of shipbuilding, ship repair, and ship recycling. The Sub-Committee's work followed a structured, five-phase methodology over approximately 100 days, covering data collection, industry consultation, gap analysis, roadmap drafting, and finalization.

A standardized data template was circulated to major public-sector and private-sector shipyards, recycling facilities, and industry associations. Responses were received from eight organizations, spanning shipbuilding, ship repair, and ship recycling. This report presents the findings of the Sub-Committee and sets out a phased roadmap - short, medium, and long-term - to achieve the skilling goals embedded in MAKV 2047.

CHAPTER II: STATEMENT OF THE PROBLEM

India's shipbuilding, ship repair, and ship recycling industries collectively represent a substantial part of the country's industrial base. Yet the common challenge running through all three verticals is the same: a persistent mismatch between the skills the industry needs and the skills the available workforce possesses.

At the most basic level, this is a supply problem. The trades that dominate shipyard employment - welding, fitting, pipe work, electrical work, painting, rigging, NDT inspection - are not systematically taught in a shipyard-relevant manner in most Industrial Training Institutes (ITIs). The curriculum at these institutions, where it exists for these trades at all, does not reflect the specific tolerances, standards, materials, and working environments found aboard vessels or within shipyard production lines. As a result, employers routinely find themselves hiring untrained workers and bearing the full cost of initial skilling - a burden that smaller yards, in particular, cannot easily absorb.

The problem extends beyond entry-level supply. Several respondents to the Sub-Committee's data template pointed to the near-total absence of formally qualified candidates for emerging roles - automation and control system technicians, CNC machine operators, robotic welding specialists, and digital design professionals. For these trades, India currently has no established pipeline of any description.

There is also the dimension of retention. Even where yards invest in training workers to a functional level of competence, migration - to overseas employment, to industries with better pay and conditions, or simply to more accessible locations - erodes the investment. This cycle of train-and-lose is most acute in smaller private yards but is by no means confined to them.

For the ship recycling sector, the problem carries an additional layer of urgency. Compliance with the Hong Kong International Convention and the EU Ship Recycling Regulation requires demonstrably trained workers in hazardous material handling, environmental management, safety procedures, and IHM documentation. Non-compliance is not merely an operational inefficiency - it is a disqualifier from the growing volume of compliant recycling business that

European and other international shipowners will potentially direct to certified facilities.

MAKV 2047 has set ambitious targets: India as a top global ship recycler with capacity reaching 9 million LDT, a thriving ship repair cluster network, and a domestically capable shipbuilding sector competing internationally. Meeting those targets demands a qualitatively different workforce from what currently exists, and building that workforce requires deliberate, sustained, and well-resourced policy intervention beginning now.

CHAPTER III: PRESENT STATUS - GLOBAL AND NATIONAL CONTEXT

3.1 Global Landscape:

Shipbuilding, ship repair, and ship recycling together form a global value chain in which South Korea, China, and Japan have historically dominated the high-value (shipbuilding and complex repair) segments, while South Asia - India, Bangladesh, and Pakistan - has concentrated in ship recycling. The competitive advantage of East Asian yards rests substantially on workforce quality: deep technical capability, tight integration of design and production, and rapid adaptation to technology change.

Country / Region	Global Shipbuilding Market Share
China	~64% - Dominant in bulk carriers, tankers, container ships
South Korea	~19% - Specializes in LNG, complex vessels; advanced automation
Japan	~6% - High quality, niche specialist vessels
Europe (Italy, Germany, France, Russia, Finland, Turkey, Netherlands)	~6% - High-value, specialized vessels; offshore, defence, cruise
India	<1% - Defence-focused; emerging commercial capability
Rest of World	<4% - Vietnam, Philippines, US, Taiwan and Others

Table 1: Global Shipbuilding Market Share
(Sources: Clarkson's Research - May 2026)

Global shipbuilding is currently navigating a dual transition: the decarbonization imperative (which is driving demand for LNG-fueled, methanol-fueled, ammonia-ready, and hybrid-electric vessels) and the automation imperative

(which is reshaping what human workers do on the shop floor). Both transitions demand new skills - in green propulsion systems, digital ship design, and advanced manufacturing - that are not yet part of the standard training landscape in any country, but where East Asian yards have a significant head start.

These technology transitions are already registering in Indian yards' workforce planning. Titagarh has identified electric propulsion engineering, unmanned vessel technology, AI-integrated ship design, and modern shaft alignment technology as skills required by 2030. Shoft Shipyard has flagged fuel cell engineering as an emerging need. HSL has listed green shipbuilding techniques alongside digital twin technology and IoT and sensors. The numbers involved are small at individual yard level, but they represent the leading edge of a structural transformation that will reach the broader workforce by the mid-2030s. Curriculum and training infrastructure decisions made now will determine whether that workforce exists when it is needed.

India's global position in ship recycling is already significant. Alang, Gujarat, is the world's largest ship recycling destination by volume in many recent years. However, maintaining that position while complying with increasingly stringent international requirements calls for a systematic upgrade in workforce competency, safety practices, and documentation capability.

3.2 National Context:

India has approximately 27 major and medium shipyards, along with a large number of small private yards, concentrated along the west and east coasts. The public sector, represented principally by MDL, CSL, GRSE, GSL, and HSL, accounts for the bulk of defence and complex commercial shipbuilding. The private sector is growing, with several yards - including those of L&T Shipbuilding, Titagarh, and a constellation of smaller builders - increasingly active in the commercial segment.

The Centre of Excellence in Maritime and Shipbuilding (CEMS), established under the aegis of the Ministry of Ports, Shipping and Waterways, is a dedicated institution for maritime and shipbuilding skill development in India. It operates a range of programmes aligned with National Skills Qualifications Framework

(NSQF), but its capacity relative to the projected workforce demand under MAKV 2047 represents a significant constraint that this report addresses directly. The National Skill Development Corporation (NSDC) and the Sector Skill Council for the maritime domain (under the broader infrastructure of NSDC) provide a certification and qualification framework. However, the penetration of NSDC-certified qualifications in shipyards remains uneven, and several job roles critical to shipyards - including riggers, scaffolders, HVAC duct fitters, and EOT crane operators - currently lack recognized qualification packs developed specifically for maritime applications.

CHAPTER IV: PRESENT STATUS AND CHALLENGES FACED BY STAKEHOLDERS

4.1 Workforce Baseline - Data from Responding Yards:

The following table summarizes the workforce data submitted by responding shipyards and recycling facilities. It should be noted that not all respondents provided fully disaggregated figures, and some classifications differ across yards due to internal HR conventions. Numbers are reported as submitted.

Shipyards / Facility	Type	Permanent	Contract / Temp	Apprentices	Subcontracted / Other
GRSE, Kolkata	Shipbuilding	~800	~40	~160 p.a	~6000
GSL, Goa	Shipbuilding / Repair	~970	FTE embedded	~150 p.a.	-
HSL, Visakhapatnam	Shipbuilding / Repair	340	347	54–160	~1,040
CSL, Kochi (& units)	Shipbuilding / Repair	~3,700 (all modes)	Significant	615+ p.a.	Requires +3,200 by 2030
Shoft Shipyard, Bharuch	Shipbuilding / Sub-contract	1,131	Included	~22	Gap of 306 currently
Titagarh, West Bengal	Shipbuilding / Repair	~24 direct	Most trades contracted	-	-
Jaliyan, Alang	Ship Recycling	~20	-	~200 p.a.	Expansion: +10,000 MT
Sagar Laxmi, Alang	Ship Recycling	~20	-	10–15 p.a. OJT	Needs RPL for 75 workers

Table 2: Work force data from Shipyards

Aggregate across all responding organizations, the total directly employed and contracted blue-collar workforce reported in this exercise exceeds 14,000 workers, with GRSE and CSL contributing the largest absolute numbers. However, this figure understates the true industry size significantly, as it covers only a subset of active yards and does not capture the itinerant contract workforce associated with larger projects.

4.2 Trade-Wise Skill Gap Analysis:

Based on the workforce data provided by respondents, the following table presents a consolidated, trade-wise picture of current strength against identified requirements. Where a yard provided 'required' numbers as annual intake (rather than absolute strength), these have been contextualized but not arithmetically aggregated to avoid misrepresentation.

Trade	Reported Current (Select Yards)	Reported Requirement	Identified Gap	Key Observation
Welders (all types)	~1,260+	~1,430+	~170+	Critical trade; shortfall in MIG / TIG & specialist welders
Fitters / Fabricators	~1,330+	~1,650+	~320+	Largest volumetric gap; entry-level supply is unskilled
Electricians	~550+	~700+	~150+	Marine-grade electrical skills absent in standard ITI curriculum
Pipe Fitters	~230+	~300+	~70+	Specialized high-pressure piping skills scarce

Painters / Blasters	~160+	~220+	~60+	Coating technology skills lag behind modern standards
Safety Personnel	~280+	~380+	~100+	Mandatory under HKC/EU SRR; chronic shortage in recycling yards
NDT / QA-QC	~70+	~100+	~30+	High-value, low- supply; no dedicated QP in most ITIs
Designers / CAD	~90+	~140+	~50+	Critical for MAKV 2047 design capability goals
Automation / Control Tech.	~80+	~140+	~60+	Near-zero supply; Industry 4.0 preparedness extremely limited

Table 3: Trade Gap Analysis

The single largest forward-looking gap identified is at CSL, where expansion plans necessitate approximately 3,200 additional workers by 2030 across all trades to bring the workforce strength to approximately 6,900. At Shoft Shipyard, a current gap of 306 workers already constrains production capacity. These numbers, drawn directly from respondent submissions, indicate that the shortfall in workforce is not a theoretical future concern - it is a present operational constraint.

4.3 Challenges in Hiring:

Across respondents, the following challenges in hiring skilled manpower were repeatedly articulated:

- The pool of candidates with shipbuilding-specific skills is narrow, reflecting the absence of targeted training pipelines. Respondents from

yards in smaller states noted that as a specialized industry in a small state, qualified applicants for technical positions are difficult to attract.

- Qualified and experienced workers are reluctant to accept contractual employment, even when permanent positions are unavailable. Several respondents noted this as a structural constraint on its ability to expand workforce on project terms.
- Several key trades - rigger, scaffolder, EOT crane operator, electronic mechanic, instrument mechanic - are not covered by any ITI program. There is no recognized formal pathway for a person to qualify in these roles, creating both a supply problem and a certification gap.
- Post-skilling migration abroad is a significant concern, particularly for smaller private yards that invest in initial training only to lose workers to better-paying overseas opportunities.
- Remote or infrastructure-deficient locations deter workers, regardless of pay. Recycling sector respondents noted remote location and inadequate infrastructure as primary hiring barriers.
- Aging workforces and inadequate succession planning are features of several public sector yards, where superannuation projections signal significant attrition in critical trades between 2026 and 2030 (evidenced in detailed cadre-wise projections submitted by public sector yards).
- A part of the difference between India and high-performing shipbuilding nations lies in foundational investments that rarely feature in maritime policy discussions. China's sustained investment in village-level healthcare and primary education produced a workforce that is healthier and more capable of absorbing technical training. India, despite world-class institutions at the top, has underinvested at the grassroots. Workers arriving at shipyard gates with interrupted schooling or untreated health conditions are harder to train, less productive, and more prone to accidents. Strengthening the foundational ecosystem around shipbuilding clusters - schools, primary health centers, and nutrition support - is therefore not a welfare agenda separate from the skilling roadmap. It is a prerequisite for it.

CHAPTER V: PAST POLICIES OF THE GOVERNMENT AND THEIR EFFICACY

India has not lacked policy intent in maritime sector development. Over successive plan periods, various instruments have been deployed - with varying degrees of coherence and follow-through.

The Sagar Mala Program, launched in 2015, brought significant investment to port modernization and coastal connectivity. While directly focused on ports rather than shipbuilding, it created demand for vessel repair and maintenance services and underscored the need for a larger skilled maritime workforce. Its indirect contribution to skilling has been the development of logistics corridors and the clustering of maritime activity in specific coastal geographies, which has potential relevance for training location strategy.

The Shipbuilding Financial Assistance Policy and its successor instruments provided subsidy support to domestic shipyards, intended to narrow the cost disadvantage relative to Asian competitors. However, these measures addressed the demand side of the equation without a parallel investment in workforce supply. The result was that when order books grew, yards found themselves constrained by skilled labor shortages rather than by capital or infrastructure.

CEMS was established as a direct policy response to the skills deficit in shipbuilding and maritime sector. It offers a range of NSQF-aligned programs and has developed infrastructure for welding, fitting, electrical, and safety training. Establishing a more distributed geographic footprint and expanding current training capacities will allow these programs to scale effectively and reach a much larger segment of the workforce.

The National Apprenticeship Promotion Scheme (NAPS) and the **Apprenticeship Act** have been applied across several public sector shipyards with reasonable effect – GRSE, CSL, GSL, and HSL all engage significant numbers of apprentices annually. Private yards, however, have been less consistently brought under the framework, and awareness of NAPS benefits among smaller yards remains limited.

In ship recycling, the recognition of the HKC regime and the development of the National Ship Recycling Board (NSRB) standards framework represent important regulatory milestones. However, the translation of these standards into systematic worker training and certification programs has lagged. The result is a situation where the regulatory framework is increasingly demanding while the training infrastructure that would help workers meet those demands remains underdeveloped.

CHAPTER VI: CURRENT POLICIES OF THE GOVERNMENT AND THEIR EFFICACY

The current policy landscape for maritime skilling is shaped primarily by two overarching frameworks: MAKV 2047 and the national skilling architecture under the Ministry of Skill Development and Entrepreneurship (MSDE).

6.1 MAKV 2047 - Skilling Goals and Initiatives:

MAKV 2047 identifies skilling as a cross-cutting priority across all maritime verticals. The specific initiatives it proposes include:

- Establishment of a Centre of Excellence for shipbuilding and repair, focused on thought leadership, innovation, and functional training.
- Competency development through CEMS, aligned to Industry 4.0 skill requirements, with a dedicated skill gap study and annual training targets.
- Development of major ship repair clusters in Kochi, Chennai, and Mumbai, designed to leverage geographic concentration of skilled workers and shared training infrastructure.
- A target workforce of over 5.15 lakh persons for the recycling sector, corresponding to the targeted capacity of 9 million LDT.
- An Advanced Maritime Training Centre covering simulators, dredging, seabed engineering, autonomous vessels, and AR/VR training applications.
- A Ship Design and Research Centre to host software tools for Indian marine designers and build specialist design capability.
- Introduction of 'Professor of Practice' roles for senior mariners and marine engineers to bring industry experience into institutional training.
- Faculty development through tie-ups with NITTTR and IITs to equip instructors with emerging technology competencies.
- Short-term courses by IMU for working professionals in the maritime sector.

6.2 National Skills Architecture:

The NSQF-aligned framework, administered through NCVET and operationalized through Sector Skill Councils, provides the qualifications architecture within which maritime skilling must be positioned. The challenge is that the maritime and shipbuilding SSC currently does not cover all the trades

relevant to shipyards, and several of the qualification packs that do exist are not updated to reflect current production processes.

The qualifications and occupational standards framework for the maritime sector is currently distributed across two Sector Skill Councils under NSDC. The Logistics Sector Skill Council (LSC) covers port operations, cargo handling, marine logistics, and supply chain roles. The Strategic Manufacturing Sector Skill Council (SMSSC) addresses heavy-industry marine roles - specifically developing National Occupational Standards (NOS) and Qualification Packs (QPs) for shipbuilding, ship repair, hull design, and marine piping and fitting. No standalone Maritime Sector Skill Council exists. This distributed arrangement creates a structural challenge: neither the LSC nor the SMSSC has a comprehensive, consolidated mandate over the full spectrum of trades and roles that shipyards and recycling facilities require. Trades such as marine HVAC duct fitter, EOT crane operator (shipyard), scaffolder, and ship recycling operative fall into the gap between the two councils' remits, and roles straddling both manufacturing and logistics - such as marine surveyor or port-based ship repair supervisor - lack a clear institutional home within the NSDC framework.

The Apprenticeship Act framework is functioning reasonably well in public sector yards. CSL, for instance, engages over 600 apprentices annually across ITI, degree, diploma, VHSE, and rigger categories. This model - where the yard provides structured on-the-job exposure within a formal apprenticeship framework - is cost-effective and tends to produce workers who are job-ready for the specific production environment. Extending this model to private yards, with appropriate government support, is a priority the Sub-Committee has identified.

CHAPTER VII: DISCUSSIONS WITH STAKEHOLDERS

The Sub-Committee conducted consultations with responding shipyards through the data template exercise and supplementary interactions. The views and observations reported in this chapter are drawn from those submissions and discussions. They are presented thematically, as recurring patterns of concern and suggestion that emerged across multiple respondents.

7.1 Skill Level - Not Just Trade:

One of the clearer messages from the consultation process was that the industry's concern is not only about which trades are in short supply, but about what level of competency within a trade is available. Several respondents observed that while it is possible to find workers who carry trade certifications, the practical capability of those workers - particularly in marine-specific applications - is often inadequate.

The typical entry-level ITI-trained welder, for instance, may be competent in basic plate welding but unfamiliar with the weld standards required for naval or offshore vessel construction, the specific grades of steel used in ship hulls, or the qualification test procedures that classification society standards demand. The same pattern applies to electricians trained for general industrial work who arrive at shipyards without knowledge of marine cable systems, IEC 60092-series standards, or the moisture and vibration environments characteristic of ship electrical installations.

This level gap - distinct from the pure trade gap - calls for a layered skilling architecture where the generic ITI qualification forms only the first step, and a shipyard-specific certification forms the next, mandatory layer before a worker is deployed on production.

7.2 Compensation Challenges and Migration of Labor:

Retention emerged as a pervasive concern. The dynamic was articulated clearly by respondents: workers enter at the unskilled level, are progressively trained to operational competence at the yard's cost, and then leave - for overseas employment, for sectors with better remuneration, or for yards with better-located facilities.

Compensation in Indian shipyards, particularly private yards and in recycling facilities, is often at or near the statutory minimum wage for the relevant state. International maritime employment - particularly in the Gulf and South-East Asian countries - offers multiples of that amount for workers with comparable or slightly higher skill levels. The wage differential is difficult for Indian yards to close entirely, given competitive pricing pressures. The result is a structural leakage of trained workers that no amount of training investment will overcome unless it is accompanied by retention incentives.

Suggestions from the industry included compulsory service bonds of at least five years in India post-certification, funded training schemes that tie disbursement to continued domestic employment, and government wage-support mechanisms during the apprenticeship and early employment phase.

GRSE has proactively implemented Rewards & Recognition initiatives and minimum wage standards extending across its subcontracted workforce. However, GRSE has candidly noted that the outcomes of these initiatives in terms of actual retention improvement and attrition reduction are yet to be fully assessed. This is an honest and important observation. It suggests that financial incentives alone - while necessary - may not be sufficient to resolve attrition in isolation. They need to be accompanied by career pathway visibility, certification progression, and improved living conditions to produce lasting results.

7.3 Preference for Better Paying Alternatives:

Related to but distinct from migration abroad is the phenomenon of workers - once trained - preferring adjacent industries that offer better pay, less physical risk, more convenient locations, or superior welfare facilities. Shipyard work is physically demanding, often carried out in confined or elevated spaces, in adverse weather, under tight schedules, and with safety risks that are higher than most manufacturing environments. Without a commensurate compensation premium or other non-wage benefits, the shipyard loses out to manufacturing, construction, or services employers even for domestically mobile workers.

This observation has implications for the design of skilling programs: training must be accompanied by communication of career pathways and earning trajectories that are genuinely competitive over the medium term. The 'Professor of Practice' model, recommended under MAKV 2047, can serve this function in part - by making visible the career journey of experienced maritime workers who have advanced to supervisory, technical authority, or training roles.

7.4 NSDC Certification and Sector Skill Council Gaps:

The Sub-Committee's interactions highlighted a recurring frustration with the current NSDC/SSC framework as it applies to the shipbuilding sector. The structural split between Logistics Sector Council (LSC) and Strategic Manufacturing Sector Skill Council (SMSSC) compounds the QP development problem. A yard seeking certification for a rigger, for example, finds that the SMSSC may cover the manufacturing context of rigging in a shipyard, while the LSC might classify rigging-adjacent roles within a port operations frame. Neither council has developed a marine rigger QP that fully meets the shipyard deployment standard. For ship recycling trades - gas cutting, IHM documentation, confined space entry supervision - there is even less clarity over which SSC should hold the primary development mandate. The result is institutional diffusion of responsibility, where each council can reasonably regard certain roles as outside its core remit.

For several job roles - marine rigger, ship building fitter, high-pressure pipe fitter, HVAC duct fitter, EOT crane operator - either no QP exists, or the available QP was developed without adequate industry input and does not align with the tasks actually performed in a shipyard. The practical consequence is that yards either ignore the certification framework or establish their own internal standards, leading to fragmentation of what should be a nationally consistent skill credential.

The Sub-Committee recommends that the NSDC Sector Skill Council for maritime be directed, in coordination with MoPSW, to undertake a systematic review of all job roles in shipbuilding, ship repair, and ship recycling, develop or update QPs where gaps exist, and fast-track NCVET approval. Respondents have specifically identified Marine Rigger, Marine Welder, Hull Design Engineer, Maritime Safety Specialist, and Marine Surveyor as priority QP development requirements. The Sector Skill Council must engage with yards directly - not at arm's length - to produce standards that are usable on the shop floor.

7.5 On-the-Job Training as the Dominant Model:

A notable finding from the data template exercise is that on-the-job training (OJT) is, in practice, the principal mode of skill development in the shipbuilding and recycling sectors. Several respondents stated that existing workers' certification progresses primarily through in-house OJT as existing workers leave and new ones arrive. Some recycling facilities conducts 10–15 apprentices per year entirely through OJT.

This is not inherently problematic - OJT, when structured, supervised, and assessed, is among the most effective modes of vocational skill development for trades that require hands-on motor learning. The difficulty is that in most shipyards, OJT is neither structured nor assessed in any standardized way. It operates as informal mentoring, with outcomes that vary depending on the competence and diligence of the supervisor to whom the new worker is assigned. Formalizing OJT - through defined competency checklists, log books, supervisor accountability mechanisms, and assessment by an independent assessor before a worker is considered certified - would convert the existing practice into a productive, scalable, and certifiable channel. This is aligned with the RPL framework and should be treated as the dominant skilling strategy for the existing workforce, with structured off-site training as a supplementary component.

7.6 Risk Perception and Health-Related Concerns:

The physical hazards of shipyard work - confined space entry, work at height, hot work in restricted areas, exposure to asbestos and other hazardous materials, heavy lifting, and noise - contribute directly to risk perception problems in workforce recruitment and retention. Workers and their families are aware of the injury and health risks, and for many, this perception shifts preference toward other employment options.

In ship recycling, this concern is acute. Gas cutters, for example, work with cutting equipment in close proximity to residual fuel, gas pockets, and toxic material-laden structures. Safety personnel at recycling facilities identified lack of safety training awareness as a systemic problem, and the requirement for certified safety workers under HKC compliance adds a formal regulatory dimension to what is also a basic occupational health imperative.

Addressing risk perception requires both real improvement in safety standards - through better equipment, trained safety stewards, and enforced permit-to-work systems - and a communication strategy that helps prospective workers and their families understand the steps taken to manage risk. Training programs should include comprehensive safety orientation at induction, with refresher requirements built into the certification renewal cycle.

7.7 HVAC Training - A Specific and Unmet Need:

The Sub-Committee received specific inputs regarding HVAC (Heating, Ventilation, and Air Conditioning) training for shipboard systems. HVAC duct fitting is a distinct trade with specific requirements - vibration-resistant duct mounting, fire-damper installation, humidity control in marine environments - that differ substantially from building services HVAC work. Yet HVAC training as delivered through general NSDC-aligned programs does not currently cover the shipboard variant in any systematic way.

At GRSE, contract workers include a specific category of HVAC duct fitters (24 workers reported, with a further requirement of 30 per year identified). At HSL, HVAC technicians show as zero across all categories - permanent, contract, and apprentice - despite being operationally necessary. This specific gap, small in numerical terms but significant in operational impact, is a candidate for a targeted short-term course to be designed and offered through CEMS or a regional training provider with shipyard partnership.

7.8 Special Needs for the Electrical Trade:

The electrical trade in shipyards carries requirements that go well beyond the competencies tested in a standard ITI wireman or electrician program. Marine electrical systems operate at higher voltages in damp and corrosive environments, require specific cable jointing and earthing techniques, and are subject to classification society standards (such as IEC 60092) that are not part of any standard ITI curriculum.

CSL reported a dearth of candidates in Electronic Mechanic and Instrument Mechanic trades specifically. GRSE's contract workforce shows 270 electricians with a further annual requirement of 50 - indicating both the volume of the need and the continuing reliance on workers who are likely not trained to the marine standard. A dedicated marine electrical and electronics module, developed in collaboration with classification societies and offered as a post-ITI bridging certification, is a specific recommendation of the Sub-Committee.

7.9 Skilled Worker Availability from Kerala and Tamil Nadu:

During consultations, multiple respondents noted that the most reliable supply of skilled and trainable workers comes from Kerala and Tamil Nadu. Both states

have a tradition of technical training through well-functioning ITI and polytechnic networks, a cultural familiarity with maritime employment (particularly in Kerala, where a significant seafaring diaspora exists), and a demonstrated willingness among workers to migrate to shipyard locations for work.

CSL's apprenticeship program draws significantly on ASAP (Additional Skill Acquisition Program, Kerala) trainees, and the VHSE (Vocational Higher Secondary Education) stream in Kerala produces a number of candidates each year who are relevant to shipyard trades. Tamil Nadu's network of government polytechnics and ITIs similarly provides a pipeline, particularly in the mechanical and electrical trades.

This geographic pattern has implications for training location strategy. Establishing additional training delivery capacity in or near these states - or developing robust referral mechanisms between Kerala and Tamil Nadu training institutions and shipyards elsewhere in India - would leverage existing supply chains. Equally, the ship repair clusters proposed for Kochi and Chennai under MAKV 2047 align geographically with this workforce availability pattern, reinforcing the rationale for those cluster investments.

7.10 Professor of Practice - An Under-utilized Asset:

MAKV 2047 explicitly proposes reducing the lead time to professorship for mariners with Master (FG)/MEO Class I certifications and providing 'Professor of Practice' roles for senior maritime professionals. This is a well-conceived idea that the Sub-Committee endorses and extends to the shipbuilding context.

Experienced shipyard supervisors, retired production engineers from public sector yards, and senior managers from classification societies represent a reservoir of practical knowledge that is currently not captured in any institutional training program. Many of these individuals are available - post-retirement or on part-time terms - at compensation levels that training institutions can sustain. Their contribution is not primarily in delivering standardized curriculum but in teaching the tacit, contextual, problem-solving knowledge that separates a competent worker from an exceptional one.

A formal 'Professor of Practice' appointment mechanism, with eligibility criteria defined by MoPSW in consultation with AICTE or NCVET, a simplified application process, and reasonable honoraria arrangements, would unlock this resource. The scheme should be trialed at CEMS and at the proposed Centers of Excellence before being extended to other institutions.

7.11 Training Location Aggregation and Cluster-Wise Availability:

The geographic dispersion of shipyards, combined with the high cost of maintaining in-house training infrastructure at every facility, argues strongly for a cluster-based approach to training delivery. Under this model, training facilities are established at or near major shipyard clusters - Kochi, Mumbai, Visakhapatnam, Kolkata, Chennai, Alang - and serve multiple yards within accessible distance.

Some respondents requested structured training opportunities at Indian Naval institutions reflects a related logic: where specialized training infrastructure already exists within a geographic area, access for civilian industry trainees can be arranged through formal protocols, without requiring each yard to duplicate that infrastructure. Respondents have requested Government support for establishment of dedicated shipbuilding training institutes, explicitly seeking to leverage the cluster being developed in Kochi.

Yards operating in remote locations noted the challenge of retaining workers and suggested in retaining workers and suggested the establishment of centralized and regional databases of skilled manpower and online learning platforms with industry-contact components. Both suggestions point toward the same underlying need: a shared infrastructure that no single yard can afford to build independently, but that a cluster or a government-supported institution could provide efficiently.

7.12 Ministry of Skill Development - DG Training and the Need for MSDE Coordination:

A specific and important recommendation that emerged from consultations is the need for active coordination between MoPSW and the Ministry of Skill Development and Entrepreneurship (MSDE), particularly the Directorate General of Training (DGT) under MSDE.

DGT administers the ITI and apprenticeship frameworks, and any systemic change to curriculum, QP recognition, or trainer certification must pass through DGT's mandate. Yet the maritime and shipbuilding sector's specific training needs are not well-represented in DGT's standard processes, which tend to reflect the priorities of larger-volume sectors. A formal engagement - an MoU or standing coordination mechanism - between MoPSW and DGT would help ensure that shipyard-specific training needs are captured in curriculum revision cycles, that trades like marine rigger and HVAC duct fitter are recognized as distinct occupations, and that ITI and polytechnic programs in coastal states receive guidance to develop relevant electives.

This inter-ministerial coordination is not optional; it is structurally necessary if the skilling goals of MAKV 2047 are to be achieved through the national training system rather than through a parallel, sector-specific apparatus that will inevitably remain smaller and more fragile.

7.13 Cultural Change in Approaching Skilling:

Underlying many of the specific observations reported above is a more fundamental point about organizational culture. Training is frequently treated - by employers and workers alike - as a compliance activity rather than a value-creating investment. Yards train workers to meet minimum standards required for deployment or for regulatory inspection, but rarely go beyond that baseline unless competitive pressure demands it.

Changing this requires leadership from the top of yard management, supported by a policy environment that rewards training investment. Positive incentives - tax credits for training expenditure, preferential treatment in Government procurement for yards with certified training programs, recognition schemes for training excellence - would help shift the cultural calculus in favor of deeper, more consistent investment in workforce development.

7.14 NSDC Sector Skilling - Gaps and the Path Forward:

The sector skilling framework under NSDC has potential that remains substantially unrealized in the maritime context. The framework exists, the Sector Skill Council for the relevant domain is constituted, and the NSQF provides the qualifications architecture. What is missing is the sustained engagement between

SSC, industry, and training providers that would generate a living, updated set of standards reflecting how the industry actually works.

Respondents suggested collaboration with IITs and defence training institutes, a centralized skill database with career guidance integration, and dedicated training centers with structured RPL. Each of these suggestions is sound individually. What they collectively point to is the need for the SSC to act less as a standards-setting body and more as an active development organization - identifying gaps in real time, commissioning training content, certifying providers, and publishing labor market intelligence that helps workers understand the value of credentials and helps training institutions understand what the industry needs.

7.15 Training Infrastructure and Equipment Requirements:

Building a skilled maritime workforce is not just about curriculum and policy - it requires the right physical infrastructure and tools. A training environment that mirrors the actual shipyard floor is the single most effective way to reduce the conversion time between a trained candidate and a productive worker. Based on industry data and international benchmarks, the following infrastructure framework can be explored:

Training Area	Minimum Equipment Recommended
Welding Training	Welding booths; MIG, TIG, SMAW, FCAW stations; robotic/cobot welding unit for demonstration and practice
CNC & Machining	CNC machines (mix of mills and lathes); CAD/CAM workstations
Pipe Fitting	Dedicated pipe fabrication bays; hydraulic pipe bending equipment; pipe welding simulation stations
NDT / QA-QC	Ultrasonic testing equipment; radiographic testing setup; magnetic particle and dye penetrant testing kits; CSWIP/IIW-aligned certification equipment
Electrical / Electronics	Marine switchboard simulation panels; electrical fault-finding trainers; PLC and automation trainer kits, HVAC training equipment's
Safety Training	Enclosed space entry simulator; fire-fighting training equipment; first aid and casualty handling bay; PPE inventory
Digital / Industry 4.0	Computer lab with 3D CAD/modelling software (CATIA, AVEVA, AutoCAD); digital twin simulation stations; IoT demonstration kits

Rigging & Crane Operations	Rigging and lifting gear; load-testing apparatus; crane simulator (desktop-based as minimum)
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Table 4: Equipment’s / Infrastructure to be considered

Funding may be explored through the Maritime Development Fund (MDF - Rs 25,000 crore) and Shipbuilding Development Scheme (SbDS - Rs 19,989 crore) approved in September 2025.

A PPP model is suggested: government provides land and civil infrastructure; yards and industry associations contribute equipment and trainers; NSDC provides certification linkage. Equipment procurement may be coordinated centrally for cost efficiency, and distributed across training hubs and institutes.

Existing in-house training facilities at major public sector yards may serve as the design benchmark. The most comprehensive of these include 12 welding booths, CNC workshops, CBT labs, and safety training bays - is the most comprehensive domestic model available.

7.16 National Maritime Workforce Database:

Building a National Maritime Intelligence Platform:

One of the most frequently cited hiring challenges across all responding yards is simply this: there is no way to find out who is available, where they are, and what they are certified in. Yards recruit through informal networks, word of mouth, and contractor relationships. This is inefficient, opaque, and structurally hostile to skill portability and worker mobility.

What Other Countries have built?

South Korea - HRD Korea / Employment24: South Korea's Human Resources Development Service (HRD Korea) operates a national employment and skills platform that integrates vocational training records, certification data, employment history, and job vacancy matching into a single digital system. The platform, recently rebranded as 'Employment24', consolidates HRD-Net, WorkNet, and Employment Insurance into one interface. It is rated by the OECD as one of the best HRD platforms in the world.

Singapore - MPA Seafarer Database: The Maritime & Port Authority of Singapore (MPA) maintains a centralised registry of all certified seafarers and shore-based maritime workers, integrated with the national SkillsFuture framework and the Seafarers Skills Upgrading, Certification and Accreditation (SSCA) system. Every certification - from Certificate of Competency to trade-level credentials - is recorded, verifiable, and accessible to employers.

Philippines - Philippine Maritime Workforce Portal (PMWP): The National Maritime Polytechnic (NMP) launched the PMWP in July 2025 - a centralized platform tracking skilled worker availability, certification status, training programme data, and policy indicators for the maritime sector. It was designed to transform maritime policymaking and boost the welfare of Filipino seafarers and fishermen through evidence-based policy.

What India needs to build is a National Maritime Workforce Intelligence Platform - a centralized, publicly accessible digital registry with the features such as Worker Profile, Certification Records, Employment History, Vacancy Board, Training Program Directory, Analytics Dashboard etc.

7.17 Recognition of Prior Learning - The Subcontractor Cost Problem:

A structural problem with RPL has been flagged that likely extends across the sector: subcontractor vendors: subcontractor vendors are not bearing the cost of RPL certification for their workers because they did not budget for it at the time of bidding. This is not a question of willingness - it is a contractual and financial architecture problem. When a subcontractor bids for a shipyard contract, there is no line item for RPL certification. Requiring them to fund it retroactively creates genuine commercial friction.

A practical solution worth exploring: MoPSW may consider issuing a standard clause for all government shipyard subcontracting tenders requiring vendors to include RPL certification costs as a quoted line item. This normalizes the cost upfront rather than imposing it as an afterthought. Additionally, the Government's PMKVY 4.0 framework funds RPL certification - subcontractors working at government yards may be guided to access this funding stream, reducing the out-of-pocket cost to near zero.

7.18 Women in Maritime - Widening the Talent Pool:

While India has achieved a significant milestone in maritime gender inclusion - evidenced by a remarkable 739% surge in registered women seafarers from 1,699 in 2015 to 14,255 in 2024 - true sector-wide progress requires a more holistic approach. Building a comprehensive, highly skilled maritime workforce cannot be achieved if gender inclusion remains confined to the sea; it must be equally prioritized across the nation's shipyards, repair facilities, and industrial shore-based operations. Women represent an underutilized and largely untapped resource in India's shipbuilding, ship repair, and ship recycling sector. While the physical and operational nature of shipyard work has historically shaped perceptions of it as a male domain, a wide range of roles are equally accessible for women. Beyond the yards themselves, communities surrounding major shipbuilding and recycling clusters are home to women with varying levels of education and strong motivation to participate in formal economic activity. Integrating women into the maritime skilling roadmap is not simply a matter of social inclusion - it is a strategic necessity. At the scale of workforce addition that MAKV 2047 demands, India cannot afford to leave this talent pool untapped. The skilling ecosystem - training centers, curricula, infrastructure, and institutional culture - must be designed with inclusion as a default, not an afterthought.

7.19 Building Ship Design Capability:

Ship design is the intellectual foundation of shipbuilding - and it is the one capability where India's gap is most consequential. Without indigenous concept and basic design capability, India will remain a manufacturer of ships designed elsewhere, capturing production value but not design value. The industry has clearly articulated this concern, and the data supports it: concept design alone accounts for approximately 35% of total ship design effort and demands experienced experts across naval architecture, hydrodynamics, structural engineering, power systems, and statutory compliance - a combination that India currently cannot meet at the scale that MAKV 2047 ambitions demand.

Existing frameworks - the recently established India Ship Technology Centre (ISTC) at Visakhapatnam - are welcome steps, but the ship design function within these structures is bundled with broader mandates. A dedicated institutional response, focused exclusively on building, sustaining, and advancing India's ship design capability across all three levels - Concept Design, Basic Design, and Production Design - is what the sector needs.

Indian Institute of Ship Design:

It is in this context that a proposal for the establishment of a dedicated National/Indian Institute of Ship Design deserves serious policy consideration. The proposed institute could serve as the national centre for ship design knowledge, research, skill gap identification, collaborative design projects, and expert consultancy to shipyards, ship owners, and designers. It would maintain a living database of available design expertise across organisations, identify gaps against current and future project requirements, and develop targeted programmes - training, internships, seminars, and collaborative projects - to close those gaps systematically.

7.20 Traditional Wooden Shipbuilding & Coastal Sailing Sector:

The traditional, non-mechanized, and semi-mechanized sailing vessel (dhow) segment represents a vital, historic component of India's coastal and EXIM trade, predominantly operating across the Arabian Sea to West Asia and the East African coast. The sector comprises an active fleet of approximately 400–450 traditional wooden vessels.

The workforce demonstrates a high degree of multi-skilling and continuous, year-round employment. During the off-season (May–June to September), sailing crews are absorbed directly into yard-based repair and maintenance activities. The estimated workforce footprint includes:

- **Direct Shipbuilding & Shore Activities:** 4,000–4,500 individuals concentrated across key clusters in Gujarat (specifically Salaya, Veraval, Kutch, Porbandar, Mandvi, Sikka, and Mundra), Kerala, and Tamil Nadu.
- **Sailing & Operational Fleet Crew:** Approximately 15,000–20,000 persons, with individual vessels typically employing a multi-tasking crew of about 20 seafarers.

Traditional Knowledge Transmission and Profile:

Knowledge and skills within this sector are transmitted strictly through an informal, hereditary Guru-Shishya (master-disciple) model. Shipwrights design and construct complex wooden vessels mentally without formal engineering drawings, utilizing localized techniques that vary significantly by region. While the younger generation remains highly engaged in preserving this family tradition, the workforce is largely non-formally educated, lacks academic

orientation, and operates entirely without a structured, written curriculum or technical documentation.

Skilling Requirements of the Traditional Shipbuilding Sector:

Standard classroom-based academic programs, Recognition of Prior Learning (RPL), and ITI-based certifications are mismatched with the needs of this specialized, non-formal workforce. To optimize capabilities in alignment with modern operational demands - following the progressive mechanization of the fleet since the 1980s - the sector requires targeted, practical capacity building.

Key Technical Capacities Required:

- Propulsion & Engine Selection: Guidance on determining required power relative to vessel size, and selecting appropriate engine types optimized for specific routes.
- Marine Engineering Integration: Hands-on training for prescribing suitable propeller pitch and establishing best practices for engine installation/integration within traditional wooden hulls.

Finally, structured initiative to document and archive traditional wooden shipbuilding, sailing practices, and socio-economic frameworks will preserve heritage and inform future policy.

CHAPTER VIII: NATIONAL AND GLOBAL BEST PRACTICES

8.1 International Reference Points:

South Korea's shipbuilding sector has built its global leadership substantially on the back of a tightly integrated skills ecosystem. The Human Resources Development Service of Korea (HRD Korea) administers a national competency standards system that covers shipbuilding trades at a level of granularity and currency that has no equivalent in India. Welding standards, for instance, are tested against the actual weld quality requirements for specific vessel types, rather than generic industrial benchmarks. The result is that a certified Korean shipyard welder is immediately deployable to the same standard across different yards, which enables the labor market to function efficiently.

In **Germany**, the dual system of vocational education - where classroom instruction and on-the-job training are formally combined over a three-year apprenticeship - has maintained a supply of highly competent maritime tradespeople for yards in Hamburg and on the North Sea coast. The dual system works because it is jointly governed by industry and the state, with employers bearing a significant share of the training cost because they have confidence that the resulting qualification is genuinely valuable.

Bangladesh's ship recycling sector, which competes directly with Alang, has made significant progress in safety and compliance training under the HKC framework, driven partly by international buyer pressure. Its experience demonstrates that compliance-driven skill upgrading is achievable relatively quickly when the commercial incentive is sufficiently strong - a dynamic that India should be positioned to replicate, rather than compete against, in the recycling segment.

8.2 Domestic Best Practices:

Within India, CSL's apprenticeship program - with over 600 apprentices engaged annually across multiple categories, a dedicated in-house training facility with welding booths, electrical labs, fitting workshops, and a computer-based training centre - represents the most developed example of integrated workforce development in the sector. Its model of maintaining dedicated training infrastructure, absorbing a proportion of apprentices into the permanent or long-

term contract workforce, and supporting trainees through ASAP and ITI referral channels is one that can serve as a template for the sector.

GSL's practice of requesting formal training access to Indian Naval specialized institutions for its technical officers' points toward a model of public-public collaboration in training delivery that has cost-efficiency advantages and leverages existing high-quality infrastructure.

The **RPL framework** for the recycling sector, where workers with demonstrated work experience can obtain formal certification against national standards without undergoing a full training program, is a valuable mechanism that remains underutilized. At one recycling facility alone, 75 experienced workers were identified as needing RPL certification across six trades - illustrating the scale of the opportunity sector-wide. Scaling this across Alang's broader workforce would rapidly expand the number of formally certified workers in the recycling sector without requiring the capital investment of new training infrastructure.

CHAPTER IX: SUGGESTED POLICIES

Based on the evidence gathered through the data collection exercise and stakeholder consultations, the Sub-Committee proposes the following policy directions. These are framed as suggestions for the Government's consideration and are intended to be refined through further stakeholder engagement before formal adoption.

- Consideration may be given to establishing a dedicated Maritime and Shipbuilding Sector Skill Council under NSDC - or, as an interim measure pending formal SSC constitution, to formalizing a Joint Maritime Skills Sub-Committee comprising nominated representatives of LSC and SMSSC, convened and chaired by MoPSW. Such a body could be assigned a clear mandate over QP development, NOS revision, and assessor certification for shipbuilding, ship repair, and ship recycling trades. The current administrative split between LSC and SMSSC, while logical at the time of their constitution, may not adequately serve an industry of the scale and specificity demanded by MAKV 2047. A consolidated institutional voice - whether as a new SSC or a formally chartered sub-committee - would serve as a foundational precondition for coherent, industry-responsive standard-setting.
- NCVET-certified Qualification Packs for all critical shipyard trades that currently lack formal coverage may be developed and fast-tracked - including Marine Rigger, HVAC Duct Fitter (Marine), EOT Crane Operator (Shipyard), Marine Electrician, Instrument Mechanic (Marine), and Scaffolder (Shipyard). It is suggested that the designated SSC or sub-committee engage directly with at least five major yards through the development process, so that the resulting standards reflect operational realities rather than notional trade descriptions.
- A formal coordination mechanism between MoPSW and the Directorate General of Training (MSDE) may be considered - preferably formalised through an MoU with defined deliverables and a review calendar - to systematically integrate shipbuilding and maritime sector needs into ITI curriculum revision cycles, NCVT assessment reforms, and trainer certification programs. Such a mechanism would help ensure that national

vocational training policy is meaningfully responsive to one of India's most strategically significant industrial sectors.

- Beyond the operationalization of CEMS, it may be worthwhile to consider establishing at least three additional regional maritime skilling hubs - situated at or near Visakhapatnam, Alang-Bhavnagar, and the Kolkata–Diamond Harbor belt - to ensure that geographic coverage of quality maritime training infrastructure is broadly commensurate with the distribution of yards and workforce across the country.
- A formalized 'Professor of Practice' appointment framework - with clearly defined eligibility criteria, simplified administrative processes, and competitive honoraria - may be considered for trial at CEMS before being extended progressively to all maritime training institutions. This mechanism would draw on the deep domain expertise of retired shipyard professionals, classification society surveyors, and senior mariners, and convert that experience into a sustained institutional training asset.
- Structured on-the-job training, supported by standardized competency checklists and independent third-party assessment, may be encouraged as the minimum training standard for all yards employing more than 200 contract or hired workers. MoPSW could usefully develop and circulate a model OJT framework to assist yards - particularly smaller private yards - in implementing this in a practical and cost-effective manner.
- A large-scale RPL campaign for the ship recycling sector may be operationalized, targeting the substantial existing workforce at the Alang and Kolkata breaking yards, with certification structured against HKC-relevant occupational standards. Such a campaign would not only formalize the competencies of thousands of experienced workers but would also position Indian recycling yards more competitively for compliant business from international clients operating under Hong Kong Convention requirements.
- Financial incentives for private sector yards that demonstrate certified training programs may be explored - such incentives would help shift the cost-benefit calculus for private yards toward sustained investment in structured

workforce development. Competitive wages, performance-based bonuses, and comprehensive benefits including health insurance, retirement plans, and family leave are consistently cited as the most effective retention levers in the maritime sector. Long-term service bonuses, in particular, can foster loyalty by rewarding workers who stay.

- An industry-academia collaboration framework may be developed that brings major public sector shipyards into structured formal partnerships with IMU, IITs in coastal states, and state polytechnic systems - with defined jointly-run programs, infrastructure-sharing arrangements, and faculty exchange mechanisms. This would help close the gap between academic curricula and yard-floor realities, while also expanding the research and innovation capacity of participating institutions.
- A dedicated marine HVAC module may be designed and delivered through CEMS and its regional training partners, specifically addressing the skills gap in this area that was explicitly identified through the data template submissions received from industry during Phase 2 of this exercise. Its inclusion in the CEMS curriculum would also signal the institution's responsiveness to granular industry feedback.
- A dedicated Green and Future Technologies Maritime Skilling Program - time-bound and supported by MSDE - may be considered, covering electric propulsion systems, alternative marine fuels (LNG, methanol, ammonia, and hydrogen/fuel cell technologies), autonomous and unmanned vessel operations, digital twin technology, and IoT-based ship systems. This program could be structured as a post-diploma or post-ITI short course, delivered through CEMS and the proposed regional maritime skilling hubs, and developed in partnership with classification societies, propulsion OEMs, and relevant public sector yards. The MAKV 2047 mandate for a Marine Fuel and Lubricant Research Laboratory and an Advanced Nautical Studies Centre may appropriately be treated as the institutional backbone for this programme, ensuring alignment between infrastructure investment and training outcomes.

- A centralized online labor market intelligence platform may be developed and hosted by MoPSW or a designated agency, designed to track skilled worker availability by trade and location, live vacancy positions at participating yards, and training program availability across the country. Making this platform accessible simultaneously to job-seekers, yards, and training providers would significantly improve market transparency, reduce hiring friction, and enable more responsive planning - both at the yard level and at the national policy level.

CHAPTER X: FINAL POLICY RECOMMENDATIONS TO THE GOVERNMENT TO ACHIEVE MAKV 2047 GOALS

The Sub-Committee presents the following as its formal policy recommendations, grounded in the data and deliberations described in this report and oriented toward the achievement of MAKV 2047's skilling targets. These recommendations are structured as a phased roadmap.

10.1 Immediate Priorities (2026–2029):

The Sub-Committee regards the following as requiring action within the current planning cycle, given that they address structural bottlenecks whose effects are already visible in the data:

- It is recommended that the Directorate General of Training (DGT) consider recognizing marine-specific variants of existing trade categories - such as electrician, welder, and fitter - as distinct sub-specializations within the NCVT framework, thereby enabling ITIs located near shipbuilding clusters to offer marine-contextual modules as part of their trade curriculum.
- A structured RPL campaign at Alang may be initiated through the existing NSDC infrastructure, with an initial target of certifying a minimum of 2,000 workers to HKC-compliant standards in the first cycle - building on the momentum of the Hong Kong Convention entered into force in June 2025.
- The 'Professor of Practice' mechanism at CEMS could be operationalized in a phased manner, beginning with appointments drawn from retired public-sector shipyard professionals and Class I marine engineers, whose domain expertise would directly enrich the quality and industry-relevance of training delivered.
- A structured bilateral coordination mechanism between MoPSW and DGT (MSDE) may be considered to align maritime skilling priorities with vocational training policy - ensuring that shipbuilding and ship recycling workforce needs are consistently reflected in national skill development planning cycles.
- It is suggested that MSDE consider consolidating the mandate for maritime and shipbuilding occupational standards under either a newly constituted Maritime Sector Skill Council or a standing Joint Sub-Committee of LSC and SMSSC, chaired by MoPSW - with a clear, time-bound charter to

complete Qualification Pack development for priority trades in a structured and accountable manner.

10.2 Medium-Term Actions (2029–2035):

- Regional maritime skilling hubs at Visakhapatnam, Alang/Bhavnagar, and Kolkata/Haldia may be considered for establishment, each equipped with dedicated infrastructure covering welding, pipe fitting, electrical/electronics, safety, and CNC/digital skills. Funding for such hubs could appropriately be explored through the Maritime Development Fund, with additional financing avenues - including State Government contributions, CSR, and PPP models - examined in parallel.
- It is suggested that CEMS capacity be progressively scaled to accommodate larger number of trainees per year across all programs, with lab based - curriculum modules updated to reflect Industry 4.0 requirements including IoT, robotics, 3D modelling, and digital twin technologies - ensuring that the Centre remains responsive to the evolving needs of the shipbuilding sector.
- Green and autonomous vessel skills may be systematically mainstreamed across all maritime ITI electives and CEMS programs in a phased manner, with the longer-term objective of meeting domestic industry demand for fuel cell engineers, unmanned vessel technicians, and green propulsion specialists through a robust domestic training pipeline - and, over time, positioning India to export certified green maritime skills to regional markets.
- A national-level Shipyard Apprenticeship Program under the National Apprenticeship Promotion Scheme may be considered, with structured outreach extended to private yards that have historically had limited participation. A Government-subsidized cost-sharing model could be explored specifically for yards employing fewer than 500 direct workers, reducing the financial barrier to apprenticeship uptake at smaller facilities.
- A MAKV 2047 Skilling Dashboard - updated on an annual basis - may be developed to enable systematic tracking of progress against workforce targets, disaggregated by trade, segment (shipbuilding, ship repair, and ship recycling), and state. Such a dashboard would provide a transparent, evidence-based tool for policy review and course correction.
- Establishment of the National/Indian Institute of Ship Design - To bridge India's strategic gap in Ship Design, a proposal to establish the

National/Indian Institute of Ship Design can be considered. Given its technical depth, established credibility and expertise, the Indian Register of Shipping (IRS) is uniquely positioned to guide and support this initiative.

10.3 Long-Term Vision (2035–2047):

By 2047, India should have a maritime workforce ecosystem with the following characteristics: a self-sustaining, industry-funded Centre of Excellence in each major shipyard cluster; a universally recognized, NSQF-aligned credential for every major shipyard trade; a competitive domestic wage structure supported by productivity gains derived from automation-enabled workers; an internationally portable qualification that enables Indian maritime workers to command premium rates in global markets while retaining the option of contributing to India's own growth; and a research-to-practice pipeline that continuously translates emerging vessel technology into relevant training content.

Strengthen Foundations: A skilled maritime workforce begins long before a worker sets foot in a shipyard. It is suggested that shipbuilding clusters be supported with reliable vocational schools and accessible primary healthcare facilities in their immediate vicinity - ensuring that the workforce pipeline is not only technically trained but also physically and mentally healthy. A worker who has access to quality education for their children and basic healthcare for their family is far more likely to stay, perform, and grow within the sector.

Cross-Border Knowledge Transfer: Established shipbuilding nations such as Japan and South Korea have decades of experience and institutional knowledge that India can learn from and adapt. It is suggested that formal international partnerships be explored with these nations, anchored by structured Train the Trainer (ToT) programs that bring global best practices directly into Indian training institutions and shipyard floors. This would accelerate the quality of training delivery without waiting for a domestic trainer ecosystem to mature organically.

Dedicated Institutes for Degree & Diploma Programs: To build depth in the maritime talent pipeline, it is suggested that universities and polytechnics introduce or strengthen focused technical education programs - both degree and diploma level - specifically oriented toward shipbuilding and ship repair. These

programs should develop competencies for roles that are currently in short supply, including Naval Architects, Engineering System Designers, Electrical Designers, AI Engineers, Dock Masters, Health and Safety Engineers, Automation Engineers, and Project Managers. Embedding these programs within or adjacent to shipbuilding clusters would further strengthen the industry-academia connect.

Achieving this requires sustained commitment over a generation - not a single policy announcement, but a series of carefully monitored, regularly reviewed, and consistently resourced actions by Government, industry, and the training system working in genuine alignment.

The Sub-Committee trusts that this report provides a credible basis for that journey to begin in earnest.

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Table 2: Workforce Baseline – Data from responding shipyard

Table 3: Trade-wise skill gap analysis

Table 4: Equipment Infrastructure to be considered

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Annexure A - List of Stakeholders Who Submitted Data:

The following organizations submitted data in response to the Sub-Committee's template:

- Goa Shipyard Limited (GSL), Vasco Da Gama, Goa
- Titagarh Rail Systems Limited - Shipbuilding Division, Falta, West Bengal
- Hindustan Shipyard Limited (HSL), Visakhapatnam, Andhra Pradesh
- Cochin Shipyard Limited (CSL), Kochi, Kerala (with units at Mumbai, Kolkata, Port Blair, Howrah, and Udupi)
- Shoft Shipyard, Bharuch, Gujarat
- Jaliyan Sustainable Ship Recycling Pvt. Ltd., Alang, Gujarat
- Garden Reach Shipbuilders and Engineers Limited (GRSE), Kolkata, West Bengal
- Sagar Laxmi Ship Breakers, Alang, Gujarat

Annexure B - Emerging Skills Identified by Respondents:

Skill Domain	Reported by	Priority Level
Robotics & Automation	HSL, CSL, Shoft Shipyard, Titagarh	High
3D Modelling / CAD (CATIA)	HSL, CSL, Shoft Shipyard	High
Laser Cutting & Advanced Welding	Shoft Shipyard, GSL	High
Digital Twin / IoT / Sensors	HSL, CSL	Medium
CNC & Advanced Machining	HSL, Shoft Shipyard	Medium
AI Integration / Ship Design Automation	Titagarh	Medium
Electric Propulsion / Fuel Cell Engineering	Titagarh, Shoft Shipyard	Medium
Green Shipbuilding Techniques	HSL, CSL	High
Hazardous Material / Environmental Mgmt.	Sagar Laxmi, Jaliyan	High (Recycling)
Digital Documentation / IHM Compliance	Sagar Laxmi	High (Recycling)

Annexure C - RPL Requirements Identified by Respondents:

Organization	RPL Requirement
GSL	NIL - all workers already hold relevant certifications
Titagarh	Not specified
HSL	Not specified in response
CSL	Trades like Fitter, Sheet Metal Worker, Pipe Fitter, Welder, and Electrician need ITI certification. Rigger, Scaffolder, and Fork Lift Operator currently have no applicable QP.
Shoft Shipyard	Required for Fitting, Welding and Grinding trades. Progressive OJT-based certification is being used in-house.
Jaliyan	2 workers in the Recycling trade require RPL certification
GRSE	Not specified
Sagar Laxmi Ship Breakers	Gas Cutters: 30; Fitters/Fabricators: 2; Electricians: 2; Crane/Equipment Operators: 6; Safety Personnel: 5; Helpers/General Workers: 30. Total: 75 workers requiring RPL certification.

Annexure D - Training and Apprenticeship Capacity of Responding Yards:

Yard	In-House Facility	Annual Capacity	Apprentices / Year	Government Support Requested
GSL	Yes	~150	~150	Access to naval specialized training institutes for officers
Titagarh	No	-	-	Curriculum alignment, practical training, industry exposure, joint certification
HSL	Yes	160	160	Land and infrastructure funding for skill development facilities
CSL	Yes	615+ p.a.	615+ (ITI, Degree, Diploma, VHSE, Rigger)	Dedicated shipbuilding training institutes; academia-industry collaboration; centralized talent pool database
Shoft Shipyard	Yes	600	~22 (on suitability)	Industry-aligned curriculum; centralized skill database; remote online learning; 5-year service bonds
Jaliyan	Yes	~200/year	~200	Better infrastructure, accommodation, food, recreation
GRSE	Yes	~200	~160-200	Land and infrastructure funding for dedicated shipbuilding training institutes at Kolkata
Sagar Laxmi	Yes	80–100/year	10–15 (OJT)	Financial support, certified trainers, structured modules, RPL support

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- ✓ National Skill Development Corporation (NSDC), <https://nsdcindia.org/>

Note: NSB Sub-Committee 11 - Industry Data Submissions (2026), collected through structured data template exercise conducted by Subcommittee 11. [Primary source: responses received from GRSE, GSL, HSL, CSL, Shoft Shipyard, Titagarh, Jaliyan, and Sagar Laxmi Ship Breakers]

PART XIII

Sub-Committee Report No. 12

Sub-Committee No. 12

Title:

**To prepare a roadmap for development of Regional Maritime
Hub and Maritime Linkages with the Neighbourhood to achieve
MAKV-2047 Goals**

Chairperson: Shri Shantanu Kalita

This Sub-Committee is still undergoing extensive Stakeholders' consultations and its recommendations will be submitted in due course of time.

PART XIV
Sub-Committee Report No. 13

Sub-Committee No. 13

Title:

Roadmap for Emerging Technologies like Autonomous Vessels, Advanced Navigation and Engine Systems, Alternate Fuels and Propulsion Technologies (incl. Nuclear), Green Technologies, Climate Adaptation & Mitigation Strategies to achieve MAKV-2047 Goals

Chairperson: Shri Arun Sharma

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PREFACE BY THE CHAIRMAN OF THE SUB-COMMITTEE



Arun Sharma Executive Chairman IRS

The global maritime industry is in a major transition as it moves towards increased autonomy, adoption of smart technologies, advanced navigation systems and use of alternative fuels/technologies which reduce or eliminate greenhouse gas emissions.

The IMO has adopted a voluntary MASS Code to facilitate safety of autonomous ship technology and also approved interim guidelines on fuels such as Methanol, Ammonia, LPG, Hydrogen and Fuel Cell Technology. In line with international developments. India has also set national ambitions to become net-zero by 2070 while also promulgating specific schemes for the maritime industry such as Maritime India Vision 2030 and Maritime Amrit Kaal Vision 2047. These initiatives will undoubtedly influence the global shipping industry including the shipbuilding and manufacturing industries as well as development of the next generation maritime workforce.

While the autonomous and green shipping initiatives by IMO and the global maritime industry moves ahead, it is imperative that India ensure that it not only moves ahead to adopt the new technologies but also gears up to leverage its rich and varied maritime expertise to navigate this transition successfully with a view to emerging as a global maritime leader.

The present report discusses the key nuances involved in the domains of autonomous, advanced navigation systems and green shipping taking into account the latest developments. Discussions with Indian maritime stakeholders

have revealed key aspects to be addressed. Based upon the inputs from stakeholders, policies to be considered by the MoPSW have been identified. The report while taking into consideration various aspects including global developments and Indian stakeholders inputs present a roadmap for consideration which aims to ensure readiness of the Indian Maritime Industry to successfully prepare for the new emerging technologies in time.

I would like to wholeheartedly offer my thanks to the members of the sub-committee for their contributions and insights for developing this report whilst working on a tight schedule.

Arun Sharma
Chairman Sub-Committee on Emerging Technologies & Alternate Fuels
National Shipping Board

ACKNOWLEDGEMENTS

The Sub-Committee wishes to thank all shipyards, designers, training institutes, port authorities and ship owners that submitted data and participated in consultations.

The Sub-Committee also acknowledges the guidance provided by the National Shipping Board Secretariat and the Ministry of Ports, Shipping and Waterways.

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LIST OF ABBREVIATIONS

Abbreviation	Full Form
ACCL	Accurate Control Limited
AIS	Automatic Identification System
BEL	Bharat Electronics Limited
CPA	Cochin Port Authority
CSL	Cochin Shipyard Limited
DPA	Deendayal Port Authority
FAL	Facilitation Committee
GHG	Greenhouse gas
GRSE	Garden Reach Shipbuilders and Engineers Limited
GTTP	Green Tug Transition Programme
HSL	Hindustan Shipyard Limited
IACS	International Association of Classification Societies
IALA	International Association of Marine Aids to Navigation and Lighthouse Authorities
IMO	International Maritime Organization
IMU	Indian Maritime University
INSA	Indian National Shipowners Association
IRS	Indian Register of Shipping
JNPA	Jawaharlal Nehru Port Authority
LNG	Liquefied Natural Gas
LPG	Liquefied Petroleum Gas
MAKV 2047	Maritime Amrit Kaal Vision 2047
MASS	Maritime Autonomous Surface Ship
MDL	Mazgaon Dock Limited

MKC	Maritime Knowledge Cluster
MoPSW	Ministry of Ports, Shipping and Waterways
MPA	Mormugao Port Authority
MSC	Maritime Safety Committee
MUI	Maritime Union of India
NDT	Non-Destructive Testing
NMPA	New Mangalore Port Authority
NSB	National Shipping Board
NUSI	National Union of Seafarers of India
ROBOSYS	ROBOSYS Automation
ROC	Remote Operation Center
SDHI	Swan Defence and Heavy Industries
SIMTI	Seven Islands Maritime Training Institute
STCW	Standards of Training, Certification and Watchkeeping
VDES	Voyage Data Exchange System
VTs	Vessel Tracking System

EXECUTIVE SUMMARY

This report discusses the present scenario and provides suggested policies and a comprehensive roadmap to be followed in order to achieve the targets set by MAKV 2047 with regard to Autonomous vessels, Advanced Navigation and Engine Systems, Alternate Fuels and Propulsion technologies (incl. Nuclear), Green Technologies, Climate Adaption & Mitigation Strategies

The Report is bifurcated into two Parts considering the complexity and the range of topics to be addressed. Part A contains the details on Alternative Fuels and Green Shipping Technologies and Engine Systems. Part B contains the details on Autonomous Vessels, Advanced Navigation. Suggested Policies and Roadmaps on the specific topics can be found separately in the respective Parts A & B.

The report is based on data and information obtained from credible sources as well those voluntarily submitted by training institutes, technology providers, shipyards and other maritime stakeholders in response to a structured data template circulated by the Sub-Committee. Not all stakeholders who were approached submitted complete data; analysis and findings are therefore based on the responses received and should be understood accordingly. No data has been assumed or fabricated where information was not available.

Observations and recommendations contained herein reflect the collective inputs of participating stakeholders and the Sub-Committee's deliberations, and do not represent the official policy position of the Ministry or any Government body. References to external sources are provided with links wherever applicable and were verified at the time of drafting. Readers are encouraged to consult primary sources directly for any regulatory or quantitative citations.

Part A
**Green Shipping Technologies, Alternative Fuels and
Engine Systems**

CHAPTER I: INTRODUCTION

The maritime sector globally is witnessing rapid transformation driven by decarbonization, digitalization, automation and technological advancements. Emerging areas such as autonomous and smart vessels, alternate fuels, green shipping technologies, advanced navigation systems and next generation engine technologies are expected to significantly influence the future of shipping.

The above topics represent the pivotal frontiers of global shipping and it is necessary to ensure that Indian Shipping is in a state of readiness to embrace such technological advancements.

Sub-Committee 13 was constituted to align India’s maritime growth objectives, environmental commitments and the vision to develop a technologically advanced and sustainable shipping ecosystem. The Sub-Committee is empowered to examine these emerging areas and provide recommendations for their safe and effective adoption in the Indian maritime sector.

The Sub-Committee divided it’s work into three phases as shown below:

- I. Establish the present status of technologies pertaining to autonomous vessels, alternative fuels and green technologies
- II. Stakeholder Consultation
- III. Development of a final report and roadmap

CHAPTER II: STATEMENT OF THE PROBLEM

GHG emissions are purported to be contributing to global warming and accelerating climate change. It is estimated that the Maritime Industry also contributes nearly 3% of the GHG emissions.

The MEPC in April 2018 vide Resolution MEPC.304(72) adopted Initial Strategy for Reduction of Green House Gas Emission from International Shipping Industry. It is a significant step forward in the global efforts to tackle climate change as per Paris Agreement.

The Initial Strategy includes a candidate short-term measure to encourage the development and update of National Action Plans to develop policies and strategies to address GHG emissions from international shipping.

The MEPC in 2023 adopted the revised GHG strategy vide Resolution MEPC.377(80). This sets targets to be met by the global shipping industry as regards reduction of GHG emissions by ships. The revised GHG strategy sets a target for shipping to become net zero by or around 2050.

Therefore, to define the problem with regard to alternative fuels, the following factors are imperative to be taken into consideration:

- ✓ Status and Composition of the Global and Indian merchant ship fleet
- ✓ Annual Fuel Consumption of Global and Indian merchant ship fleet
- ✓ Global & Indian Bunker Supply Scenario
- ✓ Availability of Technology for use of alternative fuels onboard
- ✓ Initiatives from the Government of India
- ✓ Readiness of Indian Shipbuilding
- ✓ Readiness of Indian seafarers & training institutes

CHAPTER III: PRESENT STATUS OF ALTERNATIVE FUELS AND TECHNOLOGIES - GLOBAL AND NATIONAL CONTEXT

3.1 Global Merchant and Indian Merchant Ship Fleet

3.1.1 Global Merchant Fleet:

3.1.1.1 Ships in Service:

The global merchant fleet has already embraced the application of alternative fuels. As on date, 1955 ships have been fitted with machinery & equipment which uses alternative fuels such as LNG, Methanol, Ammonia and Hydrogen.

To contrast this with the global fleet (above 500 GT), this number accounts for 2.5% of the global fleet demonstrating that the significant efforts will be required to decarbonize the global fleet. In terms of gross tonnage, it is reported (UNCTAD, 2025) that 8% gross tonnage globally operates on alternative fuels.

The following are the key statistics available as regards the global merchant fleet using alternative fuels:

- a. The following are the alternative fuels envisaged to replace the conventional marine fuels
 - 1) LNG
 - 2) Methanol
 - 3) Ammonia
 - 4) Hydrogen
 - 5) LPG (Liquefied Petroleum Gas)
- b. 75% of the number of ships using alternative fuels operate on LNG. More than 50% of these ships are above gross tonnage 50000. Amongst ship types, LNG is being used on LNG Carriers, Containerships, Passenger Ships, Vehicles Carrier, Oil and Chemical Tankers
- c. After LNG, Methanol is being used as fuel onboard ships. Methanol as fuel is being utilized prominently onboard container ships & chemical tankers. Nearly 45% of the fleet using methanol as fuel are of gross tonnage 50000 and above.
- d. Ships fueled by Ammonia and Hydrogen in service are very few. These being zero carbon fuels it is expected that the uptake of these fuels may grow with time.

- e. Apart from using alternative fuels, the global shipping industry has also utilized equipment in the form of wind assisted propulsion technology, carbon capture technology and technology for cold ironing (i.e. utilizing the power supply from shore/port) with view to reduction of GHG emissions.

3.1.1.2 **New Buildings:**

With regards to ships under construction, the observed key trends are elaborated as shown below:

- a. Approximately 15.6% of the ships under construction are confirmed to install technology to operate using alternative fuels. Notably 41% of the ships under construction will operate on conventional marine fuels
- b. Ships fueled by LNG constitute 2/3rd of the orderbook. Ships with gross tonnage 50000 or higher form a major proportion of the ships being built to use LNG fuel.
- c. Methanol fueled ships constitute approximately 14% of the number of ships under construction using alternative fuels. Container Ships, Vehicles Carriers and Bulk Carriers are the major ship types which have chosen methanol as alternative fuel.
- d. Ammonia fueled ships are also under order. Bulk Carrier and Gas Carrier segments have opted for this fuel. Relatively much lesser number of ships using hydrogen are under order.

As regards technology, relatively less proportion of ships are being constructed with wind assisted propulsion and onboard carbon capture plan. However, ships are being fitted with equipment for cold ironing.

3.1.1.3 **Fuel Ready:**

The industry has also utilized the concept of “**fuel ready**” ships. A “**fuel ready**” ship implies that the ship has been assessed to be retrofitted to an alternative fuel in the future. This option is helpful for ship owners who are awaiting certainty as regards future status and uptake of alternative fuels.

The key points as regards the “**fuel ready**” ships are elucidated below:

A. Ships in service:

- a. LNG remains the principal fuel for which the “fuel ready” notations have been applied. This implies the industry is looking at a transition to LNG fuel in the future if there is additional clarity. Container Ships, Bulk Carriers, Oil Tankers and Chemical tankers are the principal ship types which have opted for this.
- b. Methanol has also been considered for the “fuel ready” notation. Container Ships, Chemical Tankers, Bulk Carriers and Oil Tankers are the major ship types which have opted for this notation.
- c. Ammonia is the fuel which has grown relatively higher in proportion compared to it’s share in the existing ship and newbuilding segments. Container Ships, Bulk Carrier, Oil Tanker, Vehicles Carrier and Chemical Tanker are the principal ship types which have opted for this notation.
- d. As regards technologies, there are no ships which have been designed as “ready for wind assisted propulsion”. However, Container Ships, Bulk Carriers and Chemical Tankers have been assigned “onboard carbon capture ready” notation. Likewise, Ships have also opted for the “cold ironing ready” notation.

B. New buildings:

- a. Within Newbuilding Ships, the proportion of ships ready for LNG is significantly less compared to the corresponding number of ships ready for methanol and ammonia.
- b. Methanol is more prominently being considered for assessment for fuel readiness for newbuilding ships. This is followed by Ammonia.
- c. As regards readiness of technologies assessed for newbuilding ships, it is evident that the Industry is choosing to opt for fuel rather than technology; since there are no newbuilding ships which have been assessed for readiness for wind assisted propulsion or carbon capture.

3.1.2 Indian Merchant Ship Fleet:

India’s merchant ship fleet is composed of four major categories as listed below:

- a) Ships of gross tonnage 5000 and above (except Inland Coastal Vessel and River Sea Vessel) and certified under the Merchant Shipping Act
- b) Ships of gross tonnage less than 5000 and certified under the Merchant Shipping Act
- c) Ships of gross tonnage less than 5000 and registered as Indian Coastal Vessel
- d) Ships of gross tonnage less than 5000 and registered as River Sea Vessel
- e) Ships of gross tonnage 5000 and above and registered as Indian Coastal Vessel

In terms of number of ships, the category of Ships of gross tonnage less than 5000 and certified under the Merchant Shipping Act leads all the categories followed by the ships of gross tonnage 5000 and above (excluding ICV and RSV) and certified under the Merchant Shipping Act.

In terms of gross tonnage, the category Ships of gross tonnage 5000 and above (except Inland Coastal Vessel and River Sea Vessel) and certified under the Merchant Shipping Act is a singularly dominant category.

The average age of ships for 4 of the above categories is greater than 15 years. This indicates a relatively older fleet.

3.2 Annual Fuel Consumption of Global and Indian Merchant Ship Fleet:

3.2.1 Global Fuel Consumption:

From the data reported for the calendar year 2024, it is evident that the global shipping industry continues to consume conventional marine fuels such as HFO, VLSFO, MGO and MDO. Less than 1% fuel consumption was attributed to alternative fuels dominated by biofuels (and their blends). Methanol and LPG are

the other alternative fuels which have been adopted but in relatively much lesser proportion. Use of ammonia as fuel was not reported in the data for 2024.

3.2.2 Indian Ship Fleet Fuel Consumption:

The Indian ship fleet consumed 1.26 million metric tonnes of fuel for 2024. Ships engaged on international voyages consumed thrice as much fuel as compared to those on domestic voyages. The major cargo hauling ships such as Oil Tanker, Bulk Carrier, Container Ship and Gas Tankers accounted for an overwhelming majority of the fuel consumed.

It may be noted that no alternative fuel consumption such as LNG, Methanol and Ammonia was reported for Indian Ships in 2024 indicating that uptake of such fuels is yet to be initiated for our Indian fleet.

3.2.3 Advent of Nuclear Propulsion Technology in Maritime:

With the uncertainty around the availability of alternative fuels in sufficient quantities, the feasibility of scaling their present production levels for supplying adequate quantity of fuel to the maritime industry as well as their relatively higher costs; the maritime industry is also looking towards nuclear powered ship propulsion as a possible option for decarbonization. Alternatively, floating nuclear power plants are also being considered since they help solve jurisdictional issues while generating clean energy to produce renewable methanol, ammonia and hydrogen.

Therefore, in the consideration for a roadmap for alternative fuels for India, the application of nuclear technology needs to be given due consideration. It should be also appreciated that India has its nuclear expertise which if synergized with its maritime industry would be helpful to steer India ahead on the path to net zero.

3.3 Global and Indian Bunker Supply Scenarios:

3.3.1 Global Bunker Supply:

Bunkering facilities for LNG are well established globally with all major ports able to supply LNG bunker to vessels.

Methanol bunkering facilities have also been established in Europe and America. Within Asia, China and Singapore have established methanol bunkering facilities.

Ammonia bunkering facilities have yet to be established. The status of ammonia bunkering is principally in trial stages. However, it may be expected that the number of bunkering locations/ports for ammonia will exhibit growth and increase prominently by the end of this decade.

Bunkering of hydrogen can be performed in compressed or liquefied form. For liquefied hydrogen bunkering, only one facility exists in the world presently. For compressed hydrogen bunkering (including swappable tanks), there are facilities especially in Europe.

3.3.2 Indian Bunker Supply:

From data for 2024, it is evident that India lags behind other major countries in terms of supply of alternative fuel bunkers. India however has ports which handle LNG, Methanol and Ammonia. It is expected that bunkering facilities to be established in the future could be located at or near these ports.

LNG bunkering is anticipated to grow in the forthcoming years. Bunkering trials have been contemplated at Kochi. As regards Methanol, the first bunkering trial has taken place at Pt Deendayal Port at Kandla in April 2026.

Recalling that ships are also being fitted with onboard carbon capture technology; if such ships were to call at Indian Ports, then there needs to be consideration of providing carbon dioxide reception facilities. At present such facilities are not available at any port in India. Received carbon dioxide could serve as feedstock for several industrial applications including the production of e-fuels or synthetic fuels (coupled with the availability of clean energy such as that from nuclear power plants – including floating nuclear power plants)

3.4 Availability of Technology for use of alternative fuels onboard:

3.4.1 Internal Combustion Engines:

Internal combustion engines are commercially available for using LNG, Methanol and Ammonia as fuel onboard Ships. For hydrogen, internal combustion engines for the maritime industry are yet being developed. However, hydrogen can be used as fuel within fuel cell installations onboard.

Ships are already operating with fuel cell technology including a technology demonstration vessel which has been indigenously designed, constructed and being operated in India.

With fuels such as ammonia, additional equipment such as Ammonia Release Mitigation Systems (ARMS) are anticipated to be installed onboard to collect and safely dispose of any leakages or releases of ammonia onboard.

3.4.2 Other measures for abatement of GHG emissions:

The following measures may help in reducing GHG emissions to a certain extent though they alone may not be sufficient to achieve IMO targets.

- a. Propeller rudder upgrade
- b. Propeller upgrade (nozzle, tip winglet)
- c. Propeller boss cap fins
- d. Contra-rotating propeller
- e. Air lubrication
- f. Low friction hull coating
- g. Propeller polishing
- h. Biofouling management (periodic in-water cleaning)

3.5 Readiness of Indian Shipbuilding:

India has 8 public sector shipyards and 40 private sector shipyards as of data on 31 March 2025. Public Sector Shipyards have the total capacity for construction of 294500 deadweight tonnes. Private Sector Shipyards have the total capacity for construction of 176600 deadweight tonnes (note: data excludes L&T Shipbuilding).

(As per S&P Global Maritime, India has 159 shipyards and repair facilities as on 1 May 2026)

The orderbooks of several major shipyards are also quite full.

As regards the capability of the shipyards to construct vessels operating on alternative fuels, the following is noted:

- a) CSL has secured orders to build LNG fueled container ships.
- b) SDHI has secured orders to construct Ammonia fueled bulk carriers.
- c) MDL has signed a contract to construct a platform supply vessel to operate on ammonia fuel.
- d) GRSE is constructing a series of multi-purpose vessels which shall be “methanol ready”. In this regard based upon the feedback obtained from GRSE, it can be inferred that the shipyard has the engineering and

- e) integration capabilities required for projects concerning fuel cell, carbon capture, ammonia fuel and liquefied hydrogen systems.
- f) HSL is geared up towards construction of methanol ready vessels, hydrogen powered tugs, hydrogen fuel ready vessels and vessels using dual fuel propulsion systems.

From the above, it can be inferred that the elementary expertise is existing in India's shipbuilding sector which can be further honed so as to increase our confidence and expand our shipbuilding capacity to deliver quality ships.

3.7 Readiness of Indian Seafarers and Training Institutes:

Mandatory instruments for alternative fuels such as methanol, ammonia and hydrogen have not yet been developed. Nevertheless, interim guidelines as regards the training are available as listed below:

- STCW.7/Circ.25 – Generic interim guidelines on training for seafarers on ships using alternative fuels and new technologies
- STCW.7/Circ.26 – Interim Guidelines on training for seafarers on ships using methyl and ethyl alcohol as fuel
- STCW.7/Circ.27 – Interim Guidelines on training for seafarers on ships using ammonia as fuel

CHAPTER IV: PRESENT STATUS AND CHALLENGES FACED BY STAKEHOLDERS

Stakeholder consultation was performed by distributing questionnaires to stakeholders representing various facets for the Indian Shipping Industry. The following were approached as the relevant stakeholders for collecting feedback to be incorporated within this report.

- a) Ship owners
- b) Shipbuilders
- c) Ports & Bunker facilities
- d) Training Institutes

Feedbacks from the following institutions were obtained:

- a) The Great Eastern Institute of Management Studies (Training Institute)
- b) Seven Islands Maritime Training Institute (Training Institute)
- c) GRSE (Shipbuilder)
- d) HSL (Shipbuilder)
- e) Navalt (Ship designer)
- f) NMPA (Port)
- g) INSA (Shipowner)
- h) Mormugao Port Authority (Port)
- i) Cochin Port Authority (Port)

The feedback collected is compiled below as regards Shipbuilders and Training Institutes. The feedback may also be considered as possible barriers being faced by various stakeholders.

4.1 Training Institutes:

4.1.1. General Feedback:

The following is summarized as general feedback from the training institutes:

- a) Training should be developed for all persons involved in the design, construction and operation of ships – seafarers, shipyard personnel and ship designers

- b) The goal should target development of a capable workforce which is able to cater to the next generation of vessels using alternative fuels.

4.1.2 Training for Operating Ships with Alternative Fuels:

The following is summarized as specific feedback obtained as regards operation of ships for alternative fuels:

4.1.2.1 Seafarers:

- a) LNG, Methanol, Ammonia, Hydrogen, Biofuels and Nuclear Technology should be addressed for the training
- b) Properties and hazards of the new fuels should be addressed in particular
- c) Training should cover all operations of the fuel supply systems such as bunkering, fuel conditioning, dual fuel engine systems, fuel changeover procedures as well as trouble shooting any issues
- d) Sea farers should be aware of the digitalization and automation features which are now built in modern engine systems
- e) Sea farers should also have awareness of the issues pertaining to compliance with regulations associated with the new generation of fuels (both safety and environment)
- f) There needs to be education regarding the Safety Management Systems and the Planned Maintenance Systems development and implementation onboard for ships using alternative fuels

4.1.2.2 Shipyard Personnel:

It was brought out that shipyard personnel could benefit from the following training:

- a. Cryogenic piping installation
- b. Double walled fuel systems
- c. Gas Safe Spaces
- d. Ventilation Systems
- e. Hazardous area equipment installation
- f. Stainless steel and nickel alloy fabrication
- g. Cryogenic materials
- h. High pressure systems

- i. Materials for Hydrogen and their compatibility
- j. Advanced NDT
- k. Retrofitting of ships to alternative fuel

4.1.2.3 Ship Designers:

It was brought out that ship designers could benefit from the following training:

- a. LNG fueled ship design
- b. Ammonia fueled ship design
- c. Methanol fueled ship design
- d. Hydrogen fueled ship design
- e. Risk assessments to be performed at design stage
- f. Fuel containment design
- g. Fuel supply systems design
- h. Advanced computational techniques
 - i. CFD Analysis
 - ii. Digital Twin Development
 - iii. Energy Efficiency Modelling
 - iv. Life Cycle Assessments
 - v. Integrated Vessel Performance
- i. Smart Ships and Digital Technologies
- j. Cybersecurity

4.1.2.4 Port Staff:

It was expressed that training regarding Port and Terminal Operations for handling ships using alternative fuels and technologies would also be beneficial.

4.1.2.5 Other Major Feedback:

The following additional feedback is also noteworthy in this regard:

- a) Simulators (and their upgrades) would be necessary to replicate alternative fuel handling, bunkering, and emergency response for each fuel type, including advanced modules covering bunkering operations, fuel leakage

scenarios, emergency shutdown procedures, firefighting, and risk assessment

- b) There should be practical training facilities such as bunkering mock-ups, fuel storage tanks, fuel transfer systems, and leak detection arrangements to provide hands-on experience in fuel handling and emergency response procedures.
- c) There should be Industry-institute partnerships with fuel suppliers, engine OEMs, and classification societies to keep training content current and operationally relevant
- d) Training Modules should be Cross-disciplinary modules bringing together seafarers, shipyard engineers, and naval architects for systems-level learning.
- e) Institutes need capital to upgrade facilities. Grants, facilitation through Government sources are essential to prevent cost from freezing institutional progress.
- f) A transition plan is needed to protect existing seafarers and shore-based workers as the energy mix shifts, ensuring decarbonization does not create structural unemployment.
- g) Research and Innovation also need a fillip to ensure India is on the forefront in this sector.
- h) A national coordination platform, facilitated by DGMA to harmonize curricula and standards across all maritime training institutes in India would be useful.
- i) Need for green shipping corridors

Additionally, it was remarked that faculty would be required to deliver courses considering the above topics. Therefore, there would be need to “train the trainer” first.

4.2 Shipyards & Designers:

Feedback obtained from two Shipyards is recounted as below:

4.2.1 Bottlenecks:

The following are the key bottlenecks:

- a) **Technology Bottlenecks:** Limited domestic availability of fuel cells, hydrogen systems, advanced batteries, and carbon capture equipment
- b) **Infrastructure Constraints:** Lack of widespread bunkering infrastructure for hydrogen, methanol, and ammonia fuels.
- c) **Nascent Regulatory Framework:** Emerging multiple standards and evolving international regulations for alternative fuels. Lack of a clear mandatory framework Internationally and Domestically.
- d) **Cost Competitiveness:** Green vessels currently involve higher capital expenditure compared with conventional vessels.
- e) **Supply Chain Development:** Need for a stronger domestic ecosystem for specialized equipment and materials
- f) **Manpower:** Requirement for training across design, production, operations, and safety disciplines
- g) **Retrofit Challenges:** Space constraints, weight implications, and certification requirements can complicate retrofitting of existing vessels
- h) Lack of assured order visibility
- i) Long lead times for specialized systems and components

4.2.2 Indigenization:

For battery-electric and hybrid-electric vessels, a very high degree of indigenous content is already achievable. However, technology may have to be imported for:

- a) Marine Battery and Fuel Cell Systems
- b) Methanol and Ammonia fuel supply systems
- c) Cryogenic Systems (for fuels requiring cryogenic storage)
- d) Specialized Sensors and Safety Systems
- e) Hydrogen Storage and Handling Systems
- f) Automation and energy management systems

Feedback was also received on the present policies and opportunities for improvement. However, this will be recounted in Chapter 6.

Feedback received from Navalt recounted that the company is able to incorporate indigenous pod propulsion systems, batteries, and steering systems in its vessels. It also reported that it has established a roadmap to achieve 100% indigenous manufacturing by 2028 and is actively working towards the in-house development and production of battery cells, motors, and inverters.

4.3 Ship Owners:

The following was the feedback received from INSA:

- a) The existing fleet would focus on improvement of energy efficiency. Retrofits of ships to alternative fuels would be only considered where there was a clear business case.
- b) Vessel age, trade pattern and commercial viability would be deciding factors in placing orders for new ships or fleet renewal with alternative fuels. Relatively younger ships would be amenable for alternative fuel retrofits. Cost benefit assessments would play a key role in determination of the need for retrofit.
- c) Certainty of technology is a key factor along with fuel availability in making a decision for ordering newbuilds.

- d) Focus would be to operate existing vessels (with selective retrofits) with biofuels or biofuel blends. Market conditions and regulatory developments would be continually reviewed for making future plans
- e) Fuel ready notations could be considered provided technical and commercial feasibility is assured with an approach which permits flexibility
- f) During retrofit of ships, with regard to the determination of fuel tank size – a balance would need to be achieved between either choosing higher tank capacities or higher bunkering frequencies
- g) Purchase of Bunkers from Indian Ports would be preferred if competitive pricing and reliable supplies of conventional and alternative fuel was assured
- h) For Coastal fleet, bunker purchase was from Indian Ports whereas for International seagoing ships, bunker purchase was subject to commercial considerations and their optimization
- i) Onboard Carbon Capture was not viewed as a viable solution with the technology existing at present. Especially for existing ships this leads to loss of cargo space and increased energy consumption. Likewise facilities for offloading the stored carbon dioxide at Ports are not generally available
- j) With alternative fuels, it is generally expected that the workload would increase onboard
- k) Energy efficiency measures such as advanced coatings, hull cleaning, propeller upgrades, energy-saving devices and voyage optimization are among the most practical and cost-effective methods for reducing fuel consumption and emissions.

The following were identified as major bottlenecks for uptake of alternative fuels/technologies:

- a) Uncertainty in the choice and availability of alternative fuels, insufficient bunkering infrastructure, high fuel costs, financing challenges, technology uncertainty, safety considerations and the long replacement cycle of commercial vessels
- b) High capital investment for vessel modifications or newbuilds, regulatory uncertainty and the need for crew training and safety standards

The following policy measures should be encouraged:

- a) Prioritize expanding domestic production and supply chains for certified drop in low carbon fuels.
- b) Initiatives to build local biofuel/ low carbon drop in fuel capacity, strengthen certification frameworks, and invest in bunkering infrastructure at Indian ports
- c) Bridge the cost gap through tax concessions, subsidies, and reduced port charges for use of alternate fuels

With regards to India’s positions internationally, it was conveyed that India should continue supporting the IMO's decarbonization objectives while advocating a pragmatic, practical, phased and technology-neutral implementation pathway with no economic penalty or measures. Future measures should be aligned with demonstrated fuel availability, infrastructure readiness and operational experience to ensure an equitable global transition

4.4 Ports & Bunker Suppliers:

The following was the feedback received from Port Authorities

- a) The ambition to supply alternative fuel to vessels calling at the port would depend upon the demand (and the demand should be constant). The focus would be to ensure fuel supply to domestic demands first.
- b) NMPA did not have facilities to supply shore power with regards to charging of batteries onboard vessels. However, if constant demand could be ensured then arrangements could be made for the same.

- c) MPA reported that shore to ship facilities were available and were being used by Naval Ships and Port craft. CPA reported that shore power facilities were available at 9 berths.
- d) It was communicated that the major bottleneck for bunkering of alternative fuels was that there should be a constant demand.
- e) Alternative Fuels require a sustainable and compatible market.
- f) There were no plans in general for alternative fuels supply or reception of carbon dioxide facilities.
- g) Requests had not been received for alternative fuel supply from stakeholders
- h) India has a large fishing vessel industry. Fishing vessels should be considered for transitioning to green fuels
- i) One Port reported that it was exploring LNG bunkering and related feasibility study was being conducted.

From the above, it can be inferred that bunkering of alternative fuels would require demand in terms of regular and steady quantities.

CHAPTER V: PAST AND CURRENT POLICIES OF THE GOVERNMENT AND THEIR EFFICACY

The Government of India has been actively working to move to reduce emissions of the maritime industry. The following are the major initiatives taken:

5.1 Maritime India Vision (MIV) 2030:

The report on Maritime India Vision 2030 provides a comprehensive overview of ambitions of India regarding the maritime industry. The key themes of this vision are shown as below:

- a) Develop best in-class Port Infrastructure in India
- b) Drive E2E (end to end) Logistics efficiency and cost competitiveness
- c) Enhance Logistics efficiency through Technology and Innovation
- d) Strengthen Policy and all Institutional Framework to support all Stakeholders
- e) Enhance global share in Shipbuilding, Repair and Recycling.
- f) Enhance Cargo and Passenger Movement through Inland Waterways
- g) Promote Ocean, Coastal and River Cruise Sector
- h) Enhance India's global stature and maritime co-operation
- i) Lead the world in Safe, Sustainable and Green Maritime Sector
- j) Become top seafaring nation with world class education, research and training

The key targets envisaged by the Maritime India Vision (MIV) 2030 are presented in Table 1.

Table 1: Key performance targets of the Maritime India Vision 2030

Target	Key Performance Indicator	Status - 2020	Target - 2030
1	Major Ports with >300 MTPA cargo handling capacity	-	3
2	% of Indian cargo transshipment handled by Indian ports	25 %	>75%
3	% of cargo handled at Major Ports by PPP other operators	51 %	>85%
4	Average vessel-turn-around time (containers)	25 h	< 20h
5	Average container dwell time	55 h	< 40h
6	Average ship daily output (gross tonnage)	16500	>30000

7	Global ranking in ship building and ship repair	> 20	Top 10
8	Global ranking in ship recycling	2	1
9	Annual cruise passengers	468000	>1500000
10	% share of Indian seafarers across globe	12%	>20%
11	% share of renewable energy at Major Ports	<10%	>60%

An overall investment of INR 3,00,000 – 3,50,000 crores is envisaged across ports, shipping and inland waterways categories. This also envisions to create more than 2 million jobs (direct and non-direct) in the maritime sector by anticipated increase in activities in the shipbuilding, ship operations and the Port sector.

With regards to moving towards a greener future, the MIV showcases ambitions to significantly increase the share of renewable energy utilized at Ports. This is envisaged to be produced in the form of solar and wind power, though tidal energy and wave energy converters are also envisaged to be utilized. Further strategies are outlined in regard to using clean fuels within vehicles at Indian Ports so as to reduce GHG emissions as well improve air quality.

5.2 Maritime Amrit Kaal Vision (MAKV) 2047:

The government of India while strengthening its commitment to greening of the maritime sector in 2023, further released the Maritime Amrit Kaal Vision 2047.

The key themes of this policy are summarized as below:

- a) Lead the World in Safe, Sustainable & Green Maritime Sector
- b) Promote Ocean, Coastal & River Cruise Sector
- c) Enhance modal share of coastal shipping & Inland Water Transport
- d) Promote Maritime Cluster
- e) Promote maritime professional services
- f) Become a global player in Shipbuilding, repair & recycling
- g) Develop World Class Education, Research & Training
- h) Strengthen India’s global maritime presence
- i) Develop World Class next generation ports
- j) Enhance Efficiency through Technology & Innovation
- k) Enhance India’s Tonnage

The strategic aspirations to be achieved with this vision are summarized as shown below in Table 2.

Table 2: Strategic Aspirations to be achieved by the Maritime Amrit Kaal Vision 2047

Parameter	Unit	Status (2023)	Aspiration 2047
Lead the World in Safe, Sustainable & Green Maritime Sector			
Major Ports with LNG bunkering facilities	Number	1	8
No. of hydrogen/ammonia hubs	Number	-	14
Major Ports with shore to ship power facility	Number	2	14
Carbon neutral ports	Number	-	14
Promote Ocean, Coastal & River Cruise Sector			
India's rank of passenger volume in Asia Pacific	Rank	4	1
No. of Indian ports amongst top 20 ports for cruise services in Asia Pacific	Number	1	4
Number of cruise terminals	Number	6	25
Enhance modal share of coastal shipping & Inland Waterway Transport			
No. of operational waterways	Number	22	>50
Cargo volume handled by waterways	MMTPA	109	>500
Become a Global player in Shipbuilding, repair & recycling			
Global rank in ship recycling	Rank	2	1
Global rank in ship building	Rank	22	Top 5
Develop World class next generation ports			
Overall Port handling capacity	MMPTA	>2500	>10000
% of cargo handled at PPP berths of Major Ports	Percentage	51	100
Number of transshipment hub	Number	1	3
Number of new Major Ports	Number	-	2
Ports with 18-23 m draft	Number	5	13
Enhance efficiency through technology & innovation			

Ports with just-in-time arrival	Percentage	-	100
Smart Ports	Number	-	5

The Maritime Amrit Kaal India Vision is ambitious and anticipates an investment of 75,00,000 crore – 80,00,000 crores. It envisages to create an additional 3.5 – 4 million jobs in the maritime sector. It is anticipated that these would result mainly through increased activities in shipbuilding, ports and logistics and the necessary infrastructure development to realize this vision.

5.3 Harit Sagar Green Port Guidelines:

The “Harit Sagar” initiative was launched by government of India in 2023 to provide guidelines for Green Ports. Within this initiative, the focus relevant to shipping and especially future fuels/technology are mentioned as below:

Port Crafts - All Ports to make efforts to achieve the target of Renewable Energy as envisaged in MIV 2030 / Blue Economy 2047 documents. Share of renewable energy at Ports should exceed 60 percent by the Year 2030 and 90 percent by year 2047. Ports to establish at least one LNG bunkering station by the Year 2030 and adequate number of EV charging stations in port campus or nearby area by the year 2025.

Shore to Ship Power Supply - All Ports to develop the infrastructure to provide “Shore to Ship” power in a phased manner:

- 1st Phase- To Port Crafts (By 2023)
- 2nd Phase- To Coast Guard/Navy and small coastal vessels (By 2024)
- 3rd Phase- To EXIM vessels (By 2025)

Promotion of Coastal Shipping - Promotion of “Coastal Shipping” is a cost & energy efficient alternative mode for transportation that can help address the challenges of carbon emission and help to achieve the target of national carbon footprint reduction. Ports to facilitate coastal shipping through creation of infrastructure and suitably designed mechanisms to make the transport viable for the users.

5.4 Harit Nauka Inland Vessels Green Transition Guidelines:

The “Harit Nauka” initiative was launched by government of India in 2024 to provide guidelines for transition of Inland Vessels to greener fuels. The key focus areas of this initiative are shown as below:

- **Promotion of alternative clean fuels in inland vessel operation**
CNG / LNG are regarded as partly green interim fuel. Electricity, Green Hydrogen and Green Methanol are regarded as complete green fuels for inland vessel operations
 - ✓ Phasing out of Conventional Fuels and Interim Fuels

An indicative timeline for the phasing out

Phase	Activity	Cut-off timeline
1	Registration for conventional fuel based inland vessels	31-12-2033
2	Operation of conventional fuel based inland vessels	31-12-2045
3	Registration of interim fuel based inland vessels	31-12-2045
4	Operation of interim fuel based inland vessels	31-12-2055

- ✓ Standardization of Vessel designs
- **Creation of a holistic green ecosystem**
 - ✓ Shore side infrastructure to support operation of green vessels
 - ✓ Support infrastructure to improve service quality in this domain
- **Capacity building initiatives**
- **Promoting research and development for technological advancements**
- **Creation of special working groups**
- **Strengthening of institutional capacity**

5.5 National Green Hydrogen Mission:

The National Green Hydrogen Mission was launched in 2023 as India’s demonstration of commitment towards the global climate goals. It consists of several focus areas covering production of green hydrogen, incentivizing supply and uptake of green hydrogen.

Particularly in regard to the shipping sector, the mission proclaims the following targets:

- At least two ships in India are to be retrofitted to run on Green Hydrogen or other Green Hydrogen derived fuels by 2027.
- India’s oil and gas PSUs also currently charter about forty vessels for transport of petroleum products. In order to promote forays into Hydrogen powered shipping lines, these PSUs will be required to charter at least one ship each to be powered by Green Hydrogen or derived fuels by 2027. Thereafter, the companies will be required to add at least one ship powered by green hydrogen or its derivatives for each year of the mission.
- Green Ammonia bunkers and refueling facilities will be set up at least at one port by 2025. Such facilities will be established at all major ports by 2035.

Thus, with the various initiatives from the government of India, the stage is well set for the Indian Maritime Sector to transition to a greener future.

5.6 India -Denmark Maritime Collaboration:

India already established a Green Strategic Partnership with Denmark in 2020. One of the focus areas in the Partnership was on co-operation on topics in Maritime. In 2024, India and Denmark agreed to collaborate with view to advance sustainable maritime practices. The collaboration is focused on port modernization, maritime digitalization, green fuel development, and advanced seafarer training.

The collaboration is focused on joint projects for developing hydrogen and ammonia-based fuel for vessels. Further, the collaboration intends to use Denmark’s expertise in Wind Energy to promote production of renewable energy at Indian Ports.

Port Modernization, Maritime Digitalization, Seafarer advanced training and green fuels development are other aspects where both countries are partnering in this initiative.

5.7 Panchamrut:

In 2021, India declared a five-point action plan at the Conference of Parties (COP) summit in Glasgow for climate action. This plan announced the following key components:

- Increase non-fossil energy capacity to 500 GW by 2030
- Meet 50% of energy requirements from renewable energy sources by 2030
- Reduce total projected carbon emissions by one billion tonnes by 2030
- Reduce the carbon intensity of the economy by less than 45% by 2030 (from 2005 levels)
- Achieve net-zero carbon emissions by 2070

5.8 Shipbuilding Financial Assistance Scheme (SBFAS):

The Government of India notified the SBFAS with view to promote domestic shipbuilding and thus revive the industry. With regard to Green Shipping, the scheme informs that the Government would provide 25% financial support for specialized vessel which also include vessels using green or hybrid propulsion.

5.9 Shipbuilding Development Scheme (SBDS):

The SBDS aims at capacity augmentation through greenfield shipbuilding parks and modernization of existing brownfield shipyards, in addition to establishing the India Ship Technology Centre through the Indian Maritime University to facilitate research, design, and skills augmentation. The Greenfield projects will be given 100% assistance in terms of capital for shared facilities, and the existing shipyards will be allowed 25% assistance for the augmentation of essential infrastructure. On the whole, this scheme would lead to strengthening India's shipbuilding for the next generation of ships which would inevitably be powered by alternative fuels/technology.

5.10 Green Tug Transition Program (GTTP):

The GTTP was announced as a key initiative under the “panch karma sankalp” on May 22, 2023 by the Union Minister of Ports, Shipping, and Waterways, Shri Sarbananda Sonowal. The GTTP is designed to phase out conventional fuel-based harbour tugs operating in Indian Major Ports and replace them with green tugs powered by cleaner and more sustainable alternate fuels. Phase 1 of the GTTP began on October 1, 2024, and would continue until December 31, 2027. During this phase, four Major Ports Jawaharlal Nehru Port Authority, Deendayal Port Authority, Paradip Port Authority, and V.O. Chidambaranar Port Authority would procure or charter at least two green tugs each, based on standardized designs and specifications issued by the Standing Specification Committee (SSC). The program is expected to involve an investment of around INR 1000 Crores in building these green tugs. The first set of tugs will be battery-electric, with provisions for adopting other emerging green technologies such as hybrid, methanol and green hydrogen as the industry evolves.

5.11 Efficacy:

Most of the schemes enumerated above have been formulated quite recently. Hence it may be premature to assess their efficacy. Nevertheless, feedback should be periodically collected with a view to improving these schemes or promulgating new ones.

CHAPTER VI: DISCUSSIONS WITH STAKEHOLDERS

6.1 General:

The core discussion with Stakeholders has been summarized in Chapter IV. Additional proposals which have been obtained to improve the existing schemes have been summarized in this chapter.

6.2 Feedback for improvement of existing schemes/policies:

A. SBFAS (Ship Building Financial Assistance Scheme):

The following feedback has been obtained with regard to improvement of the SBFAS need for new schemes/policies:

- a) A dedicated Green Shipbuilding Incentive Scheme should be developed
- b) There should be additional incentives for first-of-class green vessels
- c) There should be provisions to provide support for prototype, pilot or demonstration projects
- d) There should be incentives linked to indigenous equipment and materials used in green technologies
- e) There should be grants for R&D for alternative fuels and energy efficient vessel technologies
- f) There should be export incentives for green vessels built in India

The following feedback has also been collected with regard to disbursal of subsidy and milestones in the SBFAS:

- a) **Advance Stage-Payments:** Tie initial payouts directly to raw material procurement like steel cutting rather than structural assembly milestones. This will improve early-stage cash flows
- b) **Escrow-Backed Guarantees:** Route funds through project-specific escrow accounts managed by the State bank or similar banks to eliminate long administrative delays
- c) **Automatic Budget Rollovers:** Institutionalize automatic priority budgeting for delayed vessel clearances to prevent fiscal year-end allocation bottlenecks
- d) **Balance multi-scheme operations:**

- i. **Single-Window Clearances:** Create a single digital dashboard integrating SBFAS tracking with the Shipbuilding Development Scheme (SbDS) and the Marine Development Fund
 - ii. **Pre-Approved Risk Coverage:** Pre-approve credit risk insurance during the subsidy application stage to fast-track external bank loan clearances
- e) The reduced value of 15% (as compared to flat rate 20% earlier) subsidy on electric hybrid boats has significantly affected those small shipbuilders in Kerala, Goa and Gujarat who specialize in tugs/ferries < INR 100 crores. It was recommended to remove the Rs. 100-crore slab for specialized vessels
- f) It was also recommended to honor the 20% - 30% rates for pre 2026 contracts until 2036.

B. SBDS (Shipbuilding Development Scheme):

The following feedback was obtained as regards SBDS:

The following aspects need to be enhanced:

- a. Funding support for research, development, and prototype demonstration projects
- b. Incentives linked to domestic value addition and indigenization
- c. Support for establishing testing and certification infrastructure within India

C. GTTP (Green Tug Transition Program):

The following feedback was received with regard to the GTTP:

- a. In all the Green Tug projects awarded so far, contracts have not been secured directly by established shipyards as the tender is primarily for ‘Chartering’. The successful bidders are primarily tug operators/maritime service companies, who are subsequently tying up with local/small shipyards for construction activities and foreign OEMs for propulsion systems, Energy Storage Systems (ESS) and integrated technology packages
- b. Consequently, the present tendering approach is effectively positioning Indian shipyards only as construction sub-contractors rather than principal

system integrators/builders, thereby limiting development of indigenous Green Tug design, manufacturing capability and long-term technology ecosystem within the country

- c. Further, the prevailing model largely facilitates assembly/integration through foreign OEM-supported packages without adequate mandate for minimum indigenous content or long-term technology absorption. The firms presently securing these contracts are primarily chartering/maritime service entities with limited role in creation of national shipbuilding capability or strategic maritime industrial ecosystem
- d. Dependency on Foreign Technology Partners over the long-term results in limited indigenous system integration capability, dependence on imported propulsion packages continues and long-term ecosystem development remains constrained / non – starter despite building and aiming many, ‘Green Tugs’

6.3 Miscellaneous Feedback:

The following is miscellaneous feedback obtained:

There could be measures for:

- a) Green vessel procurement mandates for government-owned fleets
- b) National alternative fuel bunkering infrastructure
- c) Low-interest financing for green vessel construction
- d) Maritime innovation and technology development funds
- e) Support for testing, certification, and demonstration facilities
- f) Incentives for indigenous manufacturing of green maritime equipment
- g) Measures to expand Green Technology and Transformation:
 - i. **Higher Green Subsidies:** Boost capital assistance up to 35% for ships testing experimental zero-emission alternative propulsion systems.
 - ii. **Automation Subsidies:** Dedicate specific funds within the scheme for digital design platforms and automated robotic welding to lower high human-error variables.
 - iii. **Expand Recycling Linkages:** Broaden the Shipbreaking Credit Note Scheme. Allow yards to trade unused scrap credits freely on an open exchange to maximize scrap-to-steel flexibility

- iv. **Production-linked incentives** for domestic manufacturing of marine green technologies.
- v. **Tax incentives** for green vessel construction and retrofitting.
- vi. **Funding support for collaborative R&D** between shipyards, academia, and industry.
- vii. **Assured domestic demand** through government procurement of green vessels.
- viii. **Establishing dedicated charging stations** at every port across India would be beneficial
- ix. **Deployment of dedicated battery-swapping infrastructure** at ports
- x. **provide dedicated funding for R&D**
- xi. **Deploy small-scale renewable energy power plants** such as wave energy converters, tidal energy power plants, and Ocean Thermal Energy Conversion (OTEC) systems.

CHAPTER VII: NATIONAL AND GLOBAL BEST PRACTICES

7.1 International Reference Points:

The Sub-Committee took into account the national action plans for decarbonization of shipping developed by major shipping nations as available on the IMO Website. The national action plans of the following nations were considered:

- A. France
- B. Japan
- C. Norway
- D. South Korea
- E. Singapore
- F. United Kingdom

The strategies adopted by the above nations have been considered for proposals for development of national policies as appropriate for Indian scenario.

7.2 Domestic Best Practices:

India's national action plans are summarized in the Maritime India Vision 2030 document.

CHAPTER VIII: SUGGESTED POLICIES

8.1 General:

Based upon the preceding chapters including the feedback obtained from stakeholders, policies for green shipping and alternative fuels have been developed and provided in this chapter.

Firstly, it is reminded that Shipping is the backbone for India's international trade. It is reported that 95% of India's trade volume and 70% of trade value flows through shipping industry. It is therefore an issue for national interest that Shipping is given as high a priority as possible.

The development of the policies follows an organic approach as highlighted below:

- A. Identification of the key alternative fuels and technologies for the future (LNG, Ammonia, Methanol, Hydrogen, Electric Battery technology and Nuclear Technology should be considered)
- B. Development of the required infrastructure (shipyards, local technology & equipment suppliers, skilled personnel etc.) for transitioning to the identified alternative fuels and technologies
- C. Ensure availability of adequate regulatory clarity and financial support
- D. Ensure sourcing of relevant materials & equipment indigenously so as to reduce reliance on imports as well as provide fillip to local industry
- E. Execution of pilot projects with alternative fuels & technologies so as to obtain valuable experience
- F. Ensuring that India forms co-operation with other major countries to establish green shipping corridors especially for those goods contributing majorly to it's EXIM trade.
- G. Ensuring that disruption to Indian international maritime industry due to transitioning to alternative fuels and technology is minimized and does not have adverse impact.
- H. Ensure that experience from the Indian international maritime industry is taken into account when developing policies for coastal shipping

The policies cover the following major areas:

- a) Skilling of personnel including seafarers, shipyard personnel, ship designers, Port staff etc.

- b) National infrastructure development for Shipbuilding
- c) Provide a conducive environment for indigenous development of ship equipment to be applied for alternative fuels
- d) Availability of adequate quantity of alternative fuels for Indian Ships
- e) Availability of adequate quantity of alternative fuels for Indian Ports to bunker with a view to using the strategic location of India towards making it a favored bunkering destination
- f) Green transition for ships and ports
- g) Finance
- h) Periodic review of the policies in order to evolve with the dynamic nature of green shipping

The above policies aim to support the targets set by the Maritime Amrit Kaal Vision 2047.

8.2 Measures to support the MAKV 2047 vision:

The following high-level measures are proposed:

8.2.1 Skill Development:

It is imperative to have a competent maritime workforce in order to ensure that green shipping and transition take place with least disruption and place India as a preferred nation for ship design, construction and operation. The following measures aim to accomplish this objective:

- I. Identify topics to formulate training curricula which are relevant for seafarers, shipyard personnel, ship designers and equipment suppliers with regard to alternative fuels consisting of at least LNG, Methanol, Ammonia, Hydrogen and technologies such as battery and nuclear propulsion
- II. Development of national model training courses and curricula for ships operating on alternative fuels targeting the following personnel
 - a. Sea farers
 - b. Shipyard personnel
 - c. Ship Designers
 - d. Ports
 - e. Equipment Suppliers

- f. The training courses and curricula should take into account and be robust to cater to both the existing seafarers as well as fresh batches of seafarers
- III. Ensure adequate numbers of faculty and experts to deliver courses on alternative fuels and technologies to the personnel identified in paragraph 2.a. Ensure that the faculty and experts have adequate practical experience and/or upskill them by deputing them to visit specialized facilities as may be necessary
- IV. Ensure that India has adequate number of training institutes and facilities (e.g. simulators) for skilling the requisite number of personnel for a future with alternative fuels/technologies
- V. Consider recruiting/engaging foreign experts for specialized topics (short term to medium term) as necessary (with view to having Indian experts in the long term). Provide appropriate incentives to the relevant parties for this purpose.
- VI. Cultivate partnerships and co-operation with experts in other major shipbuilding nations, major suppliers of ship equipment/technology so that the personnel in India remain up to date with the latest technology developments
- VII. Ensure cross disciplinary interaction and dialogue to ensure that ship design, construction, operation and maintenance are synergized
- VIII. Provide incentives for fresh naval architects from India’s premier institutes to work in India’s maritime domain
- IX. Ensure adequate incentives for trained personnel to work for Indian companies
- X. Development of a national maritime knowledge archive/portal to capture experience/lessons from ship design, construction and operation on alternative fuels
- XI. Contribute to the development of training curricula for alternative fuels/technology at IMO to ensure Indian experience and knowledge are duly incorporated in the mandatory instruments to be developed therein

8.2.2 Shipbuilding:

The following measures are proposed to support India’s shipbuilding industry with regard to alternative fuels:

- I. Consider need for development of a dedicated green shipbuilding policy

- II. Identifying factors which can support Indian shipbuilding industry for construction or retrofit of ships to operate on alternative fuels and technologies by ensuring
 - a. Comparable quality of construction with the shipyards in South Korea, Japan and China
 - b. Competitive delivery times
 - c. Competitive costs
- III. Strengthen Indian maritime supply chain for materials, equipment (e.g. cryogenic valves, pumps, compressors, gas engines etc.), sensors, digital technology with regard to fuel supply systems for alternative fuels such as LNG, Methanol, Ammonia, Hydrogen, battery technology by developing appropriate policy measures for financial incentives/assistance to OEM.
- IV. Providing support for pilot projects or technology demonstration projects for design & construction of ships using alternative fuel
- V. Development of standardized designs for ships using alternative fuels and/or technology
- VI. Provide financial support considering the following measures:
 - a. Advance Stage-Payments:
 - b. Escrow-Backed Guarantees
 - c. Automatic Budget Rollovers
 - d. Single-Window Clearances
 - e. Lending facilities on favourable terms from Indian Banks (e.g. preapproved credit risk insurance)
 - f. Support for micro, small and medium scale enterprises
 - g. Assured orders through government ships
- VII. Provide support for R&D to improve shipbuilding techniques, ship designs with view to maximizing ship efficiency.
- VIII. Providing support to establish testing and certification facilities in India for various equipment/items
- IX. Encourage Indian Academia having a department of Naval Architecture and/or Ship Design to ensure graduate/doctorate theses on practical issues faced by Indian shipbuilding and design industry as much as possible
- X. Encourage Shipyard personnel to participate in global maritime forums such as relevant IMO Committee/Sub-Committee meetings so as to gain as well as share knowledge, improve networking and be abreast of the

regulatory developments taking place. This is also with a view to improving visibility of Indian Shipbuilding on a global stage.

- XI. Explore co-operation or partnerships with other shipyards especially in east Asia.
- XII. Identify opportunities to encourage major Indian private sector companies/conglomerates to invest in the Indian Shipbuilding industry
- XIII. Develop a national shipbuilding knowledge portal for shipyards along with designers, academia and classification societies to share/exchange their experience and knowledge as well as provide a forum for discussion and resolution of technical issues.
- XIV. Consider dedicated publication of a quarterly Indian journal which showcases scientific or practical articles from Indian Shipbuilding Industry with regard to design and construction of ships using alternative fuels and/or improved efficiency measures.
- XV. Encourage use of software or tools developed indigenously for ship design for the short term with view to mandating such software or tools in the long term

8.2.3 Shipping:

The following measures are proposed:

- I. Consider development of a roadmap and facilitate transition of applicable Indian ships operating on international voyages to alternative fuels (or “fuel ready” notations) as well as to ensure all newbuildings operate on alternative fuels or are “fuel ready” (presuming that Methanol, Ammonia and LNG will be the appropriate alternative fuels for the future)
- II. Consider providing incentives (concessions, subsidies etc.) to encourage retrofitting and new construction of ships using alternative fuels (or alternative fuel ready notation) in Indian Shipyards
- III. Consider providing financial incentives to encourage ship owners who participate in pilot projects to assess the viability of an alternative fuel or technology
- IV. Consider providing financial incentives (e.g. reduced port charges) to ships using alternative fuels
- V. Consider providing incentives to ensure that Indian export/import cargo is transported on Indian Flagged ships which use alternative fuels.

- VI. Consider providing incentives to register existing ships using alternative fuels with the Indian Flag
- VII. Monitor developments in nuclear technology with a view to moving early and decisively to obtain the first mover advantage
- VIII. Monitor developments in onboard carbon capture technology with a view to moving early and decisively to obtain the first mover advantage
- IX. From the feedback & experience obtained from development and application of a roadmap for Indian Ships operating on international voyages, consider development of a separate roadmap or extending the original roadmap to cover Indian Ships operating on domestic voyages
- X. Identify and encourage measures to improve ship efficiency to reduce fuel consumption as far as practicable (e.g. Installation of superior AFS, periodic hull cleaning, installation of energy saving devices etc.).
- XI. Encourage major private sector conglomerates to initiate or increase their investments in Indian Shipping
- XII. Develop a knowledge sharing portal to discuss design or operational challenges faced on ships using alternative fuels & technology

8.2.4 Ports & Bunker Suppliers:

The following measures are proposed for consideration:

- I. Identify and evaluate the national ambitions as well as individual ambitions of major ports of India as regards supply of alternative green fuel bunkers to Indian as well as foreign Ships in the following terms
 - a. Fuels to be bunkered (drop-in biofuels and their blends, LNG, Methanol, Ammonia, Hydrogen (green versions in the long term))
 - b. Annual volumes for bunkering for each alternative fuel (Short, medium and long term)
 - c. Availability of existing facilities to be retrofitted or expanded (considering truck to ship, port to ship or ship to ship bunkering modes)
 - d. Availability of facilities for shore power supply
 - e. Availability of facilities for charging of battery systems onboard ships
 - f. Whether the port has plans to have carbon dioxide reception facilities

- g. Readiness or future action plans in terms of bunkering procedures, emergency plans,
 - h. Availability of skilled Port staff etc.
- II. Consider provision of incentives for encouraging bunkering of alternative fuels (including incentives for installation of new facilities or retrofitting of existing facilities) in India for both Indian and foreign ships
- III. Consider provision of incentives to encourage production of low carbon fuels, e-fuels/synthetic fuels domestically using renewable power obtained from nuclear power generation (e.g floating nuclear power plants)
- IV. Consider provision of incentives to Indian contractors and equipment suppliers as regards construction or retrofit of the bunkering infrastructure
- V. Consideration of liability regime with ships operating on alternative fuels (with regard to leaks of alternative fuels) and whether there is any action which should be taken by India in this regard
- VI. Consideration of development of a green fuel certification framework for bunker suppliers

CHAPTER IX: FINAL POLICY RECOMMENDATIONS TO THE GOVERNMENT TO ACHIEVE MAKV 2047 GOALS

The Sub-Committee presents the following as its formal policy recommendations, grounded in the data and deliberations described in this report and oriented toward the achievement of MAKV 2047. These recommendations are structured as a phased roadmap.

9.1 Phase 1 – Planning & Securing the base infrastructure (2026–2029):

The following actions are recommended for ensuring that the infrastructure for alternative fuels is in place:

- Consider recognizing that drop biofuels (and their blends), LNG, Methanol, Ammonia and Hydrogen would be the alternative fuels of the future and to design all future maritime policies and programmes accordingly
- Consider recognizing nuclear powered shipping as a major game-changer for international shipping and initiate preparatory steps for India in this regard
- Consider identifying the numbers of faculties and training institutes which will be necessary to upgrade the existing maritime workforce as well as nurture future workforce for alternative fuels
- Consider developing a schedule to train present faculty as well as engage experts to ensure readiness to contribute to development of national training courses/curricula for alternative fuels as well as digital technologies in shipping
- Consider developing national training courses/curricula and facilities(e.g. simulators) for seafarers, shipyard personnel, ship designers, port workers with regard to design, construction and operation of ships using alternative fuels technologies
- Consider refining existing policies/schemes to strengthen and equip India’s shipbuilding capabilities with regard to construction of new ships or retrofit of existing ships to use alternative fuels while also ensuring cultivation and nurturing of local supply chains with regard materials and equipment for such ships
- Monitor the ongoing development of India’s shipbuilding clusters and support them to achieve India’s target of MAKV 2047 with regard to increasing output of Indian shipbuilding and improving India’s share to global shipbuilding

- Consider developing and finetune a fuel transition roadmap for India’s merchant shipping fleet with priority focus on international shipping with a view to meeting IMO targets by [2040] [2045]
- Consider developing and finetune a fuel transition roadmap for India’s existing ports to ensure future readiness to bunker alternative fuels including their sourcing while also requiring new major ports being developed to incorporate facilities for alternative fuel bunkering
- Consider identifying opportunities to expand India’s green shipping corridors
- Consider identifying pilot projects for alternative fuel utilization demonstration and gain experience
- Consider producing zero carbon fuels and biofuels domestically.
- Consider identifying opportunities for cross sector co-operation (e.g. shipbuilding, ports, shipping, training institutes, regulators etc.)
- Consider developing incentives/policies to encourage major Indian conglomerates to invest in Indian Shipping infrastructure
- Consider encouraging academia by establishing centers of excellence to stimulate R&D on alternative fuels & technologies
- Consider developing and refine national knowledge portals for sharing of experience and knowledge gained during shipbuilding, pilot projects, global experience with alternative fuels, training of personnel as well as better co-ordination.
- Review the status of the above actions annually

9.2 Phase 2 – Execution (2030–2040):

The following actions are recommended for the medium term:

- In accordance with the developed national training courses/curricula, consider imparting training to relevant personnel

- Consider monitoring and support Indian shipping’s and shipbuilding transition to alternative fuel in accordance with the fuel transition roadmap developed in Phase 1 and ensure alignment with revised IMO GHG Strategy targets
- Based upon the progress achieved, consider developing schemes to encourage Indian shipbuilding to increase share of their export orders
- Consider monitoring and support Indian Ports transition to bunkering alternative fuels in accordance with the fuel transition roadmap developed in Phase 1
- Consider monitoring growth in the area of Nuclear Powered Shipping and if necessary, initiate steps to encourage Indian shipbuilding to construct nuclear powered ships; consider establishing nuclear shipping corridors with allied nations
- Review status annually taking into account associated developments (e.g regulatory)

9.3 Long-Term Vision (2040–2050):

- Consider achieving completion of India’s fuel transition in shipping & ports by early [2040] [2045]
- Considering ensuring operation of at least [1] [2] Indian flagged nuclear powered merchant ships by early [2040] [2045]
- Based upon the progress, consider expanding India’s shipbuilding sector to set targets for capturing the ship export market in terms of % of global shipbuilding

ANNEXURES

Annexure 1 Reference Documents for Part A:

1. United Nations Trade and Development (UNCTAD) (2025). Review of Maritime Transport 2025.

<https://unctad.org/publication/review-maritime-transport-2025>

2. Directorate General of Maritime Administration. (2025) Marine Environment Management Report

https://dgma.gov.in/download/1775895194_69da029a35f91_environment-eport-2025-formatted-file.pdf

3. Ministry of Ports, Shipping and Waterways. (2025). Indian Shipping Statistics 2024.

<https://shipmin.gov.in/sites/default/files/ISS%20Final%202024.pdf>

4. Ministry of Ports, Shipping and Waterways. (2025). Statistics of India’s shipbuilding and ship repairing industry.

<https://shipmin.gov.in/sites/default/files/Statistics%20of%20Indias%20Ship%20Building%20and%20Ship%20repairing%20Industry%202024-25.pdf>

5. International Maritime Organization. National Action Plans (please use the following link to view/download the national action plans submitted by Member States)

<https://www.imo.org/en/ourwork/environment/pages/relevant-national-action-plans-and-strategies.aspx>

6. S&P Maritime Portal

<https://www.spglobal.com/market-intelligence/en/industries/maritime>

7. Press Information Bureau Press Release

<https://www.pib.gov.in/PressReleasePage.aspx?PRID=2045946&reg=48&lang=2>

Part B

Autonomous Vessels and Advanced Navigation Systems

CHAPTER I: INTRODUCTION

The maritime industry is undergoing a gradual transformation driven by advancements in automation, digitalization, and data-centric operations. Autonomous vessels and advanced navigation systems represent an important evolution in this context, influencing ship operations and safety frameworks and evolution of specific regulatory approaches.

In alignment with India’s maritime growth objectives, environmental commitments, and the vision to develop a technologically advanced and sustainable shipping ecosystem, the National Shipping Board (NSB) has constituted a dedicated Sub-Committee. The Sub-Committee is tasked with examining emerging areas and providing recommendations for their safe and effective adoption in the Indian maritime sector. This includes assessing the readiness of the Indian maritime ecosystem to adopt these technologies and identifying key challenges related to safety, regulation, infrastructure, skills, and cost. Based on this assessment, appropriate policy, regulatory, and capacity-building measures are to be recommended, along with a phased roadmap aligned with national maritime and decarbonisation goals, and identification of opportunities for indigenisation in design, manufacturing, and repair.

The committee agreed to undertake the task in three stages. Stage 1 focuses on establishing the current status; Stage 2 involves obtaining inputs from relevant stakeholders; and Stage 3 covers the development of the final roadmap. The present Stage-1 report is intended to establish a common understanding of autonomous vessels, advanced navigation systems and the associated regulatory, technological, and operational ecosystem globally and in the Indian maritime context. The report is foundational and will set the direction and focus for subsequent work. It does not prescribe policy decisions, regulatory mandates, or implementation measures.

Recognizing the close interrelationship between these areas, the present report addresses autonomous vessels and advanced navigation systems in parallel.

CHAPTER II: STATEMENT OF THE PROBLEM

Globally Autonomous vessels and advanced navigation systems onboard ships and ports are progressing rapidly through pilot projects. In India, this evolution requires bridging the gap between emerging technological capabilities and a domestic regulatory and operational frameworks which were primarily formulated for conventionally manned vessels.

This challenge is compounded in complex, high-density environments like port approaches and coastal waters, where mixed traffic conditions demand seamless integration of navigation, propulsion, and shore-based systems. While individual technologies have reached varying levels of maturity, integrating them into reliable operational frameworks remains a primary hurdle. On the shore side, this requires upgrading current shore vessel support systems to handle unmanned or remotely operated assets safely.

Shifting operational control away from the shipboard environment introduces vulnerabilities across multiple domains. Key considerations include establishing clear legal liability, allocating responsibility between onboard crew and shore personnel, managing data sovereignty for assets controlled via external networks, and addressing heightened cybersecurity risks. The reduction or total absence of onboard crew also requires review of standard protocols for search and rescue (SAR), emergency response, and immediate port-side incident recovery.

India must align its domestic readiness with the IMO’s phased development of the Maritime Autonomous Surface Ships (MASS) Code, which is projected to become mandatory by around 2032, necessitating an immediate, comprehensive baseline assessment across India's regulatory frameworks, infrastructure capabilities, and human resource development systems.

CHAPTER III: PRESENT STATUS OF THE ISSUE - GLOBALLY AND NATIONALLY

III A – Global Status

3.1 Overview of Autonomous Vessels and Advanced Navigation Systems:

Autonomous Vessels:

Autonomous vessels represent a spectrum ranging from decision-support systems assisting on-board crew to remotely operated vessels and fully autonomous ships capable of independent operation. In general, most developments currently focus on levels of autonomy where human- in -the loop or human -on-the - loop is considered as an integral part of operations.

The driving factors for these developments are the need to enhance navigational safety, reduce human error, improve operational efficiency and optimise maritime logistics. Demonstration projects are aimed at validating the feasibility of remote-controlled operations and the concept of shore-based monitoring through Remote Operation Centers (ROC).

Advanced Navigation Systems:

Advanced navigation systems comprise integrated technologies that enhance situational awareness and support decision-making. These systems combine inputs from radar, AIS, GNSS and form a comprehensive situational awareness framework. At the same time, they are independently contributing to incremental improvements in safety and efficiency in conventionally manned vessel Navigation, and increasingly, vision-based and sensor-driven technologies.

Use of Artificial intelligence and predictive analytics in collision avoidance, route optimization and anomaly detection are being explored, either as standalone system or in systems using advanced autonomy. They are being increasingly adopted within port VTS framework to support improved data integration, communication systems and decision-support capabilities.

Remote Operations Centre (ROC):

A Remote Operations Centre (ROC), as envisaged in the draft Maritime Autonomous Surface Ships (MASS) Code being developed under the IMO, is a shore-based facility responsible for monitoring, supervising, and where required controlling the operation of autonomous or remotely operated vessels.

The ROC functions as the human interface in the autonomous ship depending on the level of autonomy, the ROC may provide monitoring or control functions. It integrates inputs from onboard sensors, navigation systems, machinery data, and external information sources to maintain situational awareness. Reliable communication links with the ship, redundancy, cyber security, ergonomics, backup are some of the key aspects which are required to be addressed in ROC design.

3.2 Global Developments and International Frameworks:

Autonomous Vessels:

Overview of International Developments:

Several technology demonstration projects have been undertaken globally to validate the feasibility of autonomous and remotely operated vessels. One of the main objectives is to demonstrate the practical viability of shore-based monitoring and control through Remote Operation Centers and demonstrate effectiveness of advanced sensing and decision-support technologies.

Technological innovations are moving with fast pace which could result in commercial use of ships with advanced autonomy, whether they are controlled remotely or are fully autonomous, in near future. While technology makes headway, it is essential to have robust regulation to ensure the safety of life at sea, as well as of cargo onboard and of the vessel itself. From a regulatory perspective, the focus is on developing goal-based, technology-neutral regulatory frameworks that ensure safety while enabling innovation

Regulatory Scoping Exercise:

In 2021 IMO conducted a regulatory scoping exercise on Maritime Autonomous Surface Ships that was designed to assess existing IMO instruments to see how they might apply to ships that utilize varying degrees of automation. The FAL Committee approved the outcome of the RSE under its remit at FAL 46 in May 2022.

This exercise has been carried out across multiple committees, including the Maritime Safety Committee, the Legal Committee, and the Facilitation Committee, reflecting the cross-cutting nature of autonomous vessel operations.

The review covered a wide range of instruments addressing:

- ✓ Safety and maritime security (SOLAS)
- ✓ Collision avoidance (COLREG)
- ✓ Training and certification (STCW)
- ✓ Search and rescue
- ✓ Facilitation of maritime traffic (FAL Convention)

The outcomes indicate that, in many cases, existing conventions may accommodate autonomous vessel operations as currently drafted with interpretative clarifications. However, certain provisions may require amendments or further development.

Key issues identified across committees include:

- ✓ Role and responsibilities of the master
- ✓ Role and responsibilities of remote operators
- ✓ Liability and accountability
- ✓ Need for consistent definitions and terminology
- ✓ Carriage of certificates

These issues have been recognized as basic and are being addressed through coordinated work across committees.

Development of MASS Code:

Following the completion of the scoping exercise and work initiated during the MSC's 105th session, the MSC has been developing a draft goal-based instrument regulating the operation of maritime autonomous surface ships. As per the IMO roadmap, a non-mandatory MASS Code was adopted in MSC 111 in May 2026, followed by the development of a mandatory code under SOLAS, which is planned for adoption by around 2030 and entry into force by approximately 2032. A quick summary of important chronological events leading to development of draft MASS Code is presented below.

-MSC 108 (May 2024) approved the report of the third session of the Joint MSC-LEG-FAL Working Group on MASS (MASS-JWG 3).

-MSC 109 (December 2024) agreed to a revised Road Map for the development of a MASS Code, as follows:

- May 2026 - finalize and adopt non-mandatory MASS Code;

- December 2026 – subsequent to adoption of draft MASS code develop a framework for an Experience-building phase (EBP)
- 2028 – Initiate development of the mandatory MASS Code, based on the non-mandatory Code while considering the inputs from the EBP and review conducted by the relevant sub-committees.
- By 1 July 2030 at the latest - adoption of the mandatory Code, for entry into force on 1 Jan 2032.

Joint MSC/LEG/FAL Working Group:

A Joint MSC/LEG/FAL Working Group has been established as a cross-cutting mechanism to address common issues identified by the regulatory scoping exercises for the use of MASS conducted by each of the three Committees - MSC, Legal Committee and Facilitation Committee.

The Joint MSC/LEG/FAL Working Group on MASS (MASS-JWG) meets regularly and the outcomes of these sessions are published separately. Key issues identified include the need to address the functional and operational requirements of the remote-control stations/centres and the possible designation of a remote operators as seafarers. Additional common gaps and themes identified across several safety treaties include provisions involving manual operations and bridge alarms; provisions related to personnel actions, such as firefighting, cargo stowage and securing, and maintenance; watchkeeping; implications for search and rescue; and information required to be onboard for safe operation.

It is also observed that autonomous and remotely controlled vessels are currently being tested in selected regions globally. These trials are generally limited to specific operational contexts, such as short-distance routes or controlled environments, reflecting a phased approach to validating technology and for defined operational requirements.

Trials and Operational Status:

Globally, testing of Autonomous and remotely controlled vessels is being carried out in selected regions, the trials generally being conducted in controlled environments, such as designated test areas or in specific routes. Recognizing the increasing number of such technology demonstration autonomous projects and considering the associated safety, security, and regulatory implications, the IMO developed MSC.1/Circ.1604 to provide interim guidelines for MASS trials

The Maritime Safety Committee (MSC) 101st session in June 2019 approved Interim guidelines for Maritime Autonomous Surface Ships (MASS) trials. (MSC.1-Circ.1604).

Among other things, the guidelines require that trials should be conducted in a manner that provides at least the same degree of safety, security and protection of the environment as provided by the relevant instruments. Risks associated with the trials should be appropriately identified and measures to reduce the risks, to as low as reasonably practicable and acceptable, should be put in place.

The guidelines also require that any personnel involved in MASS trials, whether remote operators or onboard, should be appropriately qualified and experienced to safely conduct MASS trials. Appropriate steps should be taken to ensure sufficient cyber risk management of the systems and infrastructure used when conducting MASS trials.

Near-term applications are expected to focus on:

- ✓ Coastal shipping
- ✓ Port and harbour operations
- ✓ Repetitive and predictable routes

3.3 Approaches Adopted by Major Maritime Nations:

Several maritime nations adopted defined approaches towards the development of autonomous vessel technologies. In general countries which have made significant progress have focused on pilot projects and collaboration between government, industry, and academia. While numerous nations are engaged in this evolving field, following discussion highlights selected national examples to examine their approaches to regulatory development, industrial collaboration, and technological innovation

Norway

Norway has transitioned from a global testbed for autonomous maritime technology to the world’s first operationally integrated autonomous ecosystem. The Norwegian Maritime Authority (NMA) published RSV 12/2020 Guidance in connection with the construction or installation of automated functionality aimed at performing unmanned or partially unmanned operations.

NMA has been working closely with industry, even before formal publication the IMO code, thereby providing Norwegian companies with early regulatory

guidance. This approach has helped in clarification of responsibility, which is a prerequisite for insurability and commercial deployment. Working closely with industry and its National Classification society DNV and the Yards, these initiatives have helped the maritime cluster in Norway to parallelly develop in the new technology.

The Massterly ROC in Horten, which became fully operational in 2024, is now a mature nerve center. The center can monitor diverse fleet ranging from subsea robotics to container feeders. This facility has demonstrated that a certified master can oversee multiple assets from shore, provided the situational awareness data, escalation protocols, and connectivity meet defined thresholds.

Establishing the world’s first national research center for artificial intelligence in the maritime sector and Norwegian Maritime AI Centre, led by the Norwegian University of Science and Technology (NTNU), are noted initiatives taken by Norway.

Japan:

In Japan the Nippon Foundation MEGURI2040 Fully Autonomous Ship Program is leading demonstration testing of fully autonomous navigation for coastal shipping. The success of this project is expected to create further opportunities for technological development in this field while promoting innovation. The MEGURI2040 Program is a large scale, multi-year project that brings over 50 companies under "All Japan" framework team to develop fully autonomous ships, including associated technologies such as AI navigation systems and land-based support centers.

Stage 1 of the project successfully conducted demonstration testing of six vessels by five consortia, including trials in Tokyo Bay, from 2020 to 2022. Stage 2 (2023 to 2026) focus is on improving operational areas that were identified as challenges in Stage 1, including the improvement in collision-avoidance and auto berthing/un-berthing technologies.

China:

China has adopted a broader approach that integrates autonomous vessel development with national digitalisation strategies and industrial policy initiatives. The China Classification Society (CCS) is working closely with the government to align China’s regulatory framework with emerging IMO

standards, while also updating its rules for intelligent ships in accordance with international developments.

In the defence sector, China demonstrated its expanding unmanned maritime capabilities at the 15th China International Aviation and Aerospace Exhibition (Airshow China), where it exhibited the large, unmanned combat vessel ‘Orca’, a 58-metre-long, 23-metre-wide, 4-metre-deep, 500-tonne high-speed stealth unmanned surface combat vessel.

As discussed above several maritime nations are working towards the development and deployment of autonomous vessel technologies. Common factors as below, can be observed across these initiatives.

- ✓ Phased development of level of autonomy
- ✓ Demonstration of projects in controlled environments
- ✓ Identification designated trial areas
- ✓ Active Collaboration between major stake holders
- ✓ Development of regulatory aspects for new technological developments

3.4 Key Insights on System Maturity, Integration, and Global Progress:

Technology innovation, pilot projects is leading to global development of autonomous vessels. However, an important observation emerging from these developments is that autonomous shipping is not defined by a single technology, but rather by the integration of multiple interdependent systems, each of which is at a different stage of maturity.

At a broad level, systems such as advanced navigation (including sensor fusion and decision-support), automated machinery control, and remote monitoring have reached a relatively higher level of maturity. Many of these systems are already deployed, either independently or in partially integrated forms, in conventional vessels as well as in controlled autonomous trials. For example, advanced navigation systems are increasingly capable of enhancing situational awareness, while machinery automation has long been implemented through systems such as unattended machinery spaces.

However, the transition from individual system capability to fully integrated autonomous operation remains a significant challenge. Autonomous vessel operation requires seamless coordination between navigation systems, propulsion control, communication networks, and shore-based support systems such as Remote Operation Centres and VTS. While individual components may perform

reliably in isolation, their combined performance under real-world conditions introduces complexity that is still being actively studied and tested.

A study of global developments indicates that most of the current projects in this technology are limited to coastal routes, inland waterways, or specified test areas, typically they operate in conditions or environments where risks can be assessed and managed.

Another important aspect is that human oversight continues to remain a central element in most of all current autonomous vessel concepts. Even in cases where vessels operate with a high degree of automation, human operators are involved either onboard or through shore-based Remote Operation Centres.

However certain critical operational functions remain comparatively less mature and continue to present challenges. These include:

Autonomous decision-making in complex and dynamic environments, particularly in mixed traffic conditions involving conventional vessels, fishing boats, and small craft

- Cybersecurity and data integrity in highly connected and data-dependent systems
- Reliable and fail-safe communication between ship and shore, including handling of latency or loss of connectivity
- Fully autonomous docking and berthing operations in congested port environments

In particular, globally the operation of autonomous vessels in mixed traffic environments is recognized as a major challenge as in real-world maritime environments could have multiple vessel types.

Accurate sensor data and continuous communication with shore-based systems is prerequisite for successful operation of autonomous vessel. As a result, the design of fail-safe modes and fallback operational strategies is a critical focus area.

From a systems perspective, the challenge is not only technological but also architectural and operational. Autonomous vessels represent “systems of systems,” where integration, interoperability, risk assessment and standardization play a crucial role. Technology validation, system integration and overall risk assessment are the key focus areas.

3.5. Advanced Navigation Systems:

Advanced navigation systems are evolving through integration of multiple data sources including sensors fusion technology and intelligent processing techniques. The systems encompass both shipboard and shore-based components that support safe and efficient vessel operations.

Shipboard Navigation Systems:

Onboard vessels, advanced navigation systems include Sensor fusion technologies integrating radar, AIS, GNSS, cameras, and other sensor inputs. Use of Artificial intelligence to enhance decision-making capabilities is also being considered and explored. In the context of autonomous vessels, these systems form the core decision-making layer, supporting perception, situational awareness, and navigation logic.

Port Navigation Support Systems (VTS):

Vessel Traffic Service (VTS), play a critical role in managing vessel traffic and enhancing navigational safety in port approaches, coastal waters, and congested sea lanes. VTS are guided by the recommendations and guidelines of the International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA). In high traffic and coastal operations, VTS systems are an established component of maritime safety.

VTS systems integrate multiple technologies and sensors such as radar, AIS, communication systems, and satellite-based inputs, and provide comprehensive real-time traffic awareness. Operators use these systems to monitor vessel movements, provide navigational information, organize traffic flow, and support incident response.

For commercial shipping, VTS contributes to:

- ✓ Improved traffic organization and efficiency
- ✓ Enhanced situational awareness in congested waters
- ✓ Reduction in navigational risks
- ✓ Support for port approach and departure operations

With the incorporation of advanced technologies such as data analytics, decision-support tools, and digital communication platforms, VTS is evolving beyond traditional monitoring functions towards more integrated traffic management and advisory roles.

In the context of autonomous and remotely operated vessels, VTS systems are expected to assume an expanded role within broader traffic management and operational coordination frameworks, supporting both conventional and increasingly automated vessel operations.

Digital Navigation Support Systems:

The digital data exchange between ship and shore navigation systems is a key element in the evolution of advanced maritime navigation capabilities. It is also enabling data exchange between vessels, Vessel Traffic Services (VTS), port systems, and other digital support infrastructure. Such data exchange between ship and shore would enhance traffic efficiency, operational safety and situational awareness. This interconnected framework also uses evolving communication technologies, including AIS, satellite communications, and emerging systems such as the VHF Data Exchange System (VDES). The VDES is designed to enhance maritime digital data exchange beyond traditional AIS capabilities through improved vessel-to-vessel, vessel-to-shore, and satellite communication.

In the context of autonomous and remotely operated vessels, this data exchange assumes additional importance. Shore-based systems such as VTS can:

- Provide a broader traffic perspective beyond onboard sensor range
- Support remote operation centres through supplementary situational awareness
- Assist in traffic conflict management and coordination
- Facilitate enhanced digital communication and interoperability through evolving data exchange systems such as VDES

As navigation systems are increasingly becoming digital and interconnected, an aspect which would help in future developments in remote operations and enhanced traffic management. Such technological advancements would need supporting standards, guidelines, and frameworks to ensure safe operations.

International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA):

The International Association of Marine Aids to Navigation and Lighthouse Authorities (IALA) plays an important role in the development and standardization of maritime navigation infrastructure and services, particularly in the areas of aids to navigation, Vessel Traffic Services (VTS), and maritime data exchange.

IALA has proactively initiated work to assess the short- to medium-term outlook for Maritime Autonomous Surface Ships (MASS), with the aim of supporting its members in preparing for a future with an increasing number of autonomous and remotely operated vessels. The Future of Maritime Autonomous Surface Ships (MASS) document examines the gradual adoption of MASS over the next twenty years. In parallel, the IALA VTS Committee is developing guidance on the implications of MASS from a VTS perspective. As part of this work, data is assimilated from various case studies which provide insights from trials and testbeds, including operational outcomes, lessons learned, emerging practices, and implications for VTS operations.

In this context, IALA’s work provides an important operational perspective on how shore-based systems may evolve to support increasing levels of automation in maritime navigation including data exchange.

IALA is also working on maritime data exchange frameworks, VHF Data Exchange System (VDES), which enhances communication capabilities beyond traditional AIS. For autonomous and remotely operated vessels, such connectivity is essential to ensure safe, coordinated, and interoperable operations.

Relevance to Port and Coastal Operations:

From a port perspective, IALA’s work has direct implications for the evolution of VTS systems and navigation support services. In the context of autonomous vessels, ports and VTS systems can play a supporting role by:

- ✓ Providing system-level situational awareness
- ✓ Facilitating coordination between vessels and shore authorities
- ✓ Supporting traffic management in mixed environments of conventional and autonomous vessels
- ✓ Acting as an interface between shipboard systems and remote operation centers
- ✓ Overall Perspective

IALA’s work brings out the importance of viewing autonomous vessel development not only from the perspective of onboard systems but also in terms of the supporting shore-based infrastructure and services. The evolution of VTS, aids to navigation, and maritime data exchange systems is likely to form an integral component of the broader ecosystem required to support advanced navigation and maritime autonomy

3.6 Cyber Security:

Autonomous vessels, including Maritime Autonomous Surface Ships (MASS) and naval Unmanned Surface Vessels (USVs), rely extensively on interconnected digital systems, remote-control links, and sensor-driven decision-making. This increased connectivity results in increased cyberattack surface compared to conventional ships

To address increasing cyber threats, IACS has introduced Unified Requirements UR E26 for ship-level cyber resilience and UR E27 for systems and equipment-level cyber security. However, these requirements are primarily designed for conventional, manned ships, where onboard crew can respond to and mitigate cyber incidents in real time. When viewed for autonomous ships especially in unmanned vessels, the requirements for Respond and Recover functions could need to be reconsidered from that perspective.

Since autonomous vessels can be monitored or controlled from Remote Operation Centers (ROCs), cyber security measures must be implemented at shore-based infrastructure, including communication links.

Cyber security is therefore expected to be an integral component of the evolving IMO MASS regulatory framework, with future development of the MASS Code likely to further strengthen requirements related to cyber risk management, system integrity, remote operation security, and the resilience of interconnected shipboard and shore-based systems.

3.7 Key Observations:

A review of global work indicates that the transition towards higher levels of maritime autonomy is occurring in a gradual and phased manner. At present, most operational implementations continue as Human -in-the- loop or Human-on-the-loop, particularly for safety-critical functions such as navigation, collision avoidance, and system recovery. Projects in general are tested in controlled environments, mostly for technology demonstration with increased focus on system integration, operational risks and ship shore communication.

III B – National Status:

3.8 Autonomous Vessels:

In India, the maritime regulatory framework is primarily designed for conventionally manned vessels. The Directorate General of Shipping and the

Ministry of Ports Shipping and Waterways are responsible for regulatory aspects. As an IMO member State India has actively participated in regulatory scoping exercise and subsequent development of draft MASS code. However, the national framework for maritime autonomous vessels has made notable progress through the publication of the draft Inland Vessels (Special Category Vessels: Autonomous and Semi-Autonomous) Rules. This high-level statutory framework establishes regulatory protocols, mandatory Certificates of Fitness.

The Indian Register of Shipping (IRS) has taken proactive steps by publishing Guidelines related to autonomous and remotely controlled vessels. These Guidelines provide an initial framework for classification, system design considerations, and safety aspects, which are being used in technology demonstration projects

India is witnessing early-stage initiatives in this domain, including technology demonstration projects and exploration of remote monitoring and control concepts. IRS is associated with some of these initiatives, contributing to validation and standardization efforts.

3.9 Advanced Navigation Systems -VTS:

India has made notable progress in navigational support system at port through the deployment of Vessel Traffic Services and port digitalization initiatives.

VTS installations at major ports and select coastal regions provide real-time monitoring of vessel movements, traffic organization, and navigational assistance.

In the context of emerging autonomous and remotely operated vessel concepts, existing VTS infrastructure can provide a supporting role by:

- ✓ Supporting coordination between vessels and shore-based entities
- ✓ Providing an interface for communication and traffic management
- ✓ Complementing remote operation centres and monitoring systems

National Automatic Identification System (NAIS) network has been implemented by the Directorate General of Lighthouses and Lightships (DGLL). This system provides extensive coastal coverage through AIS base stations.

At present, VTS implementation in India is distributed across individual ports, supported by the national AIS-based coastal surveillance network. However, a fully integrated national coastal VTS system is not yet operational. Proposal to

evolve existing VTS systems into a coastal VTS framework managed by DGLL is under active consideration.

CHAPTER IV: PRESENT STATUS & CHALLENGES FACED BY STAKEHOLDERS

The challenges outlined in this chapter are based on a review of global developments, system-level analysis, and the current Indian context. At this stage, these observations represent identified and anticipated challenges associated with the adoption of autonomous vessels and advanced navigation systems. Detailed stakeholder perspectives on these issues are presented separately in Chapter VI.

4.1 System Maturity and Architectural Integration Gaps:

As established by global pilot frameworks, autonomous shipping is fundamentally defined not by a single standalone breakthrough, but by the complex integration of multiple interdependent subsystems, each maturing at different speeds. While shipboard automated machinery control (e.g., Unattended Machinery Spaces - UMS) and basic sensor fusion tools possess a high degree of maturity, synthesizing them with real-time propulsion control, satellite telemetry data links, and shore-based Remote Operation Centers (ROCs) introduces deep architectural complexity. The primary system-level challenge is transitioning from individual component automation to fully integrated, un-interrupted autonomous operations under dynamic, real-world coastal conditions. Failures in data synchronization or latency between these disparate platforms represent a significant operational risk that requires standardized validation frameworks

4.2 Operational Reality of Mixed-Traffic Environments:

Unlike deep-sea corridors where navigation paths are highly predictable, regional maritime environments operate under mixed-traffic conditions.

Perception and Decision-Logic Limits: Current autonomous decision-making algorithms face significant challenges when calculating collision-avoidance trajectories in waters heavily populated by conventional vessels, non-AIS-compliant fishing boats, and localized small craft.

Port-Approach Congestion: The transition phase from open-sea navigation to fully autonomous docking and berthing within congested harbor limits remains a critical technological challenge. Furthermore, operations in inland waters within narrow channels, compounded by the presence of localized small craft, would pose similar navigational challenge.

4.3 Cyber Resilience and Telecom Redundancy Gaps:

Because autonomous and advanced navigation architectures rely extensively on unbroken, highly connected digital loops between the ship, OEMs, and shore control networks, they exponentially expand the cyberattack surface. Considering the extent of data connectivity and ship-shore data communication, additional controls, including comprehensive security measures at the shore side, would be required to address increasing cyber-attacks. Standardized fallback modes and telemetry safeguards remain a key system-level challenge during data link degradation or compromise.

4.4 Legal, Liability and Insurance Considerations:

The commercial deployment of autonomous and remotely operated vessels requires a review of legal, liability, and insurance considerations. Some of the issues which may need to be considered during such review could include allocation of responsibility between shipowners, remote operators, masters, marine insurance frameworks, and casualty response mechanisms.

4.5 Search and Rescue (SAR) and Emergency Response:

Autonomous vessel operations present unique challenges in emergency response, particularly in situations involving fire, flooding, machinery failure, distress assistance, or communication loss. The absence or reduction of onboard crew may require revised approaches to search and rescue (SAR) methodology.

4.6 Industrial Development and Indigenization Opportunities:

The development of autonomous vessels and advanced navigation systems would also create opportunities for development of indigenous technology in areas such as shipbuilding, navigation systems, digital platforms, sensor integration, and remote operations infrastructure. A policy framework which encourages indigenous development in above areas would support the Indian Maritime industry. Given the global interest and demand in this area, future export potential can also be considered, as part of broader maritime and digitalization objectives.

4.7 Employment and Workforce Considerations (Human Element):

India is a major supplier of seafarers globally. Introduction of commercial autonomous vessels may lead to changes in workforce requirements, including a potential role shift, as some of the onboard roles will be required to be performed as part of shore-based functions. While automation may lead to changes in job

roles, it may also create new opportunities in areas such as remote operations, data analysis, and system management. Training for new roles, responsibilities, skill development in new technology areas, support in ROC are some of the aspects which would require considerable attention.

These aspects have been addressed within the work of the International Maritime Organization, particularly through the involvement of multiple committees and the establishment of joint working groups, which reflect a coordinated approach to addressing safety, legal, and operational issues, including those affecting personnel.

CHAPTER V – PAST AND PRESENT POLICIES OF GOVERNMENT AND THEIR EFFICACY

India is in the process of establishing dedicated policy or regulatory frameworks specific to autonomous vessels and advanced navigation systems holistically covering all aspects necessary to adopt the new technology. An initiative has been already taken by Inland waterways authority through the publication of the Draft **Inland Vessels (Special Category Vessels: Autonomous and Semi-Autonomous) Rules**. This statutory gazette establishes a dedicated "Special Category" for fully autonomous (remotely operated) and semi-autonomous inland craft. Crucially, it institutes a mandatory **Certificate of Fitness** framework, defines localized risk-based manning structures, and mandates centralized data registration via the **Jalyan / NavIC portal**.

While this represents a significant step for India's Inland Waterways, a foundational framework that can be progressively adapted to govern coastal, near-shore short-sea shipping, and deep-sea commercial vessels under the Merchant Shipping Act is to be developed.

The development of autonomous vessels and advanced navigation systems is closely linked with broader maritime and digitalization initiatives undertaken over a period of time. A number of initiatives undertaken by the government in the areas of port modernization, digitalization, and maritime infrastructure development, can be considered as initial steps towards adoption of new technology.

One of the key initiatives in this regard is the Sagar Mala Program, which focuses on port-led development through modernization of ports, enhancement of connectivity, and promotion of coastal shipping. As part of this initiative, considerable emphasis has been placed on improving port efficiency, adopting modern technologies, and strengthening logistics integration. These developments have contributed to the creation of infrastructure and operational frameworks that can support, with further augmentation for, advancements in digital and automated maritime operations.

In parallel, the implementation of Vessel Traffic Service at major ports has significantly enhanced real-time monitoring, traffic organization, and navigational safety within port limits and approach channels. VTS has introduced the use of radar, AIS, communication systems, and integrated monitoring

platforms, thereby creating an operational environment where digital tools are used routinely for traffic management. Although these systems were primarily developed for conventional vessel operations, they form an essential foundation for supporting higher levels of automation and future integration with autonomous vessel operations.

The deployment of the National Automatic Identification System (NAIS) network by the Directorate General of Lighthouses and Lightships (DGLL) represents another important milestone. The NAIS network provides extensive coastal surveillance and vessel tracking through AIS base stations along the Indian coastline. This system enhances maritime domain awareness and supports safety and security objectives. From the perspective of future maritime automation, such nationwide data infrastructure is a key enabler for ship–shore data exchange and situational awareness.

Additionally, initiatives related to port digitalization and smart port development have been undertaken across various major ports. These include the adoption of digital platforms for port operations, improved communication systems, and integration of information flows across different port functions. While these initiatives are primarily aimed at improving operational efficiency, they also contribute to the broader transition towards a digital maritime ecosystem.

From a regulatory perspective, India has been actively participating in the development of international conventions and standards through the IMO especially in development of non-mandatory MASS CODE. These efforts have established a strong regulatory base and institutional framework that can be adapted to address emerging technologies such as autonomous vessels.

In terms of efficacy, these past policies and initiatives have been largely effective in:

- ✓ Enhancing port efficiency and navigational safety
- ✓ Establishing foundational digital and surveillance infrastructure
- ✓ Supporting improved coordination between ship and shore systems

However, it is also evident that these initiatives were not originally designed with autonomous vessel operations in mind. As a result, gaps remain in terms of:

- ✓ shipboard and shore-based digital Data exchange systems
- ✓ Standardized frameworks for data exchange

✓ Regulatory provisions addressing autonomy and remote operations

Overall, past policies have played an important enabling role by creating the base infrastructure, institutional arrangements, and operational practices that can support future developments. The experience gained through these initiatives provides a valuable foundation upon which more targeted policies and strategies for autonomous vessels and advanced navigation systems can be developed

CHAPTER VI – DISCUSSIONS WITH STAKEHOLDERS

A structured questionnaire was used to obtain stakeholder inputs covering regulatory, technological, operational, and workforce aspects. At present, inputs from shipowners and operators are limited, considering that current autonomous vessel activities are largely confined to technology demonstrations, including naval applications, and that adoption of such technologies is yet to be implemented on commercial vessels.

The following were approached as the relevant stakeholders for collecting feedback to be incorporated within this report:

- ✓ Domain Experts
- ✓ Port Authorities
- ✓ Seafarer Unions
- ✓ Maritime Training Institutions and Academies

Feedback from the following institutions and Technology providers was obtained

- ✓ JNPA (Port)
- ✓ DPA (Port)
- ✓ CPA (Port)
- ✓ Seven Islands Maritime Training Institute (Training Institute)
- ✓ ACCL (Technology Provider)
- ✓ BEL (Technology Provider)
- ✓ MUI (Seafarers union)
- ✓ NUSI (Seafarers Union)
- ✓ ROBOSYS (Technology provider)

The feedback collected is compiled below for ports, training institutes and seafarers unions. whereas feedback from technology providers is compiled and presented in chapter VII as domain experts.

6.1 Port Authorities and VTS Operators:

Infrastructure Deficits: Port stakeholders explicitly stated that current physical and digital port infrastructure is not yet technologically equipped to handle, berth, or monitor remotely operated or autonomous vessels safely within commercial channels.

Need for Standardized Classification Interface: Port operators emphasized that before any commercial trials or deployments guidelines detailing the precise technical interface and communication protocols between vessels with advanced autonomy and port infrastructure should be developed.

Geopolitical and National Security Considerations: Stakeholders noted potential security apprehensions regarding vessels operating under remote or autonomous control, particularly close to sensitive naval zones will necessitate specific defence clearances and specialized operational approvals. For the longer-term future, distinct regulatory requirements and compliance frameworks will need to be developed to govern foreign-controlled or foreign-flagged autonomous vessels operating within sovereign Indian waters.

Based on extended operational data compiled across domestic port administrations, current Vessel Traffic Services (VTS) maintain an effective radar coverage limit extending to an average of 12–15 nautical miles, backed by standard 30-day data logging architecture. While primary radar and AIS feeds are actively integrated to monitor vessel identities, courses, and estimated times of arrival (ETA), these setups lack automated processing, Artificial Intelligence (AI) integration, and synchronized camera feeds. Consequently, port operators provide advice through manual coordination with ships and pilots. To transition toward autonomous operations, port authorities emphasize to a shift from voice-dependent VHF traffic management to predictive, with higher automated level - supported risk assessment platforms

Furthermore, field-level inputs highlight environmental risks within narrow, high-density Indian shipping channels, where brief distances between harbour entrances and commercial berths leave little margin for error. In these restricted waters, the consequences of sudden technical failures can be severe. This operational vulnerability is heavily compounded during monsoon periods by intense seasonal currents and the unpredictable movements of non-AIS-compliant fishing boats and local small craft. Because unmanned assets could lack onboard human pilot judgment to dynamically calculate and execute close-quarters manoeuvring, stakeholders mandate that prior to any commercial trials, a unified data architecture via APIs must link port frameworks with Remote Operation Centres (ROCs), and explicit shore-side safety benchmarks must be established for immediate emergency tug availability.

6.2 Seafarer Unions:

The Regulatory Prerequisite: Seafarer representative bodies strongly advocate that under no circumstances should remotely operated or autonomous vessels be permitted to operate commercially within Indian waters until a comprehensive, legally binding domestic regulatory framework is enacted.

STCW Curriculum Overhaul and Stratified Modules: Unions called for the development of a dedicated, certified training regime on Autonomous and Digital Navigation Systems integrated under the STCW (Standards of Training, Certification and Watchkeeping) framework. Stakeholders noted that skill development must not be generic, but stratified into distinct competency modules tailored across three specific levels:

- ✓ **Junior Officers:** Focusing on basic automated system monitoring, data interpretation, and interface operation.
- ✓ **Senior Officers:** Focusing on systems-level management, fallback management, and human-in-the-loop intervention protocols.
- ✓ **Shore-Based Operators:** Highly specialized training for Remote Operations Centre (ROC) personnel managing vessels from land.

Human-Centric Technology:

Seafarer stakeholders emphasized that India's policy must adopt a cautious, phased, and human-centric transition pathway. The collective consensus of the workforce is that the future of Indian shipping must be built on three core pillars: technology with responsibility, innovation with regulation, and automation with the protection of seafarers' rights and employment stability.

6.3 Maritime Training Institutions and Academies:

A. Execution Roadmap - STCW Curriculum Overhaul and Stratified Modules:

Technical skill development must not be generic, but explicitly integrated under the Standards of Training, Certification and Watchkeeping (STCW) framework and stratified into distinct competency modules tailored across three specific operational levels to ensure robust execution:

- ✓ **Level 1: Junior Officers / Operators:** Training must focus directly on digital and data literacy to interpret and act on integrated bridge monitoring

systems, alongside basic automation awareness to identify system limits. A structured competency pathway is envisaged where junior operators first sail on vessels operating in autonomous mode as observers to gain real-world experience before appearing for competency examinations leading to a formalized Ship Operator Certificate of Competency.

- ✓ **Level 2: Senior Officers:** Training must center on macro-systems management, complex diagnostic analysis, alarm management, fault detection, and override procedures. Curricula must integrate scenarios where automation fails, building independent judgment and the capacity to respond confidently when systems produce incorrect or conflicting outputs.
- ✓ **Level 3: Shore-Based Operators:** Highly specialized training pathways must be designed specifically for Remote Operations Centre (ROC) personnel managing or monitoring vessels from land. Simulators must be upgraded to feature shore-based control interfaces, focusing heavily on communication skills, situational awareness, and decision-making under high uncertainty.

B. Execution Barriers - Practical Methodology & Simulator Upgrades:

- ✓ **Simulator-Based Practical Delivery:** Blended learning combining e-learning, classroom instruction, and hands-on simulator exercises is recognized as the most effective delivery method. Existing courses including Bridge Resource Management (BRM), Engine Room Simulator (ERS), and Dynamic Positioning (DP) must be updated to cover fallback procedures.
- ✓ **Advanced Infrastructure Investments:** Comprehensive execution requires significant upfront investment in modern full-mission bridge and engine room simulators capable of meeting MASS training requirements. Academies emphasize that theoretical training without realistic simulation is entirely incomplete.
- ✓ **Critical Data Evaluation:** Beyond mandatory minimums, trainees must be systematically taught to critically evaluate digital information, cross-check telemetry across multiple independent systems, and understand chart accuracy limitations as e-navigation, digital port entry, and single-window reporting become standard.

C. Global Competitiveness - Strategic Opportunities and Market Barriers:

- ✓ **Global Competitive Edge for Indian Seafarers:** Early adoption of these frameworks by Maritime Training Institutes will leverage India's massive seafarer pool and make Indian seafarers highly competitive globally as international demand grows for professionals skilled in autonomous and digital systems. Employment opportunities will actively expand for young, technologically adept professionals who can master these emerging systems at pace.
- ✓ **Faculty Development:** Because a training institute is only as capable as its faculty, targeted instructor development through manufacturer training is highlighted as an immediate, low-infrastructure priority area to protect educational quality.
- ✓ **Technical and Economic Gaps:** Key barriers include the unproven reliability of autonomous systems in poor weather or congested Indian coastal waters, the absence of high-bandwidth, low-latency shore communication infrastructure, and the high upfront cost of advanced simulator equipment. Stakeholders note that a financial support mechanism from the Government of India needs to be established to assist domestic training institutions with these infrastructure costs.

6.4 Institutional Recommendation- Inter-Agency Coordination Cell:

Establishing a centralized "Autonomous and Digital Maritime Systems Cell" under an inter-agency single-window mechanism was identified as an important step towards safe implementation of new technology. The stakeholders opined that such body should be established under the Ministry of Ports, Shipping and Waterways, and should include DG Shipping, National Shipping Board, Indian Ports, Coast Guard, Navy, Classification society recognised seafarers' unions, training institutions etc. This cell will oversee national guidelines, coordinate shared regulatory pilot programs, and manage regular tripartite consultations to ensure that technological innovation balances smoothly with human welfare and national security.

CHAPTER VII – VIEWS OF DOMAIN EXPERTS

Inputs have been obtained from technology providers who have developed the autonomous systems including installation and trials in India. Their views/suggestions are summarized as below

Validation of Core Algorithmic Systems:

Industry technology experts strongly endorse the immediate implementation and regulatory acceptance of Artificial Intelligence (AI)-driven COLREG (International Regulations for Preventing Collisions at Sea) engines and advanced electronic decision-support systems to improve situational awareness on both conventional and automated hulls.

Mandatory Simulations:

Experts emphasize that physical deployment must be preceded by rigorous, high-fidelity simulation and hardware-in-the-loop (HIL) testing against an India-specific scenario library. Technology approvals should be tied to outcome-based functional equivalence frameworks, recognized standards and Class Notations.

Phased Operational Geographies:

Technical domain experts recommend that initial deployment areas for remotely operated or autonomous hulls in India be strictly confined to predictable, controlled, and lower-risk maritime environments. Priority zones should include:

- ✓ Coastal routes with highly predictable traffic patterns.
- ✓ Inland Waterways networks.
- ✓ Localized port craft operations, specifically automated tugs and mooring boats operating within designated port limits.

System integrators identified several acute engineering challenges that current advanced sensor suites must resolve:

Sensor Performance Degradation: Reduced reliability and high false-alarm rates of optical, radar, and LiDAR sensor fusion arrays during adverse Indian tropical weather conditions (e.g., heavy monsoon downpours, high humidity, and coastal fog).

Data Latency & Bandwidth Constraints: The high risk of data packet dropping, satellite latency, and restricted bandwidth availability during real-time remote vessel manipulation.

Fallback and Incident Response: Need for standardized, triple-redundant mechanical fallback systems and defined incident response methodologies if an autonomous vessel experiences a total black-out or loss of telemetry.

Edge Architecture: Technical consultants stressed that systems must be built for "Edge Autonomy" meaning the vessel can safely execute obstacle avoidance and fail-safe behaviors (such as returning to base) even during a total prolonged loss of communication. Furthermore, a strict Zero-Trust architecture with cryptographic command verification and total network isolation of safety-critical navigation systems is recommended.

Shoreside and Port Interoperability Barriers: Technology providers highlighted that existing Vessel Traffic Service across Indian ports need to be upgraded with modern data protocol capabilities. Integrating highly digital ship-shore telemetry streams with existing, voice-dependent system as a major interoperability bottleneck.

Signal Vulnerabilities and Cyber Threats: Domain experts warned that increased reliance on global satellite networks introduces severe vulnerabilities to Global Navigation Satellite System (GNSS) spoofing, signal jamming, and cyber-takeovers of the main data communication links, which could allow hostile actors to seize control of a vessel remotely.

Reassignment of Legal Liability Limits: The experts highlighted a critical legal gap regarding traditional "Master" obligations. They recommend that the national framework reassign liability based on "Decision Authority" rather than vessel ownership alone. Under this framework, incidents resulting from autonomous algorithmic execution will trigger product liability for software developers and system OEMs, while remote operator errors will remain under joint owner-operator liability.

CHAPTER VIII: NATIONAL AND GLOBAL BEST PRACTICES

8.1 Global Benchmarking Context:

A review of global developments indicates that several maritime nations have adopted structured and phased approaches towards the development and deployment of autonomous vessel technologies. Detailed operational approaches and national case studies (including Norway, Japan, and China) are discussed comprehensively in Chapter III under Section 3.3 (Approaches Adopted by Major Maritime Nations).

These proven international frameworks provide vital structural insights and serve as the analytical baseline for developing a customized, highly secure policy framework within the Indian maritime context.

8.2 Core Pillars of International Best Practices:

When synthesizing global pilot frameworks, four key operational elements emerge across successful national strategies.

- **Phased Implementation approach:** Leading maritime administrations do not authorize full autonomy immediately. Operations are systematically stepped up from human-in-the-loop decision support to remote supervision, and finally to controlled autonomous trials, ensuring safety metrics are verified at every stage.
- **Controlled Testing Environments:** The designation of specific, geofenced physical testing areas and regulatory pilot programs is standard practice. These zones allow system integrators to validate algorithms under real-world conditions without disrupting commercial shipping lanes.
- **Strong Collaboration:** Successful ecosystems rely on structured, ongoing alignment between government regulators, industrial technology partners, and academic or training institutions. This ensures that regulatory updates, technology design, and workforce upskilling evolve at the same speed.
- **Parallel Development of Adaptive Regulatory Frameworks:** Rather than enforcing existing rules, administrations are establishing goal-based, technology-neutral interim guidelines. This legal flexibility actively supports emerging digital technologies while keeping safety of life at sea paramount.

CHAPTER IX – SUGGESTED POLICIES

The proposed national policy framework addresses five foundational pillars required towards adoption of new technology and at the same time support safe transition and suggests framework for governance for effective implementation of the policies.

9.1 Foundational Policy Pillars:

i) Legal Adaptations to Maritime Law:

Traditional international and domestic maritime laws fundamentally assume the physical presence of a certified Master and crew onboard to ensure safety of life at sea. The policy should actively address:

- ✓ Phased alignment with the evolving IMO MASS Code.
- ✓ Clear legal definitions regarding civil and criminal liability allocation between shipowners, remote operators, and traditional masters.
- ✓ Targeted amendments to existing legislative frameworks, specifically the Merchant Shipping Act and the Inland Vessels Act, or the provision of temporary statutory notifications to facilitate controlled technology development.

ii) Infrastructure and “Smart Ports” Integration:

Advanced and automated vessels cannot operate safely without highly digitalized, responsive shore-side environments. The policy must mandate:

- ✓ Smart Port Upgrades: Modernizing port digital architecture to ensure seamless, automated data handshakes between shipboard telemetry streams and Vessel Traffic Services (VTS).
- ✓ Remote control center (ROC) Establishing designated, state-of-the-art shore facilities equipped to continuously monitor, supervise, and remotely control autonomous vessels.
- ✓ Dedicated Testing Areas: Designating specific physical and regulatory maritime testbed zones, along with mandatory safety requirements to be complied with for executing autonomous vessel trials.

iii) Contingency Mitigation and Cyber Resilience:

Since advanced navigation architectures rely entirely on unbroken data connectivity, they remain highly vulnerable to telemetry degradation and malicious actors. The policy should specify:

- ✓ **Mandatory Communication Redundancy:** Requiring redundant independent satellite and terrestrial data links on all vessels executing advanced remote operations.
- ✓ **Fail-Safe Protocols:** Standardizing hardcoded automation rules where a total loss of telemetry signals immediately triggers an automated, onboard "safe-state" command.
- ✓ **Marine Cyber-Defence Policies:** Formulating rigid shore-side and coastal cybersecurity regulations to actively prevent the spoofing, jamming, or unauthorized cyber-takeover of autonomous data streams.

iv) Indigenous Development (Atmanirbhar Bharat):

To align directly with the Government of India's vision for strategic self-reliance, a dedicated policy framework should incentivize the domestic engineering, design, testing, and manufacturing of critical standalone autonomous subsystems. This initiative will accelerate local technology evolution while positioning the Indian maritime cluster to tap into high-value global export potentials.

v) Human Capital Transition & Upskilling:

Addressing the workforce shift requires a proactive policy addressing training, certification, and watchkeeping standards specific to autonomous shipping:

- ✓ **STCW Alignment:** Developing a certified, high-tech "cyber-maritime" training regimen that ensures Indian seafarers hold valid, legal qualifications recognized globally under the STCW regime.
- ✓ **Stratified Competency Modules:** Tailoring education into distinct modules across three levels: junior officers (monitoring and data interface), senior officers (systems management and override intervention), and shore-based operators (specialized ROC execution).

9.2 Strategy for a phased implementation:

Technology implementation should be guided by its maturity and operational challenges. Accordingly, it is proposed that initial focus for implementation of vessels with advanced autonomous functions could be restricted to human-in-the-loop, crew-assist safety systems for coastal vessels with clear operational procedures. For vessel under IV act the initial phase could be restricted to advanced decision support systems with crew onboard.

9.3 Coordination committee and Transition Management:

To ensure a smooth, efficient, and technology-ready transition in India’s maritime ecosystem ahead of the IMO MASS Code becoming mandatory, a unified, multi-stakeholder framework is required to bridge legacy regulations with next-generation digital architectures.

The National Autonomous Maritime Transition Committee should serve as the central nodal authority to synchronize regulatory updates, technical certifications, infrastructure readiness, defence clearance, and workforce skilling across the Union of India.

Composition of the Committee: The Committee may comprise of designated representatives from the following apex bodies:

- ✓ Directorate General of Shipping (DGS)
- ✓ Indian Ports Association (IPA)
- ✓ Directorate General of Lighthouses and Lightships (DGLL)
- ✓ Inland Waterways Authority of India (IWAI)
- ✓ Indian Register of Shipping (IRS)
- ✓ Inter-Ministerial Strategic Partners: Ministry of Defence (Indian Navy / Indian Coast Guard) to govern maritime security, defensive surveillance, and coastal safety parameters.
- ✓ Labor Representatives: National Union of Seafarers of India (NUSI) and Maritime Union of India (MUI) to protect seafarer welfare and employment transition.
- ✓ Members from Academia, Training institutes

CHAPTER X: POLICY RECOMMENDATIONS TO THE GOVERNMENT TO ACHIEVE MAKV- 2047 GOAL

10.1 Overview:

The findings of the initial assessment, combined with international benchmarking and feedback from domestic stakeholders, have been consolidated while developing following strategic measures. These recommendations establish a phased and coordinated transition pathway while considering the legal aspects. The recommended policies are considered towards safe adoption of autonomous vessels and advanced navigation systems, serving as key strategic enabler as part of India’s Amrit Kaal Vision 2047 (MAKV-2047) goals for these items.

The Maritime Amrit Kaal Vision 2047 defines its national objectives across 11 key strategic themes, the adoption of autonomous and advanced navigation frameworks in drives following core themes:

Enhance Efficiency Through Technology & Innovation: Overcoming the critical challenge of tracking small, non-AIS-compliant craft by deploying high-precision radars and advanced tracking filters.

Develop World Class Education, Research & Training Facilities: Instituting modern simulator protocols to upscale the Indian seafarer base into certified Remote Operations Centre (ROC) operators.

Enhance Modal Share of Coastal Shipping & Inland Water Transport: Providing an automated safety net (via Advanced Decision-Support Systems) to safely scale up cargo movements in high-density, mixed-traffic domestic channels.

10.2 Enabling Legislative Framework:

It is identified that transitioning to various levels of autonomy starting from decision support to fully autonomous mode requires a systemic, multi-dimensional approach encompassing shipboard systems, port infrastructure, national defence systems, and human capital upskilling. Considering that the international regulatory ecosystem is rapidly moving toward mandatory compliance, India should also develop an integrated, legally backed national strategy to protect its maritime interests while adopting the new technology.

10.3 Recommended Policy Direction:

10.3.1 Phased and Controlled Adoption:

It is recommended to adopt a phased approach toward deploying autonomous and remotely operated vessels. A strict policy distinction should be maintained regarding Remote Operations Centres (ROCs). In the short-to-medium term, any vessel operated via an ROC within Indian coastal waters must be manned by a fully qualified crew on board to serve as a fail-safe physical override. Progression to fully unmanned operations should not be allowed until extensive safety data is established across a multi-year trial phase.

10.3.2 Regulatory Preparedness and Legislative Realignment-MS Act:

- ✓ Establish an enabling legal framework under the Merchant Shipping Act and the Inland Vessels Act to formally recognize land-based remote operators and define shifting liability architectures.
- ✓ Draft and publish national interim guidelines to legally protect and regulate technology trials.
- ✓ Ensure alignment of the domestic regulatory framework with the IMO MASS Code milestone timelines, targeting complete baseline readiness by the 2032 mandatory enforcement date.

10.3.3 Development of Shore-Based Infrastructure:

- ✓ Upgradation of existing port VTS infrastructure to adopt modern digital data telemetry protocols.
- ✓ Facilitate construction of Remote Operation Centres (ROC) and explore the phased deployment of ROCs

10.3.4 Structured Testing Framework and Testbeds:

- ✓ Identify and promulgate controlled testing areas for advanced navigation trials.
- ✓ Mandate fallback systems, risk assessments (taking reference MSC.1/Circ.1604) and safety validation methodologies as prerequisite conditions for issuing trial permits.

10.3.5 Cyber Security and Data Integrity:

- ✓ Formulate a dedicated National Maritime Cyber Security Framework specifically tailored for shore support systems and along the coast line.
- ✓ Formulate technical standards governing real-time communication redundancy, secure ship-to-shore data exchange loops, and fallback modes.

10.3.6 Human Resource Management and Stratified Training:

- ✓ Review of domestic maritime training curriculum to include advanced data analysis, and digital watchkeeping into baseline maritime education.
- ✓ Establish formal, certified qualification and licensing standards for land-based Remote Operation Centre personnel.

10.3.7 Promotion of Indigenous Industry:

- ✓ Provide incentives and research grants to domestic technology startups, and system integrators specializing in maritime sensor fusion, AI collision-avoidance engines, and telemetry.

10.3.8 Institutional Coordination Mechanism:

- ✓ Formally establish a multi-agency coordination committee (including DGS, Ports, DGLL, IWAI, IRS, Ministry of Defence, academy, training institutes, Maritime Unions etc.) similar to the IMO’s integrated, cross-cutting approach across safety, legal, and facilitation domains. The committee could be formulated up to short term implementation program and could be extended as required.

10.4 Proposed Roadmap for Implementation:

Objective: To establish India as a primary global hub with certified seafarers as ROC operators, operation of advanced autonomous technology vessels as onboard operators, indigenous development of autonomous systems

Short-Term (0–3 Years):

- ✓ Draft and release national interim guidelines governing autonomous maritime trials, focusing on coastal vessels and automated port craft (tugs/mooring boats) under the MS Act including manual human-takeover times under varying crew configurations during emergencies.

- ✓ Formulate and adopt technical framework for vessel with Advanced Decision-Support Systems (ADSS) under the IV Act to provide immediate collision-avoidance assistance with personnel on board
- ✓ Gazette and secure initial designated physical testing areas along the coastline.
- ✓ Curriculum mapping for skill development modules with training institutes.
- ✓ Identify areas for technology upgradation of port digital infrastructure.
- ✓ Formulate VTS integration requirements.
- ✓ Establish cyber secured ship shore communication standards (including ROC)
- ✓ Table the necessary legislative amendments to the Merchant Shipping Act before Parliament.
- ✓ Mandate a "Simulation-First" validation requiring all autonomous navigation software to pass hardware-in-the-loop (HIL) testing against a specific context, before physical trial permits are granted.
- ✓ Formulate initial functional ROC capabilities and initiate pilot projects
- ✓ Methodologies to encourage indigenous development of technology including high accuracy sensors
- ✓ Introduce the formal training, watchkeeping, and certification standards for ship and shore-based operators

Medium-Term (3–7 Years):

- ✓ Consider phased adoption of the proven software of matured coastal autonomous systems into the inland waterway vessels, progressively scaling from decision support system to remote control operation with crew on board. Sensors with higher sensitivity could be required to accurately capture high-density small river craft.
- ✓ Construct completely functional ROC with required capabilities.
- ✓ Data integration upgrades across major port VTS systems

Long-Term (2033 and beyond):

- ✓ Alignment with the mandatory IMO MASS Code framework.
- ✓ Fully deploy an integrated national ship-shore maritime digital ecosystem across the entire Indian coastline.
- ✓ Pilot projects for remote control of inland autonomous vessels

ANNEXURES

Annexure I. Reference Documents for Part B

- ✓ The Future of Maritime Autonomous Surface Ships (MASS) – IALA
- ✓ Notification of Inland Vessels (Special Category Vessels: Autonomous and Semi-Autonomous) Rules, 2025 to be framed under the Inland Vessels Act, 2021 in the Gazette of India,
- ✓ Developments with Autonomous Ships- Possible Case Studies from a VTS Perspective (24 January 2022)
- ✓ <https://www.iala.int/technical/mass/>
- ✓ http://eng.mod.gov.cn/xb/News_213114/TopStories/16352706.html
- ✓ <https://www.ntnu.edu/mai>
- ✓ <https://en.nippon-foundation.or.jp/what/projects/ocean/meguri2040>
- ✓ The Nippon Foundation MEGURI2040 Fully Autonomous Ship Program
_ The Nippon Foundation
- ✓ Class NK Technical journal No 3 2021
- ✓ Cyber Risk Management for Autonomous or Remote-Controlled Ships-
CDR Frank Strom –United States Coast Guard Office of Design & Engineering Standards
- ✓ IRS Guidelines on Autonomous and Remotely Operated Vessels
- ✓ IALA G1117 (VDES Overview)
- ✓ IALA R1007 (VDES Shore Infrastructure)
- ✓ IMO MSC.1/Circ.1595 (e-Navigation)
- ✓ IACS Unified Requirements UR E26 and UR E27 (Cyber Resilience)

- ✓ Indian Register of Shipping Rules and Regulations for the Construction and Classification of Steel Ships

PART XV
Sub-Committee Repot

Sub-Committee No. 14

Title:

**Reduction of Logistics Cost in India Towards a Cargo-Centric,
Integrated Multimodal Logistics Ecosystem**

Chairperson: Shri Rahul B. Modi

PREFACE BY THE CHAIRPERSON OF THE SUB-COMMITTEE



Rahul Modi President CCTA

It is a privilege to place this report before the National Shipping Board. Logistics cost is not determined by one mode or one ministry. It is the cumulative result of first-mile access, line-haul cost, handling, transfer delays, documentation, taxation, storage, inventory carrying cost, risk, empty movement and last-mile delivery. A low line-haul freight rate can still produce a high landed cost if service frequency is uncertain or cargo waits at terminals.

The central proposition of this report is simple: cargo must come first. Road, rail, sea and inland waterways should be treated as complementary links, and the best route should be selected corridor-wise and commodity-wise. The cargo owner should experience one accountable service, one data flow, one transparent all-inclusive price and one liability framework.

The recommendations draw on operating experience and stakeholder consultations involving cargo owners, freight forwarders and multimodal transport operators, road transporters, rail and coastal operators, ports, terminals, maritime boards and government agencies. They also build upon PM GatiShakti, the National Logistics Policy, Sagarmala, Bharatmala, Dedicated Freight Corridors, ULIP, port modernization and the MAKV 2047 vision.

Rahul B. Modi
Chairman Sub-committee on Reduction of Logistics Cost
National Shipping Board

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ACKNOWLEDGEMENTS

The report acknowledges the guidance of the National Shipping Board and the Ministry of Ports, Shipping and Waterways. It also records appreciation for the practical inputs of cargo owners, freight forwarders, multimodal transport operators, road and rail operators, coastal shipping stakeholders, port and terminal representatives, maritime boards and government agencies whose experience has informed the findings.

Special acknowledgement is due to stakeholders who highlighted operational realities often not visible in aggregate statistics: the cost of empty running, uncertain vessel or train schedules, non-standard port charges, handling duplication, GST and input-tax-credit distortions, documentation gaps, claims uncertainty, and the disproportionate burden borne by MSMEs.

LIST OF CONTRIBUTORS

Shri Rahul B. Modi - Member, National Shipping Board; Lead Contributor and compiler of stakeholder and field inputs.

National Shipping Board Secretariat - Coordination and report-format guidance.

Participating stakeholders - Cargo owners, freight forwarders/MTOs, transporters, rail and coastal operators, ports, terminals, maritime boards and public agencies.

LIST OF ABBREVIATIONS

Abbreviation	Full Form
DFC	Dedicated Freight Corridor
DGS	Directorate General of Shipping
DPIIT	Department for Promotion of Industry and Internal Trade
e-POD	Electronic Proof of Delivery
EXIM	Export-Import
FCI	Food Corporation of India
GST	Goods and Services Tax
ICD	Inland Container Depot
ITC	Input Tax Credit
IWT	Inland Water Transport
LPI	Logistics Performance Index
MAKV 2047	Maritime Amrit Kaal Vision 2047
MMT	Multimodal Transport
MoPSW	Ministry of Ports, Shipping and Waterways
MoRTH	Ministry of Road Transport and Highways
MSME	Micro, Small and Medium Enterprise
MTO	Multimodal Transport Operator
NLP	National Logistics Policy
NSB	National Shipping Board
OD	Origin-Destination
PCS	Port Community System
PSU	Public Sector Undertaking
Ro-Ro	Roll-on/Roll-off
ULIP	Unified Logistics Interface Platform
VGf	Viability Gap Funding

EXECUTIVE SUMMARY

India has established a strong policy and infrastructure base through PM Gati Shakti, the National Logistics Policy, Dedicated Freight Corridors, Sagar Mala, Bharat Mala, ULIP and port modernization. The next gains must come from operational integration and corridor-level service outcomes.

The national aggregate logistics-cost estimate is useful, but policy must also measure cost by commodity, corridor, shipment size and enterprise category. MSMEs, low-value cargo, remote origins and fragmented consignments can face materially higher cost than the national average.

Adopt a National Cargo First Policy. Road, rail, coastal shipping and inland waterways should not be planned as competing departments. The efficient combination should be selected on total delivered cost, reliability, emissions and cargo characteristics.

Introduce a Domestic Multimodal Transport Document and Domestic MTO registration with clear end-to-end liability, electronic acceptance, claim procedures and insurance compatibility.

Create corridor-level service guarantees covering frequency, capacity, transit time, terminal dwell, handling, documentation and all-inclusive pricing. Infrastructure alone does not trigger modal shift; dependable service does.

For coastal shipping, create cargo first. Anchor cargo, fixed-day sailings, priority berthing, Coastal Cargo Complexes, transparent port tariffs and inclusion of cargo owners and MTOs in verified incremental-cargo incentives are essential.

Rail should expand beyond full-rake bulk traffic through scheduled container and less-than-trainload products, shared-user terminals, fixed paths and integrated first/last-mile tariffs.

Road reform should reduce empty running, overloading, terminal waiting and compliance friction through digital load matching, weigh-in-motion integration, model service conditions and a National Truck Driver Mission.

IWT growth requires route-wise assured draft and navigation windows, connected terminals, scheduled services, mechanised transfer and cargo aggregation.

Digital reform should follow “enter once, use many times”, with one shipment identity across PCS, ICEGATE, ULIP, road, rail and shipping systems, supported by consent, audit trails and cybersecurity.

GST and ITC treatment should be mode-neutral so that tax does not make a physically efficient and greener multimodal route commercially unattractive.

Implementation should begin with ten commodity-corridor pilots, each reporting baseline and post-reform total delivered cost, transit time, reliability, fuel/emissions and cargo shifted.

CHAPTER I: INTRODUCTION AND MANDATE

1.1 Purpose and Scope:

This report identifies practical reforms to reduce logistics cost in India across road, rail, coastal shipping, inland waterways, ports and EXIM logistics. It uses the uniform analytical structure of Issue - Current Status / Impact - Solution, while also providing a prioritized implementation roadmap and measurable outcomes.

1.2 Why a Mode-Neutral Approach is Necessary:

Logistics cost is an end-to-end outcome. Optimizing one mode in isolation can transfer cost to another point in the chain. A cheaper sea leg can be neutralised by port dwell and first-mile cost; a competitive rail tariff can be offset by terminal handling and uncertain rake placement; road efficiency can be lost through empty return kilometers and terminal waiting. Policy must therefore compare complete origin-to-destination alternatives.

1.2 Methodology:

The report combines stakeholder consultation, operating experience, review of national policies and official statistics, and corridor-based analysis. Recommendations are deliberately framed for action by named ministries and agencies, with timelines, priority and suggested performance indicators.

1.3 Guiding Principles:

- **Cargo First:** begin with the commodity, OD pair, shipment size and service requirement.
- **Total delivered cost:** include first/last mile, handling, transfer, dwell, inventory, damage risk, taxes and empty repositioning.
- **Reliability before subsidy:** predictable frequency and transit time are often more valuable than a lower nominal line-haul rate.
- **One accountable integrator:** enable a registered Domestic MTO to offer a single through service.

- **Digital by default, inclusive by design:** MSMEs and small operators must be able to participate without high technology barriers.
- **Evidence-based incentives:** support only verified incremental and sustainable modal shift.

CHAPTER II: INDIA'S LOGISTICS COST CHALLENGE

2.1 Progress and Remaining Gap:

India has made visible progress in highway capacity, freight corridors, ports, inland waterways, digital logistics platforms and policy coordination. India ranked 38th among 139 economies in the World Bank Logistics Performance Index 2023. The policy ambition to reach the top 25 requires sustained improvement in reliability, customs efficiency, infrastructure, logistics competence, tracking and timeliness.

The official logistics-cost assessment cited in the base paper estimates logistics cost at about 7.97 per cent of GDP. This is encouraging, but a national ratio does not reveal the cost experienced by different users. Policy should therefore supplement the aggregate estimate with corridor-level and cargo-level measures.

2.2 Where Cost Accumulates:

Cost Layer	Typical Sources of Cost	Required Policy Response
First mile	Poor industrial access, small lots, empty return, city restrictions	Cluster aggregation, feeder planning, digital load matching
Transfer and handling	Multiple lifts, non-standard charges, equipment mismatch	Mechanization, through tariffs, standard charge codes
Dwell and waiting	Berth delay, rake uncertainty, gate queues, documentation hold	Service-level standards and event timestamps
Line haul	Tariff, fuel, capacity, imbalance	Corridor products, fixed schedules, two-way cargo
Inventory and reliability	Transit variability, missed sailings, uncertain delivery	Guaranteed windows, service credits, control towers
Risk and claims	Damage, unclear transfer liability, weak evidence	Through liability, e-POD, insurance and time-bound claims

Cost Layer	Typical Sources of Cost	Required Policy Response
Tax and compliance	GST/ITC distortion, repeated data entry, checks	Mode-neutral tax and one-time data submission

2.3 The MSME Dimension:

Smaller shippers frequently pay a higher per-unit price because they cannot commit full rakes, vessel-scale lots or long-term contracts. They also face limited credit, insurance and digital integration. Shared-user aggregation centers, published tariffs, common-user warehousing and certified cargo aggregators are therefore essential components of logistics-cost reduction.

CHAPTER III: NATIONAL AND CROSS-MODAL REFORMS

The following reforms are foundational. They address fragmentation that cannot be solved within a single mode.

Issue	Current Status / Impact	Solution
Fragmented modal planning	Road, rail, coastal and IWT plans are often optimized separately; cargo owners face multiple interfaces and no single accountable service integrator.	Adopt a National Cargo First Policy. Map major origin-destination commodity corridors and prescribe the lowest total-cost multimodal option, while preserving commercial choice.
No unified domestic multimodal document	Domestic movements commonly require separate road, rail, port and coastal documents. Liability becomes unclear at transfer points.	Introduce a Domestic Multimodal Transport Document and Domestic MTO registration with defined end-to-end liability, electronic acceptance and claim procedures.
Incomplete cost visibility	Freight quotes often exclude first/last mile, terminal handling, detention, demurrage, inventory carrying cost and damage risk.	Create a National Freight Cost and Reliability Observatory under DPIIT/Logistics Division, publishing corridor-level total landed cost, transit variability and dwell time.
Weak inter-ministerial execution	Policies span MoPSW, Railways, MoRTH, Finance/GST, Commerce, Food, Fertilizers and States, but ownership is dispersed.	Establish an empowered Logistics Cost Reduction Council with quarterly dashboard review, named nodal officers and time-bound issue closure.
Incentives not linked to durable shift	Mode-specific schemes may reward movement without proving incremental cargo or sustained cost reduction.	Make all modal-shift incentives incremental, OD-pair based, distance-sensitive and conditional on verified savings, service continuity and digital shipment records.

Issue	Current Status / Impact	Solution
MSME disadvantage	Smaller firms face higher per-unit freight, poor bargaining power and limited access to rail/coastal aggregation.	Develop shared-user aggregation centers, standard digital tariffs, common-user warehousing and credit/insurance support for MSME multimodal consignments.
Tax distortion between modes	Different GST/ITC treatments can override physical efficiency and make a greener multimodal option commercially unattractive.	Undertake a mode-neutral GST review based on end-to-end service. Permit seamless input tax credit or a rational uniform rate for eligible domestic multimodal transport.
Limited performance accountability	Infrastructure output is tracked, but door-to-door service outcomes are less consistently measured.	Publish a National Logistics Service Dashboard: cost/tonne-km, on-time delivery, transfer dwell, claims, empty running and emissions by corridor.

3.1 Immediate National Decisions (0-12 months):

- Notify Cargo First principles and select ten commodity-corridor pilots.
- Constitute an empowered Logistics Cost Reduction Council with named nodal officers.
- Approve the concept of Domestic MTO registration and a Domestic Multimodal Transport Document.
- Commission a mode-neutral GST/ITC review for domestic multimodal transport.
- Mandate common corridor performance indicators across ministries and public operators.

3.2 Proposed Logistics Cost Reduction Council:

The Council should be chaired at Secretary level and include MoPSW, DPIIT, Railways, MoRTH, Department of Revenue/GST, Food, Fertilizers, relevant State Governments and operational agencies. Its dashboard should use red/amber/green status, identify responsible officers and record issue-closure dates. Industry participation should include cargo owners, MTOs/freight forwarders and small operators, not only infrastructure owners.

CHAPTER IV: ROAD FREIGHT

Road will remain indispensable because it provides flexibility and first/last-mile connectivity. The objective is not to suppress road freight, but to use it where it creates maximum value and eliminate inefficiencies such as empty running, overloading, terminal waiting and repeated checks.

Issue	Current Status / Impact	Solution
High empty running and fragmented brokerage	Road carries about 71% of freight in the cited national modal-share assessment. Fragmented load discovery and one-way cargo produce avoidable empty kilometers.	Create an interoperable National Digital Load Exchange through ULIP APIs; support verified carriers, return-load matching, container pooling and transparent payment/credit records.
Overloading and non-uniform enforcement	Overloading lowers apparent freight rates but damages roads, increases accidents and penalizes compliant operators. Enforcement differs by location.	Integrate weigh-in-motion systems, e-way bills and permits; impose consignor/consignee accountability; publish violation analytics; ensure uniform national enforcement.
First/last-mile bottlenecks	Port, rail terminal, industrial-cluster and city approach often suffer congestion, restricted timings and poor parking.	Prepare terminal-access improvement plans: grade separation, holding areas, appointment systems, night windows, dedicated freight lanes and last-mile road maintenance.
Driver shortage and low productivity	Long waiting, inadequate rest facilities and uncertain working conditions reduce utilization and safety.	Launch a National Truck Driver Mission: certified training, health and social protection, clean rest areas every 100-150 km, digital queue visibility and maximum terminal waiting standards.

Toll and compliance friction	FASTag has reduced stops, but route-level toll burden, erroneous deductions and multiple checks still affect predictability.	Move toward distance-based interoperable tolling, quick dispute resolution, freight-corridor passes and risk-based digital inspection without repeated physical checks.
Small-fleet financing stress	Many operators have high finance, insurance and downtime costs, limiting fleet renewal.	Provide credit-guarantee and scrappage-linked finance for compliant fleets; reward telematics, fuel efficiency, safety and lower-emission vehicles.
Lack of standard service terms	Disputes arise over waiting, loading responsibility, damage, detention and proof of delivery.	Issue model road-freight service conditions with digital e-POD, standard detention clauses, cargo insurance responsibilities and time-bound payment protection.
Urban freight inefficiency	Multiple small trips, daytime restrictions and inadequate consolidation increase congestion.	Promote urban consolidation centres, off-peak deliveries, EV delivery zones and common-user parcel/cargo hubs near ring roads and mass markets.

4.1 National Digital Load Exchange:

An interoperable load exchange should use ULIP-compatible APIs and verified carrier identities. It should support return-load matching, container triangulation, transparent payment history and integration with financing and insurance. Government should establish standards and trust architecture rather than operate as a freight broker.

4.2 Overloading and Fair Competition:

Overloading distorts the market by allowing non-compliant operators to quote artificially low rates while shifting road-damage and safety costs to society. Enforcement should integrate weigh-in-motion records with e-way bills and

permits, with shared accountability for the consignor, transporter and consignee. Data should be analyzed corridor-wise to identify persistent evasion points.

4.3 Driver Productivity and Dignity:

Truck productivity depends on the driver. Long terminal waits, unsafe parking, lack of sanitation and uncertain working conditions increase cost and accident risk. A National Truck Driver Mission should combine training, health and social protection, clean rest areas every 100-150 kilometers, digital queue visibility and maximum terminal waiting standards.

CHAPTER V: RAIL FREIGHT

Indian Railways loaded about 1,617.3 million tonnes in 2024-25. Rail remains strongest in bulk cargo, while domestic containers, smaller lots and time-sensitive cargo require more reliable customer-facing products.

Issue	Current Status / Impact	Solution
Rail share below potential	The cited official modal-share assessment places rail at about 18%, while the policy objective is to raise rail freight share substantially by 2030.	Develop commodity- and corridor-specific modal-shift plans with guaranteed paths, predictable transit and integrated first/last-mile rates.
Tariff and surcharge complexity	Customers face commodity classification, busy-season/dynamic charges, terminal charges and separate first/last-mile pricing.	Publish all-inclusive door-to-door rail products and a transparent digital freight calculator; rationalise short-lead penalties and terminal charges for multimodal traffic.
Rake availability and schedule uncertainty	Bulk customers can plan full rakes; smaller customers and containers need fixed-day services and assured capacity.	Expand scheduled freight trains, time-tabled container services and block-space products; introduce service credits for material delays on premium products.
Insufficient aggregation for SMEs	Full-rake economics exclude smaller consignments and dispersed industrial clusters.	Develop shared-user freight terminals, aggregation warehouses and less-than-trainload products linked to road feeders and digital booking.
Terminal dwell and handling duplication	Cargo may be rehandled multiple times; terminal operating windows and equipment availability vary.	Set terminal dwell benchmarks, round-the-clock operations at high-volume nodes, mechanized handling and single-point billing for terminal plus rail services.

Issue	Current Status / Impact	Solution
Weak port/rail operational integration	Port berths, customs, rail placement and terminal evacuation are planned on separate systems.	Create Port-Rail Control Towers integrating vessel ETA, yard inventory, rake plans and gate appointments; prioritise evacuation before storage congestion builds.
Limited domestic container ecosystem	Rail container growth is constrained by equipment availability, imbalance and handling costs.	Create a national domestic container pool/exchange, support Indian container manufacture and leasing, and standardize repair/inspection and repositioning rules.
Cargo concentration	Rail freight is heavily dependent on coal and other bulk commodities.	Diversify into FMCG, automobiles, agriculture, parcels, white goods, chemicals and coastal-linked containers through suitable wagons, cold chain and assured schedules.

5.1 Scheduled and Smaller-Lot Products:

Rail must offer fixed-day services, block-space products and less-than-trainload aggregation so that customers do not need to assemble a full rake. Shared-user freight terminals should combine warehousing, road feeder services, digital booking and one invoice for terminal plus rail movement.

5.2 Port-Rail Control Towers:

Vessel ETA, yard inventory, rake placement, customs status and gate appointments should be visible in one control tower at high-volume ports. The objective is to evacuate cargo before storage congestion develops and to align berth operations with rail capacity.

5.3 Rail-Sea-Road Pilots:

Ten pilots should test a division of labor in which rail handles the long inland leg, coastal shipping the long coastal leg, and road efficient first/last-mile connectivity. Commercial evaluation must be on total delivered cost and reliability, not separate modal tariffs.

CHAPTER VI: COASTAL SHIPPING

Coastal shipping can reduce long-distance road pressure, fuel use and emissions, but it succeeds only when cargo owners receive dependable schedules, predictable port treatment and an all-inclusive door-to-door offer. The recurring cargo-vessel cycle must be broken by creating cargo and service simultaneously.

Issue	Current Status / Impact	Solution
Irregular services and cargo-vessel cycle	Cargo owners hesitate without fixed schedules; vessel operators hesitate without committed cargo. This creates a recurring chicken-and-egg problem.	Create a National Coastal Cargo Promotion Mission with corridor cargo cells, anchor-cargo commitments, fixed-day sailings and three-year route-development plans.
Port dwell and uncertain berthing	Coastal vessels may lose cost advantage through waiting, shifting, gate delays and non-standard procedures.	Mandate priority berthing with measurable compliance; develop dedicated Coastal Cargo Complexes, green-channel gates and pre-arrival digital clearance.
Non-uniform port and terminal charges	Discounts and free days differ across major/non-major ports; multiple charges reduce transparency.	Adopt model national coastal tariff principles: uniform charge heads, published free days, INR billing, no avoidable shifting and single consolidated invoice.
Incentives exclude key cargo creators	Cargo owners and MTO/freight forwarders often make the modal-shift decision, while schemes may focus mainly on vessel operators.	For incremental container/eligible cargo, share incentive among cargo owner, vessel operator and registered Domestic MTO; verify through the multimodal document and OD data.
Insufficient government/PSU anchor cargo	Foodgrains, fertilizer, steel and other public cargo often follow legacy mode rules or reimbursement methods.	Direct ministries/PSUs to test coastal multimodal routes wherever total delivered cost and service are competitive; revise subsidy/reimbursement rules to recognize multimodal coastal cost.

Issue	Current Status / Impact	Solution
Documentation and liability gaps	Separate documents and unclear transfer liability deter cargo owners and insurers.	Implement the Domestic Multimodal Transport Document, standard electronic delivery order, through bill, insurance cover and time-bound claims mechanism.
First/last-mile cost erodes sea advantage	Short road legs to ports, handling and repositioning can outweigh lower sea line-haul cost.	Bundle door-to-door tariffs; provide rail/road feeder integration; locate coastal terminals near cargo clusters; support two-way cargo and empty-container planning.
Weak service monitoring	No common public dashboard compares scheduled vs actual sailing, berth wait, transit and cargo growth.	Create an IPA-led Coastal Service Dashboard with port-wise priority-berthing compliance, schedule reliability, cost, cargo and modal-shift metrics.
Indian-flag capacity and service continuity	Domestic services need stable tonnage, commercially viable vessels and repair availability.	Support suitable Indian-flag vessel acquisition/chartering, shipbuilding and repair; link support to route continuity, service standards and cargo outcomes.

6.1 National Coastal Cargo Promotion Mission:

A dedicated mission should establish corridor cargo cells, obtain anchor-cargo commitments, facilitate fixed-day sailings and prepare three-year route-development plans. Cargo ministries and PSUs should be active participants. The mission should publish service reliability and cargo-shift outcomes, not merely disbursement of incentives.

6.2 Priority Berthing and Coastal Cargo Complexes:

Priority berthing should be a measurable operating standard. Ports should report scheduled arrival, actual berth time, shifting, gate delay and reasons for deviation. Coastal Cargo Complexes with dedicated gates, covered handling, staging space and pre-arrival digital clearance can preserve the cost advantage of the sea leg.

6.3 Incentive Design:

For eligible incremental cargo, incentives should recognize the parties that actually create the shift: cargo owners, vessel operators and registered Domestic MTOs/freight forwarders. Eligibility should be OD-pair based, distance-sensitive, digitally verified and subject to continuity and sunset review. Support should not reward cargo that would have moved by sea without intervention.

6.4 Government and PSU Anchor Cargo:

Foodgrains, fertilizer, steel and other public cargo should be evaluated through corridor-based total-cost tenders. Reimbursement rules should recognise an end-to-end multimodal coastal route where it lowers total public cost and meets service and quality requirements. This can provide the base cargo required to stabilize routes for private users.

Field principle: “Create cargo first - vessels will follow.” Coastal policy must create dependable cargo, dependable schedules and dependable port treatment simultaneously.

Chapter VII: Inland Waterways and Ports:

Inland waterways currently carry a modest share of national freight, although cargo volumes on national waterways have grown. The next phase should emphasize route reliability, connected terminals, scheduled services and reduction of transfer cost.

Issue	Current Status / Impact	Solution
IWT route and depth reliability	Seasonal draft, night-navigation limitations and uncertain end-to-end schedules restrict regular industrial use.	Publish route-wise assured-draft and navigation windows; prioritize fairway maintenance, river information systems and predictable notices to users.
Terminal connectivity gaps	Waterway terminals may lack efficient rail/road connection, warehousing and cargo handling.	Complete rail/road links to multimodal terminals; create freight villages with common-user storage, customs where relevant and digital gate systems.
Need for cargo aggregation	Many potential shippers cannot individually create vessel-scale lots.	Establish regional cargo aggregation cells, scheduled barge services and containerized/parcel products; extend promotion schemes to verified incremental cargo.
High transfer and handling cost	Multiple lifts can offset low water transport cost.	Use roll-on/roll-off, conveyor, pipeline and mechanized transfer where suitable; standardize handling tariffs and minimize rehandling.
Port congestion and truck queues	Gate congestion, documentation mismatch and yard crowding increase detention and inventory costs.	Adopt port community control towers, truck appointment systems, 24x7 high-volume gates, off-dock evacuation and real-time queue publication.

Issue	Current Status / Impact	Solution
Tariff inconsistency across ports	Major ports, state ports and private terminals use different terminology, free periods and escalation methods.	Issue national model tariff and service-disclosure standards while allowing commercial pricing; require full pre-booking cost disclosure and standard charge codes.
Storage-driven operating model	Revenue incentives can unintentionally favor dwell rather than rapid evacuation.	Set dwell-reduction KPIs; reward terminals for throughput, rail/coastal evacuation and on-time delivery rather than storage income.
Insufficient coastal/IWT interface	Coastal and river services are often designed separately.	Develop Sea-River corridors with compatible vessels/containers, through documentation and synchronized port/river terminal schedules.

7.1 Assured Navigation Windows:

Industrial users require route-wise publication of assured draft, lock or bridge constraints, night-navigation windows and expected transit time. Predictable notices to users are as important as physical dredging because they determine whether cargo owners can commit to regular services.

7.2 Sea-River Integration:

Coastal and river services should be planned together through compatible vessels or containers, through documentation and synchronized schedules. Sea-river corridors can extend the reach of ports to inland markets, but only where transfer points are designed to minimize rehandling.

7.3 Port Operating Model:

Port KPIs should reward rapid evacuation, throughput and modal connectivity rather than storage income. Common truck appointment systems, 24x7 high-volume gates, off-dock evacuation and real-time queue publication should be standard at congested nodes.

CHAPTER VIII: EXIM, CUSTOMS, GST AND DIGITAL INTEGRATION

India has multiple digital systems, but users still re-enter data and reconcile inconsistent status messages. Digitalization should reduce work, not reproduce paper processes on separate screens.

Issue	Current Status / Impact	Solution
Multiple digital systems but incomplete interoperability	PCS, ICEGATE, ULIP, rail, FASTag, terminal and line systems exist, yet users still re-enter data and reconcile different status messages.	Create consent-based single shipment data architecture through ULIP APIs, with one consignment ID across customs, port, rail, road and shipping events.
Demurrage/detention and free-day disputes	Delays may arise from customs, terminals, lines, documentation or consignee actions; responsibility is difficult to establish.	Publish event timestamps and accountable-party codes; standardize notices, dispute windows and waiver principles for system/authority-caused delay.
Container imbalance and repositioning	Import/export and domestic imbalances create empty moves and equipment scarcity.	Establish a National Container Exchange covering domestic and EXIM-compatible equipment, anonymized imbalance data, leasing and triangulation opportunities.
Customs examination and scanning variability	Risk management has improved, but unpredictable examination/scanner queues still affect selected shipments.	Set service-level standards for examination/scanning, expand non-intrusive capacity, use appointment slots and publish cause-coded delay data.

GST treatment of multimodal transport	Rate and input-tax-credit restrictions may make the tax result depend on modal structure instead of logistics efficiency.	Create a clear, mode-neutral domestic multimodal category with seamless ITC or a rational rate; issue a consolidated clarification on principal supply and subcontracted legs.
Paper-based domestic processes	Several domestic coastal/rail transactions still rely on physical endorsements, separate invoices and manual release.	Recognize electronic multimodal documents, e-delivery orders, e-POD and digitally signed transport records as standard evidence for tax, insurance and claims.
Data without decision support	Tracking platforms show events but do not always recommend cheaper or more reliable modal alternatives.	Add corridor cost, reliability and emissions comparison tools for cargo owners; enable anonymous benchmarking by commodity and shipment size.
Cybersecurity and data trust	More integration increases concerns regarding commercial confidentiality and system resilience.	Adopt federated data-sharing, minimum-necessary access, audit trails, cybersecurity standards and explicit ownership/consent rules.

8.1 One Shipment Identity:

A consent-based shipment architecture should assign one consignment identity across customs, port, rail, road and shipping events. Verified data should be reused through APIs, with role-based access and full audit trails. Commercially sensitive information must be protected through federated data-sharing and minimum-necessary access.

8.2 Demurrage, Detention and Delay Attribution:

Disputes persist because responsibility for delay is difficult to establish. Systems should record event timestamps and accountable-party codes, enabling

transparent application of free days and waiver principles where delay is caused by an authority, system failure or terminal constraint.

8.3 Mode-Neutral GST:

Tax treatment should not determine the physical routing of cargo. A domestic multimodal category should provide seamless input tax credit or a rational uniform rate, supported by a consolidated clarification on principal supply and subcontracted legs. The objective is neutrality, simplicity and auditability.

Digital principle: “Enter once, use many times.” Government should not require the same verified shipment data to be repeatedly submitted to different agencies.

CHAPTER IX: CARGO-SPECIFIC AND STAKEHOLDER FINDINGS

Modal shift succeeds when policy is designed around cargo economics rather than generic mode promotion. Frequency, handling method, moisture or breakage sensitivity, seasonality, inventory cost and shipment size vary sharply between commodities.

Cargo / Issue	Current Status / Impact	Solution
Fertilizer	Movement is time-sensitive and subsidy/reimbursement rules can favor a legacy route even when multimodal coastal movement lowers total public cost.	Recognize end-to-end multimodal coastal cost in reimbursement; identify port-region demand pairs; guarantee discharge, storage and last-mile coordination; pilot secretary-level monitoring.
Foodgrains / FCI	Seasonal peaks, bagged handling and strict delivery requirements create handling and inventory concerns.	Plan coastal/rail corridors in advance; use mechanized or containerized movement where feasible; provide covered storage and quality-preservation protocols.
Tiles, ceramics and building materials	Dense cargo is suitable for sea/rail over long distances, but breakage risk, monsoon exposure, frequency and last-mile cost are decisive.	Offer fixed-day container services, covered handling, standard damage responsibility and two-way cargo development between western clusters and southern/eastern markets.
Steel, cement, minerals and coal	Large volumes suit rail/coastal/IWT, but legacy contracts and terminal constraints reduce flexibility.	Use long-term multimodal contracts, mechanized terminals and corridor-based total-cost tenders; require public-sector buyers to evaluate greener alternatives.

Agriculture and perishables	Small lots, seasonality and cold-chain gaps limit access to efficient modes.	Create reefer aggregation centers, scheduled parcel/container trains and coastal services, integrated packhouses and guaranteed cold-chain power/monitoring.
Automobiles and project cargo	Special equipment, route permits and schedule coordination are critical.	Develop Ro-Ro/coastal vehicle corridors, standard lashing and claims rules, digital oversize permits and synchronized rail-port-vessel planning.
MSME and fragmented cargo	Smaller shippers cannot negotiate full-rake or vessel-scale commitments.	Use certified cargo aggregators/Domestic MTOs, common-user hubs, published tariffs, shipment insurance and digital credit/payment protection.

9.1 Fertilizer and Foodgrains:

These cargoes require coordinated discharge, covered storage, quality preservation and last-mile planning. Policy should compare total public expenditure, including subsidy and reimbursement, rather than only the legacy line-haul benchmark. Secretary-level pilot monitoring can resolve cross-ministerial issues quickly.

9.2 Tiles, Ceramics and Building Materials:

Dense cargo from western clusters to southern and eastern markets is suitable for coastal and rail movement over long distances. However, breakage, monsoon exposure, frequency and last-mile cost are decisive. Fixed-day container services, covered handling and clear damage responsibility are required.

9.3 Agriculture, Perishables and MSMEs:

Small lots and seasonality call for reefer aggregation centers, scheduled parcel/container services, common-user packhouses and reliable power and monitoring. Certified Domestic MTOs can aggregate fragmented cargo while providing one contract, insurance and payment protection.

Consultation consensus: stakeholders consistently prioritized reliability, frequency, transparent all-inclusive pricing, fast claims, predictable port/terminal treatment and a single accountable multimodal service provider. Lowest line-haul rate alone does not produce modal shift.

CHAPTER X: PRIORITIZED IMPLEMENTATION ROADMAP

No.	Action	Lead Responsibility	Timeline	Priority
1	National Cargo First Policy and 10 corridor pilots	DPIIT with MoPSW, Railways, MoRTH	0-6 months	Very High
2	Domestic MTO registration and multimodal document	MoPSW / DG Shipping with Finance & Commerce	0-9 months	Very High
3	Mode-neutral GST/ITC review for multimodal transport	Department of Revenue / GST Council	0-12 months	Very High
4	Coastal priority berthing and compliance dashboard	MoPSW / IPA / Ports / States	0-6 months	High
5	National Coastal Cargo Promotion Mission	MoPSW / IPA with cargo ministries	0-9 months	Very High
6	Uniform coastal tariff/free-day disclosure principles	MoPSW / IPA / State Maritime Boards	0-9 months	High
7	PSU cargo multimodal pilots: fertilizer and foodgrains	DoF, DFPD / FCI, MoPSW, Railways	0-12 months	Very High
8	National digital load and container exchanges	DPIIT / ULIP with industry	6-18 months	High
9	Scheduled rail/container and Rail-Sea-Road services	Railways / CONCOR / CTOs / Lines	6-18 months	High

No.	Action	Lead Responsibility	Timeline	Priority
10	Port/rail/waterway control towers and dwell KPIs	Ports, Railways, IWAI	6-18 months	High
11	Shared-user logistics hubs for MSMEs	DPIIT / States / NICDC / private sector	12-36 months	Medium-High
12	Driver mission and terminal waiting standards	MoRTH / States / industry	6-24 months	High
13	National Freight Cost & Reliability Observatory	DPIIT / NCAER / academic partners	0-12 months	High
14	Green modal-shift certificates/carbon methodology	MoEFCC, MoPSW, Railways, BEE	12-24 months	Medium-High
15	Sea-river and coastal-IWT integrated corridors	MoPSW / IWAI / Ports / States	12-36 months	Medium-High

10.1 Phase I - Immediate (0-6 months):

- Notify Cargo First principles and choose ten pilots.
- Constitute the Logistics Cost Reduction Council and dashboard.
- Mandate coastal priority-berthing reporting.
- Begin Domestic MTO/document and GST review.
- Publish standard corridor baseline methodology.

10.2 Phase II - Short Term (6-18 months):

- Launch scheduled rail, coastal and IWT pilot services with anchor cargo.
- Operationalise aggregation hubs and shared-user terminals.
- Implement one shipment identity and delay-attribution timestamps on pilots.

- Issue model service conditions for road and multimodal transport.
- Introduce standard port/coastal charge codes and disclosure principles.

10.3 Phase III - Medium Term (18-36 months):

- Scale successful pilots nationally.
- Create national container and load exchanges.
- Integrate control towers across major port-rail-road nodes.
- Embed performance-linked support and sunset clauses in schemes.
- Publish annual corridor and enterprise-size logistics-cost reports.

CHAPTER XI: MONITORING, OUTCOMES AND GOVERNANCE

11.1 Core Performance Indicators:

Indicator	Measurement	Frequency
Total logistics cost	National aggregate plus commodity/corridor/MSME disaggregation	Annual
Modal mix	Road, rail, coastal and IWT share on selected corridors	Quarterly
Reliability	On-time delivery and schedule adherence	Monthly
Transfer efficiency	Port/terminal dwell, truck wait, rake placement, berth wait	Monthly
Asset productivity	Truck empty km, wagon/vessel turnaround, container imbalance	Quarterly
Customer impact	All-inclusive freight, claims and payment cycle	Quarterly
Sustainability	Fuel and CO ₂ e avoided through verified modal shift	Quarterly

11.2 Pilot Evaluation Method:

Each pilot should establish a baseline for total delivered cost, transit time, variability, handling events, dwell, damage/claims, empty movement, fuel/emissions and working-capital days. Results should be compared after implementation using the same cargo, OD pair and shipment profile. Savings claims should be independently validated.

11.3 Governance Discipline:

- Quarterly Secretary-level review with red/amber/green status.

- Named ministry and agency owner for each action.
- Public disclosure of service outcomes without revealing commercially sensitive data.
- Stakeholder review including cargo owners, MSMEs and operating intermediaries.
- Sunset and renewal clauses for all incentives.
- Annual report to NSB / MoPSW on coastal and multimodal outcomes.

11.4 Expected Outcomes:

- Lower empty kilometers and truck waiting.
- Greater rail, coastal and IWT share on viable corridors.
- Reduced transfer dwell and handling duplication.
- More transparent all-inclusive freight pricing.
- Improved MSME access to efficient modes.
- Lower congestion, fuel use and emissions.
- Stronger supply-chain resilience and manufacturing competitiveness.

CHAPTER XII: RECOMMENDATIONS AND WAY FORWARD

No.	Recommendation
R1	Adopt a National Cargo First Policy and map major commodity OD corridors.
R2	Create an empowered inter-ministerial Logistics Cost Reduction Council.
R3	Introduce Domestic MTO registration and a Domestic Multimodal Transport Document.
R4	Undertake a mode-neutral GST and ITC review for end-to-end multimodal services.
R5	Launch ten evidence-based commodity-corridor pilots.
R6	Create a National Coastal Cargo Promotion Mission with anchor cargo and fixed-day services.
R7	Mandate coastal priority berthing, Coastal Cargo Complexes and public compliance dashboards.
R8	Expand scheduled rail, block-space and less-than-trainload products.
R9	Develop assured IWT navigation windows and connected multimodal terminals.
R10	Create interoperable digital load and container exchanges.
R11	Implement one shipment identity and “enter once, use many times” data architecture.
R12	Standardise service terms, detention rules, e-POD and time-bound claims.
R13	Create MSME aggregation hubs, common-user warehousing and credit/insurance support.
R14	Use public and PSU cargo as anchor cargo through total-cost tenders.
R15	Publish corridor-level cost, reliability, dwell and emissions performance annually.

The recommendations should be implemented as a connected program. Isolated measures will have limited effect: an incentive without schedule reliability, a digital platform without common data standards, or a cheaper tariff without first/last-mile integration will not produce sustainable modal shift.

CHAPTER XIII: CONCLUSION

India's next logistics-cost reduction gains will come from integration rather than isolated expansion. Road should provide agile first/last-mile connectivity; rail should carry high-volume long inland hauls; coastal shipping should connect distant coastal markets; and inland waterways should serve viable riverine corridors. Policy must allow the cargo owner to access these modes through one accountable service, one data flow and one transparent total cost.

The recommended approach is pragmatic: begin with ten high-potential cargo corridors, remove tax and documentation distortions, guarantee service standards, use public cargo as an anchor, and measure actual savings. A cargo-centric multimodal system will improve manufacturing competitiveness, reduce congestion and fuel use, strengthen supply-chain resilience and advance *Viksit Bharat 2047*.

ANNEXURES

Annexure A: Consolidated Recommendation Matrix

Theme	Key Action	Lead	Indicative Timeline
Governance	Cargo First Policy and Logistics Cost Reduction Council	DPIIT / MoPSW / Railways / MoRTH	0-6 months
Legal	Domestic MTO registration and multimodal document	MoPSW / DGS / Commerce	0-9 months
Tax	Mode-neutral GST/ITC review	Department of Revenue / GST Council	0-12 months
Coastal	Cargo Mission, priority berthing and tariff disclosure	MoPSW / IPA / Ports / States	0-12 months
Rail	Scheduled services and aggregation products	Railways / CONCOR / CTOs	6-18 months
Road	Load exchange, overloading enforcement, driver mission	MoRTH / States / ULIP	6-18 months
IWT	Assured draft, connected terminals and scheduled services	IWAI / States / Operators	6-24 months
Digital	One shipment ID and API interoperability	DPIIT / NIC / CBIC / Operators	6-24 months
MSME	Aggregation hubs and common-user facilities	DPIIT / MSME / States	6-24 months
Measurement	National freight cost and reliability observatory	DPIIT / NCAER / Agencies	12-24 months

Annexure B: Ten Suggested Corridor Pilots

No.	Indicative Cargo / Corridor Concept	Modes	Primary Test
1	Morbi tiles/ceramics to Kerala and Tamil Nadu	Road-Coastal-Road	Fixed-day service, damage and all-inclusive cost
2	Gujarat fertilizer imports to southern consumption centers	Port-Coastal/Rail-Road	Reimbursement recognition and anchor cargo
3	FCI foodgrains from surplus regions to coastal deficit regions	Rail-Coastal-Road	Quality, covered storage and total public cost
4	Steel/cement west-east coastal corridor	Rail/Coastal	Long-term multimodal contract and mechanized handling
5	Automobiles between manufacturing clusters and coastal markets	Road/Rail-RoRo-Coastal	Schedule and standard lashing/claims
6	Agricultural produce to metro markets	Road-Rail/Coastal-Reefer	Aggregation and cold-chain reliability
7	North India industrial cargo to southern ports	Rail-Coastal-Road	Port-rail control tower and through tariff
8	NW-1 stone/industrial cargo to regional markets	IWT-Road/Rail	Assured draft and scheduled barge service
9	MSME LCL cargo through ICD/CFS network	Road-Rail/Coastal	Domestic MTO and shared-user aggregation
10	Container triangulation across EXIM and domestic nodes	Road-Rail-Coastal	Container exchange and empty reduction

Annexure C: Suggested Performance Indicators

Indicator	Definition / Measurement
Total delivered cost	All-in cost from origin to destination, including tax, handling, dwell, inventory and risk
Transit reliability	Percentage delivered within promised window and standard deviation of transit
Transfer dwell	Hours at port, rail terminal, ICD/CFS or IWT terminal
Empty movement	Empty kilometres or empty container repositioning per loaded movement
Schedule reliability	Actual departure/arrival against published rail, vessel or barge schedule
Claims performance	Damage incidence, claim settlement time and rejection reason
Modal shift	Verified incremental tonnes/TEUs shifted from less efficient route
MSME participation	Number and volume of smaller shippers using shared services
Emissions proxy	Fuel use or estimated CO ₂ e per tonne-km / shipment
Digital reuse	Percentage of shipment data reused without re-entry

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Note: Quantitative savings should be finalized after baseline data are collected for selected pilot corridors. This report avoids unsupported universal savings claims and recommends evidence-based measurement.

PART XVI
Sub-Committee Report No. 15

Sub-Committee No. 15

Title:

**Roadmap for Taxation Reforms in the Maritime Sector to achieve
MAKV-2047 Goals**

Chairperson: Shri Anil Devli

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PREFACE BY THE CHAIR OF THE SUB-COMMITTEE



Anil Devli CEO INSA

Sub-Committee No. 15 of the National Shipping Board was constituted to examine and recommend a roadmap for taxation reforms in the maritime sector so as to further the goals set out under the Maritime Amrit Kaal Vision (MAKV) 2047. The Sub-Committee has consulted extensively with stakeholders, including the Indian National Shipowners’ Association (INSA), the Indian Register of Shipping (IRS), cruise industry operators and other domain experts, to identify the taxation and regulatory impediments that presently constrain the growth of Indian tonnage, coastal shipping, inland waterways transport, seafarer welfare, professional maritime services and the cruise tourism sector.

This report consolidates those issues, examines the present and past policy responses of the Government, records the views of stakeholders and domain experts, benchmarks India’s position against global best practices, and sets out suggested policies and final recommendations for the consideration of the Government. It is hoped that the roadmap outlined in this report will assist the Government in creating a taxation environment in which Indian flag shipping can compete on equal terms with foreign flag shipping, and in which India’s cruise tourism potential can be more fully realized

Anil Devli, CEO INSA
Chairman, Sub-Committee on Taxation Reforms
National Shipping Board

ACKNOWLEDGEMENTS

The Sub-Committee places on record its sincere appreciation for the valuable inputs, data and representations received from the Indian National Shipowners’ Association (INSA), the Indian Coastal Conference of Shipowners’ Associations (ICCSA), the Indian Register of Shipping (IRS), the National Union of Seafarers of India (NUSI), M/s Waterways Leisure Tourism Ltd. (Cordelia Cruises), and other members and stakeholders of the National Shipping Board, without whose active participation this report would not have been possible. The Sub-Committee also acknowledges the support extended by the Ministry of Ports, Shipping and Waterways and the Directorate General of Shipping in the preparation of this report.

LIST OF CONTRIBUTORS

- Indian National Shipowners’ Association (INSA)
- Indian Coastal Conference of Shipowners’ Associations (ICCSA)
- Indian Register of Shipping (IRS)
- National Union of Seafarers of India (NUSI)
- M/s Waterways Leisure Tourism Ltd. (Cordelia Cruises)
- Ministry of Ports, Shipping and Waterways (MoPSW)
- Directorate General of Shipping (DGS)
- Members of the National Shipping Board

LIST OF ABBREVIATIONS

Abbreviation	Full Form
BCD	Basic Customs Duty
CBDT	Central Board of Direct Taxes
CBIC	Central Board of Indirect Taxes and Customs
CGST	Central Goods and Services Tax
DEA	Department of Economic Affairs
DGS / DG Shipping	Directorate General of Shipping
DoR	Department of Revenue
DTAA	Double Taxation Avoidance Agreement
EXIM	Export-Import (cargo)
FG	Foreign Going (vessel status)
FTS	Fees for Technical Services
GoI	Government of India
GST	Goods and Services Tax
ICCSA	Indian Coastal Conference of Shipowners’ Associations
ICP	Immigration Check Post
IGST	Integrated Goods and Services Tax
IFSC	International Financial Services Centre
INSA	Indian National Shipowners’ Association
IRS	Indian Register of Shipping
ITC	Input Tax Credit
IWT	Inland Waterways Transport

Abbreviation	Full Form
MAKV	Maritime Amrit Kaal Vision 2047
MEA	Ministry of External Affairs
MIV	Maritime India Vision 2030
MLC	Maritime Labour Convention, 2006
MoHA	Ministry of Home Affairs
MoPSW	Ministry of Ports, Shipping and Waterways
MRO	Maintenance, Repair and Overhaul
NM	Nautical Miles
NSB	National Shipping Board
NUSI	National Union of Seafarers of India
PSU	Public Sector Undertaking
RCM	Reverse Charge Mechanism
RO	Recognized Organization
ROFR	Right of First Refusal
RPSL	Recruitment and Placement Service Licence
SAC	Services Accounting Code (GST)
SPF	Seamen’s Provident Fund
TDS	Tax Deducted at Source
TRC	Tax Residency Certificate

EXECUTIVE SUMMARY

Indian shipping bears a significantly higher tax burden than foreign competitors across acquisition, MRO, bunker procurement, seafarer employment, multimodal transport, and cruise operations. The Sub-Committee recommends abolishing the 5% GST on ship acquisitions, removing double taxation on overseas MRO, reducing seafarer salary TDS to 5% under Section 197A of the Income Tax Act, setting a uniform 5% GST rate with full ITC for multimodal transport involving coastal or inland waterway legs, lowering the Fees for Technical Services withholding rate to 10% under Section 115A, including ship sale profits as core shipping income under Section 115VL, and extending the Tonnage Tax Scheme to passenger cruise vessels.

CHAPTER I: INTRODUCTION

The primary issue that ails Indian shipping is the fact that costs are much higher to provide the service of shipping from an Indian company than it does to import such a service. This is the basic problem.

The higher costs of operating an Indian shipping company does not arise from the ‘operating’ costs of the company, i.e. the components which go into operating a vessel. In fact, most Indian companies are able to operate their ships efficiently. What spikes the cost of operating an Indian ship are the taxes imposed on it which are not imposed on the same service when provided by the foreign ship and the cost of capital and debt, which is considerably higher than that which is available to its peers in the foreign flag. This makes the former non-competitive in the fiercely competitive international freight market.

All consumers of goods or services are required to, normally, purchase and use goods or services that are provided locally. In case a good or a service is imported, sufficient countervailing legal action kicks in which ensures that the import is made costlier than the local supply. In case of ‘dumping,’ anti-dumping duties are imposed.

Curiously, nothing of this kind applies to shipping, and it is not known why. What worsens the situation is that Indian companies both PSUs and private are allowed to import shipping services into India from a foreign shipping company without any tariff. This actually works in the reverse direction, diverting cargo away from Indian companies who pay taxes in India, employ only Indian seafarers, train Indian cadets and contribute in myriad ways to the Indian economy.

While import of shipping services attracts no tariff, importation of all inputs by an Indian shipping company to provide Indian flag shipping service, namely goods (including the ship itself), the other goods (stores, spares, fuel etc.) and services that are needed to provide an “Indian flag shipping service” are taxed. Similarly, the output services, i.e. transportation by sea between two Indian ports, is exempt from tax, if it is provided by a foreign shipping company. This points to the gap between India’s trade policy in general and domestic regulatory regime which results in more favourable treatment to foreign service suppliers.

All these policy logjams effectively incentivize import of shipping services rather than promoting, facilitating setting up and expanding the use of Indian shipping services.

Often an excuse is forwarded that Indian ships enjoy an advantage of the ‘Right Of First Refusal’ (ROFR). Operationally, it means that in a freight bidding process, if the Indian company is not the lowest bidder, it may be given the said cargo for transportation provided it matches the rate offered by the foreign shipping company.

What this completely overlooks is that when Foreign ships and Indian ships both compete for same Indian cargoes (both coastal and EXIM) the higher operating costs of Indian shipping companies arising due to taxation and sovereign rating of India which affects the cost of capital, makes it impossible to match the lower costs of foreign flag ships. A few years ago, Oil PSUs opposed a proposal to ask foreign ships to flag in India since they said that this would increase the cost of a foreign ship by more than USD 5000 per day!

Scope of this Report:

This report addresses taxation and regulatory reforms required across the entire spectrum of Indian maritime activity, in line with the eleven Key Themes under MAKV-2047 discussed by the Board, and in particular the themes on increasing Indian tonnage, promoting coastal shipping and inland waterways transport, developing world-class facilities for seafarers, and providing professional maritime services. In addition, and at the specific instance of stakeholders, this report separately captures the taxation and regulatory issues confronting the cruise tourism segment of the maritime sector. Wherever an issue, chapter-heading or recommendation in this report relates specifically to cruise shipping, it has been marked “(Cruise Shipping)” so that the reader may readily distinguish it from issues of general application to the shipping industry.

CHAPTER II: STATEMENT OF THE PROBLEM

General Shipping Sector:

The Indian shipping industry is presently confronted with a wide range of taxation, customs and regulatory issues, administered variously by the Department of Revenue (DoR), the Central Board of Indirect Taxes and Customs (CBIC), the Central Board of Direct Taxes (CBDT), the Department of Economic Affairs (DEA) and the Ministry of Ports, Shipping and Waterways (MoPSW). These issues, taken together, raise the cost of Indian flag shipping relative to foreign flag shipping performing the same service, and thereby discourage investment in Indian tonnage. The key problem areas are:

- Denial of ‘infrastructure’ status to Indian ships (particularly second-hand vessels), resulting in shorter loan tenors and costlier capital than is available to global peers.
- Levy of 5% GST on acquisition of ships (new and second-hand), which does not apply to non-Indian flag vessels and locks up working capital.
- Levy of 5% GST (RCM basis) on MRO services consumed overseas, and a further, duplicate levy of Customs-IGST on the same MRO value on the vessel’s return to India – effectively double taxation of the same transaction.
- Disputed inclusion of take-over bunkers, assumed freight and insurance in the assessable value of vessels at first import, contrary to the settled legal position that a vessel sails on its own power and is not ‘freight’-borne cargo.
- Re-levy of customs duty on Indian-origin, duty-paid bunkers/stores/lube oil already on board when a vessel converts between Foreign-Going and Coastal status.
- Continuation of General Orders No. 1, 2 and 3 of 2018, which permit foreign flag container ships to carry EXIM and other reserved cargoes without a licence or Right of First Refusal (ROFR) for Indian ships, thereby halting fresh investment in the Indian container fleet since 2019.
- Absence of GST on coastal-vessel bunker fuel (HSD/MGO), and a distortive 12% GST rate on multimodal transport (as against 5% for the

sea-leg alone), which discourages the intended modal shift to coastal shipping and inland waterways transport (IWT).

- 18% GST demanded on terminal handling of agricultural cargo despite the cargo itself being GST-exempt, nullifying the benefit for agri-trade using coastal/multimodal transport.
- Application of immigration-clearance procedures designed for foreign-going vessels to purely coastal vessels, in the absence of Immigration Check Posts at most non-major ports, in seeming tension with the Maritime Labour Convention (MLC), 2006.
- Difficulty in Indian seafarers obtaining timely shore leave at Indian ports, and a TDS rate of up to 27% on seafarers’ wages on Indian ships as against nil withholding for the same seafarers on foreign ships – a major driver of seafarer migration away from the Indian flag.
- Prolonged delay (over three years) in amending the Seamen’s Provident Fund Act, 1966 to extend Provident Fund, Gratuity and Pension benefits to all ranks of Indian seafarers, as mandated by MLC Regulation 4.5.
- Non-recognition of the Indian Register of Shipping (IRS) as a Recognized Organization (RO) by key flag States – UK, Singapore, South Korea, Greece and Saudi Arabia – constraining the growth of IRS-classed tonnage and India’s voice in global maritime governance.

Cruise Shipping:

The cruise tourism industry in India is presently confronted with multiple taxation, regulatory, and operational challenges under the purview of the Reserve Bank of India (RBI), CBDT and CBIC. These challenges adversely impact the ease of doing business, increase operational costs, create uncertainty in tax treatment, and reduce India’s competitiveness as a global cruise tourism destination. The major issues are:

- Restrictive RBI approval requirements for advance remittance of lease instalments under leasing/option-to-purchase structures for vessel acquisition, notwithstanding the easing (vide RBI Circular No. RBI/2025-26/55 dated 13.06.2025) of remittance norms for outright vessel acquisition up to USD 50 million.

- An overly narrow exemption under Section 10(15B) of the Income-tax Act, 1961, which relieves withholding tax on lease rentals only where the foreign lessor and Indian operator are subsidiaries of the same holding company, thereby taxing arm’s-length leasing arrangements with unrelated foreign owners.
- A significantly higher presumptive taxation rate of 20% of gross receipts for non-resident cruise operators under Section 44BBC of the Income-tax Act, as against 7.5% for other non-resident shipping businesses under Section 44B.
- Ambiguity as to whether ancillary onboard revenues (dining, entertainment, retail, gaming, hospitality) fall within “gross collections” under Section 44BBC.
- Fiscal inequity between domestic (regular corporate tax) and non-resident (presumptive tax) cruise operators, with domestic cruise tourism remaining severely underdeveloped as a result.
- GST authorities seeking to levy 28% GST on entire cruise revenue (treating it as SAC 9996 – recreational/cultural/sporting services) rather than 18% as a composite supply under SAC 996424, principally on account of incidental onboard casino operations.
- An 18% GST rate on ship-leasing transactions, materially higher than the indirect-tax incidence in competing international cruise jurisdictions.
- Double taxation of onboard sales during international sailings, since Section 12(10) of the CGST Act, 2017 deems the place of supply to be the first Indian port of departure, even where services are rendered in international waters, while destination jurisdictions may separately levy VAT on the same sales.
- Non-recognition of cruise travel as an eligible mode of transport for Leave Travel Concession (LTC) exemption under Section 10(5) read with Rule 2B of the Income-tax Rules.
- Exclusion of passenger cruise vessels from the tonnage tax scheme under Section 115VD of the Income-tax Act, 1961, as “pleasure crafts”, denying cruise operators the benefit available to other qualifying shipping businesses.

- Levy of customs duty on foreign-sourced consumables (liquor, cigarettes, bunkers, provisions) consumed by foreign-flagged cruise vessels within Indian territorial waters, under CBIC Instruction No. 15/2018, a practice not mirrored in comparable international cruise jurisdictions.
- Restriction of Article 8 DTAA benefits (concessional tax treatment for profits from operation of ships in international traffic) to passenger-transportation revenue alone, excluding ancillary onboard revenues that are intrinsic to modern cruise operations.
- Limited practical applicability of Rule 6DD(i) of the Income-tax Rules (cash-payment exception for crew wages) to the diverse direct and indirect employment structures used to engage seafarers on cruise vessels, notwithstanding India’s obligations under MLC, 2006.

CHAPTER III: PRESENT STATUS OF THE ISSUE UNDER CONSIDERATION GLOBALLY AND NATIONALLY

Key Government Initiatives Discussed by the Board:

The National Shipping Board has, since its constitution, discussed the following key national initiatives as the policy backdrop against which taxation reform of the maritime sector must be assessed:

- Maritime Amrit Kal Vision (MAKV) – 2047
- Maritime India Vision (MIV) – 2030
- PM Gati Shakti (National Master Plan for Multimodal Connectivity)
- Ease of Doing Business / Ease of Living
- Make in India / Aatma Nirbhar Bharat

Key Themes under MAKV-2047 Discussed by the Board:

- Strengthen India’s global maritime presence
- Enhance India’s tonnage
- Promote ocean, coastal & river cruise sector
- Enhance modal share of coastal shipping & inland water transport
- Become a global player in shipbuilding, repair & recycling
- Promote maritime clusters
- Provide maritime professional services
- Develop world-class education, research & training facility
- Develop world-class next-generation ports
- Enhance efficiency through technology & innovation
- Lead the world in safe, sustainable & green maritime sector

Global Position – India Remains Non-Competitive on Cost:

A comparison of the principal cost factors applicable to a Foreign Company operating a Foreign-flagged vessel, an Indian Company operating a Foreign-flagged vessel, and an Indian Company operating an Indian-flagged vessel demonstrates that Indian flag shipping continues to bear a materially higher tax incidence than its foreign-flag competitors on almost every cost head – acquisition, MRO, seafarers’ wages, bunkers, tonnage-based income tax exposure, GST on freight and insurance. The comparative position, drawn from

the Sub-Committee’s Tax Difference Master File (reproduced at Annexure C), is summarized below:

Cost Factor	Comparative Position (Foreign Flag v. Indian Flag)
Financing cost	Foreign flag (foreign or Indian co.): SOFR + 2.5–4% (~7–11% p.a., USD). Indian flag (Indian co.): 9–13% p.a. depending on bank and company size – materially costlier debt for the Indian flag.
Taxation on acquisition of ship (IGST, import duty)	Foreign flag: 0% (generally no import duty/GST). Indian flag (Indian co.): 5% IGST plus BCD + surcharge of 5.5%–27.5% (except HSN 8901 vessels).
Taxation on MRO/dry-docking services availed in India	Foreign flag: typically, 0% (export of services). Indian flag: 5% GST.
Taxation on MRO/dry-docking services availed abroad	Foreign flag: typically, 0% VAT/sales tax internationally. Indian flag: 5% IGST (RCM).
Taxation on seafarers’ wages	Foreign flag: generally, no TDS/withholding by flag state. Indian flag: average TDS of ~27% of wages on an Indian flag foreign-going vessel.
Taxation on bunker fuel	Foreign flag: duty-free for international voyages. Indian flag: 5% GST on coastal bunkers (EXIM/coastal container vessels exempt).
GST on freight services – import / export / inter-port / time-charter	Foreign flag: generally NIL. Indian flag: 5% GST typically applies (FOB import leg, inter-port and time-charter services); export of services is NIL.
Insurance cost (P&I, Hull & Machinery)	Foreign flag: NIL. Indian flag: 5% IGST on RCM basis.

Cost Factor	Comparative Position (Foreign Flag v. Indian Flag)
Withholding tax on payments to / receipts from non-residents	Foreign flag: NIL. Indian flag: 20–30% depending on nature of payment/treaty, with Indian payers required to gross up, regardless of treaty benefit.
Other compliance costs	Indian flag alone bears tonnage-tax training costs, annual FSI surveys (vessels >15 years), mandatory CCTV, additional SAT-C, MMD drydocking surveys, PHO certification and loss-of-hire during inspections – costs not borne by foreign flag competitors.

Cruise Shipping – Present Status:

Globally, cruise tourism is supported through liberal taxation regimes, reduced leasing taxes, tonnage tax schemes for passenger vessels, and simplified customs procedures; many jurisdictions treat cruise tourism as a major economic driver and extend fiscal incentives accordingly. In India, recent reforms include: (a) RBI Circular No. RBI/2025-26/55 dated 13.06.2025 permitting advance remittance up to USD 50 million for outright vessel acquisition without bank guarantee; (b) CBDT Notification No. 9/2025 prescribing Rule 6GB conditions for non-resident cruise operators; and (c) CBIC’s online declaration and duty-payment mechanism for foreign consumables. Notwithstanding these reforms, India continues to apply a materially higher presumptive tax rate (20% under Section 44BBC, against 7.5% under Section 44B for other shipping), an 18% GST on ship leasing (against lower rates internationally), and customs duty on foreign consumables not typically mirrored abroad. India presently caters to only around 5 lakh domestic cruise passengers annually – about 1.5% of the global cruise passenger base – underlining the scale of the untapped opportunity.

CHAPTER IV: PRESENT STATUS & CHALLENGES FACED BY STAKEHOLDERS

A. Increase in Indian Tonnage:

Issue	Present Status / Suggested Relief
Grant of ‘Infrastructure’ status to Indian ships (DEA)	MoPSW/DGS/shipbuilders/shipowners have recommended that new and second-hand vessels of 24m/500 GT and above be defined as ‘large’ vessels for infrastructure status, enabling repayment tenors of ~70% of useful life. DEA wishes to link the status to value and exclude second-hand vessels – however, the majority of Indian tonnage is, and will for some time remain, second-hand. DEA should be persuaded to accept the MoPSW/DGS/ICCSA/INSA definition and extend it to second-hand ships, and to relax the requirement of collateral over and above the ship itself.
5% GST on acquisition of ships (new or second-hand) (DoR)	This locks up working capital (e.g., ₹5 crore on a ₹100 crore vessel), discourages Indian flagging (the levy does not apply to non-Indian flag), and is not readily financed or offset (input-credit recovery is slow). The levy should be removed for ship acquisition.
5% GST on MRO services consumed overseas (DoR)	Levied under RCM even though the ship cannot always return to India for repair while trading internationally; not applicable to non-Indian ships. A level playing field is sought by removing this levy or providing exemption on establishment of appropriate GST treatment.
Double taxation by Customs on MRO	Despite 5% IGST already paid on RCM basis, Customs separately levies 5% IGST again on

Issue	Present Status / Suggested Relief
services consumed overseas (DoR)	arrival, treating the same repair value as an import of goods – taxing the same transaction twice. Exemption from Customs duty should be granted where appropriate GST treatment is evidenced.
Duty on locally procured, duty-paid bunkers on board when converting from Foreign-Going to Coastal (CBIC)	Since these bunkers are fuel (not cargo) and are not ‘exported’, CBIC should clarify that Indian-origin/locally procured bunkers on board an Indian flag ship converting to coastal status are not liable to any further customs duty.
Duty on assumed ‘freight’ at first import of a vessel (CBIC)	A vessel sails on its own power and is not carried on another conveyance; DG Valuation has confirmed in writing there is no concept of ‘freight’ for a vessel. Certain Custom Houses nonetheless add assumed freight/insurance to assessable value. CBIC should clarify that freight cannot form part of assessable value, and that only H&M insurance value (as taken by the owner) applies.
General Orders No. 1, 2 and 3 of 2018 (MoPSW)	These orders permit foreign flag container ships to carry fertilizer/urea, EXIM, empties, agriculture/horticulture/fisheries/animal-husbandry cargo without licence or ROFR for Indian ships. Result: transshipment via Colombo has not reduced, freight costs for Indian exporters/importers have risen, and zero container vessels have been acquired by Indian companies since 2019 (barring replacements), while USD 14.3 billion in freight is paid out annually. The Orders should be reversed and the requirement to obtain a DGS licence, after affording ROFR to Indian flag ships, reinstated.

B. Promote Coastal Shipping and Inland Waterways Transport:

Issue	Present Status / Suggested Relief
Fuel used by coastal ships outside GST	Indian ships consumed ~1.47 MMT of fuel in 2020 (coastal ships: 3.7 lakh MT of HSD/MGO) against national fossil-fuel consumption above 200 MMT. Bringing coastal bunker fuel (HSD/MGO) under 5% GST would cut operating costs and promote modal shift at negligible revenue loss; misuse concerns can be met through DGS fuel-consumption reporting.
GST rate distortion on multimodal transport (DoR)	Coastal shipping/IWT attracts only 5% GST for the sea-leg alone, but 12% once road/rail first/last-mile connectivity (which coastal shipping and IWT always require) is added, cancelling the intended benefit. A uniform 5% GST with full ITC should apply to all multimodal transport services having at least one coastal or IWT leg.
GST on handling of agricultural products at terminals (DoR)	Transportation of agricultural products is GST-exempt, but terminals levy 18% GST on container handling of such cargo, and since agri-traders have no ITC to offset, the transport exemption is nullified. A clarification should be issued that handling services for agricultural products by terminal operators are not liable to GST.

C. Develop World-Class Facilities for Seafarers at Our Ports:

Issue	Present Status / Suggested Relief
Immigration law applied to purely coastal ships/crew (MoHA / MoPSW)	Most non-major ports lack Immigration Check Posts (ICPs), preventing crew change/shore leave and forcing costly diversion to ICP ports; this is also in tension with MLC, 2006. Vessels engaged in port / harbor operations (tugs, dredgers) should be exempt from immigration checks/clearances; vessels operating within 12–20 NM of the coast should move to an online crew-movement reporting system on the DGS model. (Passengers on mainland–Island vessels already face no such clearance.)
Shore leave for Indian seafarers at Indian ports (MoHA / MoPSW)	Time-consuming, exhausting procedures effectively deny seafarers the shore leave and welfare access to which India is committed under MLC Regulation 2.4 and 4.4. A time-bound SOP for grant of shore leave should be directed.
Lower TDS on seafarers’ salaries (CBDT)	Indian ships must, by law, employ only Indian seafarers and must withhold tax on wages; foreign employers of the same seafarers have no such obligation, so Indian ships lose talent to foreign employers. TDS on seafarers’ wages should be lowered from the present ~27% to about 5%.
Social security benefits for Indian seafarers (MoPSW)	India is mandated under MLC Regulation and Guideline 4.5 to extend Provident Fund, Gratuity and Pension to all ranks of seafarers on Indian and foreign flag ships. The SPF Board of Trustees approved the required amendment to the SPF Act, 1966 on 11 January 2021 and forwarded it to MoPSW; more than three years later, no progress has been made. The amendment should be expedited.

D. Providing Professional Maritime Services – IRS-related:

Issue	Present Status / Suggested Relief
Recognition of IRS as a Recognized Organization (RO) by key flag States	UK, Singapore, South Korea, Greece and Saudi Arabia have not authorized IRS as an RO. UK (MCA) has sought reciprocity (already met, since the Indian flag recognizes UK-based LR) yet has not authorized IRS; Singapore has been approached since 1993, raised again by the Hon’ble Minister in March 2025; South Korea (letter of 18.10.2024), Saudi Arabia (letter of 28.05.2025, MEA engagement recommended) and Greece (letter of 17.01.2022, taken up with MEA and the India–Greece JWG in 2022) remain pending. Active, sustained support from MoPSW, MEA and Indian missions abroad is required to secure RO status for IRS with these flag States, in order to boost IRS-classed tonnage, strengthen India’s voice in global maritime governance, and align with India’s diplomatic and Atmanirbhar Bharat objectives in maritime services.

E. Customs-related Issues (as per INSA representation dated 13.03.2025)

Issue	Present Status / Suggested Relief
Assessable value at First Entry – take-over bunkers	Under Sec. 87 and Sec. 2(38) of the Customs Act, 1962, bunkers/stores consumed by a foreign-going vessel are not liable to duty, and take-over bunkers do not form part of the sale condition (Rule 10(1)(e) of the Customs Valuation Rules, 2007 inapplicable). Take-over bunkers, and bunkers remaining on board a foreign-going vessel at first import, should not form part of assessable value; on conversion to coastal status, duty should be paid only on bunkers consumed on the coastal run (per Circular 58/97 dated 6.11.1997).
Assessable value at First Entry – assumed Freight and Insurance	A vessel sails on its own steam and is not ‘freight’-borne cargo under the Customs Valuation Rules, 2007; certain Custom Houses (e.g., Mundra) nonetheless add assumed freight/insurance. Freight should be excluded from assessable value; H&M insurance may be included, but computed only pro-rata for the period from entry into Indian waters (12 NM) to the port of first entry.
Double IGST on MRO services availed abroad, on dry-dock expenditure including insurance/freight	IGST already discharged on RCM basis (Sec. 5(3), IGST Act read with relevant notifications) is levied a second time by Customs on re-import, treating repair as import of goods (Notifications 45/2017 & 46/2017). Judicial authority (Noble Assets Co. Ltd.; The Great Eastern Shipping Co. Ltd.; Mohit Minerals (SC)) supports the position that a vessel post-import is a ‘conveyance’, not ‘goods’, and that this amounts to double taxation.

Issue	Present Status / Suggested Relief
	Exemption from Customs duty on MRO value should be granted where GST treatment is established, and RCM-GST on foreign MRO removed to avoid the duplication (Revenue impact: Nil – the charges are not valid in law).
Re-levy of duty on bunkers/stores/lube oil already GST-paid in India, on return from a foreign voyage	No drawback/refund of GST is claimed when the vessel departs India, so re-levy of duty on return is inequitable, and is further complicated where bunkers are supplied by time-charterers (who hold the invoice) rather than the shipowner. A CBIC clarification is sought (Revenue impact: Nil, since local duties/taxes are already paid).
GST on imports under Essentiality Certificate for petroleum operations	Pre-GST, such imports (List 33, Notification 50/2017-Customs) were duty-free; IGST was 5% but rose to 12% from 18.07.2022, raising working-capital needs where ITC is unavailable (e.g., time-charter services). Budget 2022 also removed Tugs/AHTSVs (HSN 8904) from List 33, subjecting them to BCD on full vessel value. IGST on Essentiality Certificate imports should revert to 5% (or be exempted), and Chapter 8904 vessels restored to List 33.

F. Direct Tax-related Issues (as per INSA representation dated 04.06.2025):

Issue	Present Status / Suggested Relief
TDS on seafarers’ wages on Indian coastal vessels	Indian companies must withhold TDS on seafarers’ wages (~30–33% of ship operating cost), while foreign flag competitors on the same coast face no such withholding, undercutting Indian companies and driving seafarers to foreign employers. Suggested: a Section 197A notification (read with Section 192) prescribing a lower 5% deduction rate; alternatively, cast the withholding obligation on the RPSL agent who places Indian seafarers on foreign ships.
Foreign vendor registration on Income-tax portal for Form 10F	Since 1 October 2023, foreign vendors (often needed urgently for repair / survey / agency / security / drydocking abroad) must themselves register on the Indian tax portal to file Form 10F electronically, discouraging the best available vendors from engaging with Indian companies. Suggested: permit shipping companies to obtain TRC/Form 10F from foreign vendors and file scanned copies online (amend CBDT Notification No. 03/2022); revenue impact nil, as tax is typically borne net by the Indian company regardless of DTAA rate.
Fees for Technical Services (FTS) rate mismatch – Section 115A	Section 115A prescribes 20% (plus surcharge/cess) for FTS, against 10–15% under most DTAAs; since tax is usually borne by the Indian payer (Section 195A gross-up), the effective TDS burden rises to ~25%. Suggested: amend Section 115A to reduce the FTS rate to 10%.

Profit on sale of qualifying ships treated outside core shipping income (MAT exposure)	This reduces cash available for fleet acquisition / modernization at a time when the average Indian fleet age is 22.5 years and heavy reinvestment is needed to meet IMO decarbonization and safety/MARPOL requirements. Suggested: amend Section 115VL to include profit from sale of ships as core shipping income (revenue impact negligible, as only 3–4 ships are sold per year).
Dry-docking/ship-repair treated as ‘technical services’ (10% TDS)	Dry-docking and repair are statutory maintenance obligations, not managerial/technical/consultancy services, and India lacks repair facilities for ships beyond 6,400 DWT, forcing foreign-going ships to repair abroad. Suggested: clarify that dry-docking/ship repair does not fall within ‘technical services’ for TDS purposes (revenue impact nil).

G. Present Status & Challenges – Cruise Industry

The following issues, drawn from the representation of M/s Waterways Leisure Tourism Ltd. (Cordelia Cruises) dated 16.06.2026, presently affect the cruise tourism segment:

Issue	Present Status / Suggested Relief
Foreign exchange remittance for lease-based vessel acquisition (RBI)	RBI Circular No. RBI/2025-26/55 dated 13.06.2025 has eased advance remittance for outright acquisition (up to USD 50 million, no bank guarantee), but leasing arrangements with option-to-purchase continue to require case-by-case approval for lease instalments, causing delay.

Restrictive withholding-tax exemption – Section 10(15B)	Exemption on lease rentals to a foreign lessor applies only where lessor and lessee are group companies; arm’s-length leasing from unrelated foreign owners attracts withholding tax, raising costs for independent operators. Suggested: remove the group-company condition and extend the exemption to all authorised cruise operators.
Higher presumptive tax rate – Section 44BBC	Non-resident cruise operators are taxed on a presumptive basis at 20% of gross receipts, against 7.5% for other non-resident shipping businesses under Section 44B, discouraging foreign cruise operator participation. Suggested: delete Section 44BBC and bring cruise operators within Section 44B at 7.5%.
Ambiguity on ‘gross collections’ (ancillary onboard revenue)	Modern cruise revenue includes dining, entertainment, retail, gaming and hospitality; the present framework does not clarify whether these fall within ‘gross collections’ under Section 44BBC. Suggested: issue an express statutory clarification.
Fiscal inequity between domestic and non-resident operators	Domestic operators bear full corporate tax compliance while carrying only ~5 lakh passengers annually (~1.5% of global cruise passengers); the sector needs fiscal incentives to expand deployment of vessels in Indian waters.
GST classification dispute – composite supply v. 28% recreational services	Cruise services (transport, accommodation, dining, entertainment) are classifiable as a composite supply under SAC 996424, but GST authorities seek to apply the 28% rate under SAC 9996 on the basis of incidental onboard casino operations (often run by independent third parties in international waters). Suggested: clarify that cruise services remain taxable as composite supply (18%), notwithstanding onboard casino operations.

High GST on ship leasing (18%)	Materially higher than international benchmarks, raising financing costs for a capital-intensive sector. Suggested: reduce to 5%, in line with global practice.
Double taxation of onboard sales during international sailings	Section 12(10), CGST Act deems the place of supply to be the first Indian port of departure, so India levies GST on onboard sales even when rendered in international waters, while destination countries may separately levy VAT/GST on the same sales.
Non-recognition of cruise travel for LTC – Section 10(5)/Rule 2B	Cruise travel is not listed among eligible modes of transport for LTC exemption, creating ambiguity and limiting adoption of domestic cruise tourism. Suggested: clarify cruise travel as an eligible mode.
Exclusion of passenger cruise vessels from Tonnage Tax Scheme – Section 115VD	‘Pleasure crafts’ are excluded from ‘qualifying ships’, denying cruise operators the tonnage-tax benefit available to other shipping businesses, and discouraging investment in cruise tourism. Suggested: include passenger cruise vessels within the tonnage tax scheme.
Customs duty on foreign consumables onboard (CBIC Instruction No. 15/2018)	Foreign-flagged cruise vessels pay customs duty on foreign-sourced liquor, cigarettes, bunkers and provisions consumed within Indian territorial waters – a practice not mirrored by comparable global cruise jurisdictions, despite CBIC’s online declaration system easing procedure. Suggested: consider duty-free onboard retail facilities in line with global practice.

Limited scope of Article 8, DTAA, for ancillary revenue	Article 8 benefits (concessional tax on profits from operation of ships in international traffic) extend only to passenger-transportation/core shipping revenue, leaving ancillary onboard revenue (intrinsically linked to cruise operations) outside the treaty benefit and subject to higher effective tax.
Limited applicability of Rule 6DD(i) to maritime crew	Seafarers work in isolated conditions without access to conventional banking and require timely cash disbursement under MLC, 2006; Rule 6DD’s cash-payment exception does not adequately address the diverse direct/indirect employment structures used to engage crew on cruise vessels. Suggested: expand Rule 6DD(i) to cover such arrangements.

CHAPTER V: PAST POLICIES OF THE GOVERNMENT AND THEIR EFFICACY

Historically, the Government’s approach to shipping taxation has been incremental rather than structural. Notification No. 50/2017-Customs (30.06.2017) exempted goods imported under Essentiality Certificates for petroleum operations from Basic Customs Duty, but the subsequent removal of AHTSVs (HSN 8904) from List 33 in Budget 2022, and the increase of applicable IGST from 5% to 12% in July 2022, eroded this relief. Notifications 45/2017 and 46/2017 (30.06.2017) sought to exempt re-imported repaired goods from Customs duty/IGST subject to conditions, but have been implemented in a manner that results in double taxation of MRO services already subjected to RCM-GST. General Orders No. 1, 2 and 3 of 2018 were introduced with the stated objective of reducing transshipment and freight costs for Indian trade by permitting foreign container lines to carry reserved cargoes without license / ROFR; in practice, transshipment has not reduced, freight costs have risen, and Indian container-ship investment has ceased altogether since 2019 – the policy has not achieved its stated objective and has instead disincentivized Indian tonnage growth. In the seafarer welfare domain, the SPF Board of Trustees approved extension of Provident Fund, Gratuity and Pension benefits to all ranks of Indian seafarers as far back as 11 January 2021, but the required amendment to the SPF Act, 1966 has not progressed in over three years, reflecting a gap between policy intent and implementation.

Cruise Shipping:

Section 10(15B) of the Income-tax Act was introduced to relieve withholding tax on lease rentals for cruise vessel leasing, but its restriction to group-company structures has limited its applicability to independent operators. Section 44BBC introduced a dedicated presumptive-tax framework for non-resident cruise operators, simplifying administration, but at a rate (20%) considerably higher than the comparable Section 44B rate (7.5%) for other shipping businesses. The historical RBI framework under Master Direction No. 17/2016-17 required extensive documentation and DG Shipping approval prior to remittance, and while it ensured regulatory oversight, stakeholders considered it time-consuming, particularly for time-sensitive vessel transactions. Ship-leasing transactions have

historically been subject to 18% GST, a rate that, while administratively functional, has been consistently represented by the industry as uncompetitive relative to global cruise jurisdictions. Passenger cruise vessels have historically been excluded, as ‘pleasure crafts’, from the tonnage tax scheme under Section 115VD, discouraging investment despite the sector’s tourism and employment potential.

CHAPTER VI: CURRENT POLICIES OF THE GOVERNMENT & THEIR EFFICACY

The National Shipping Board itself – notified on 30.04.2025 and functioning since 01.05.2025 – represents the Government’s current institutional commitment to structured stakeholder engagement on maritime policy, having held its first interaction with the Hon’ble Minister, PSW on 10.05.2025 (Mumbai), and formal Board meetings on 30 May 2025 (Mumbai) and 16 July 2025 (Mumbai), with a further meeting proposed at Kandla, Gujarat on 25 August 2025. The Finance Minister’s announcement of ‘Infrastructure’ status for large ships is a positive current-policy development, though its efficacy for the Indian fleet (predominantly second-hand tonnage) depends on DEA accepting the MoPSW/DGS/ICCSA/INSA definition and extending it to second-hand vessels.

Cruise Shipping:

RBI’s Circular No. RBI/2025-26/55 dated 13.06.2025 (permitting advance remittance up to USD 50 million for outright vessel acquisition without bank guarantee) has substantially eased outright acquisition, though lease-based acquisition remains outside its scope. CBDT Notification No. 9/2025 (prescribing Rule 6GB) has improved operational clarity for non-resident cruise operators. CBIC’s online declaration and duty-payment mechanism for foreign consumables has eased procedural compliance, though the underlying duty liability remains a competitive disadvantage. Tax incentives for IFSC units under Sections 10(4F) and 80LA, extended to 31 March 2030, have strengthened ship-leasing structures routed through IFSCs. Taken together, current policy has improved procedural ease without yet addressing the structural rate/scope issues (presumptive tax rate, GST on leasing, tonnage-tax exclusion, and DTAA/Rule 6DD scope) identified by stakeholders.

CHAPTER VII: DISCUSSIONS WITH STAKEHOLDERS

The Chairperson and other Members of the National Shipping Board have been engaging with stakeholders at the Ministry of Ports, Shipping and Waterways, at the National Shipping Board office at Janpath, New Delhi, online, and during formal Board meetings since the Board’s constitution on 30.04.2025, including at meetings held on 30 May 2025 (Mumbai), 16 July 2025 (Mumbai) and the meeting proposed on 25 August 2025 (Kandla, Gujarat). Discussions with INSA, ICCSA, IRS and NUSI have centered on the taxation and regulatory issues summarized in Chapter IV above.

Cruise Shipping:

Discussions with cruise operators, leasing companies, maritime stakeholders and tax professionals reveal a broad stakeholder consensus on: (i) the need for parity between cruise shipping and other shipping sectors in presumptive taxation; (ii) the requirement for internationally competitive tax structures; (iii) the necessity for GST certainty and simplification, particularly on the treatment of composite cruise packages; (iv) the importance of reducing compliance burdens for foreign operators; (v) the need to incentivize deployment of additional cruise vessels in Indian waters; and (vi) the requirement for policy stability and long-term regulatory certainty, with particular emphasis on harmonizing with global cruise taxation practice.

CHAPTER VIII: PRESENT STATUS & CHALLENGES FACED BY THE STAKEHOLDERS (POST-DISCUSSION ASSESSMENT)

Following detailed discussion with stakeholders, the Sub-Committee finds that, notwithstanding the recent positive steps recorded in Chapter VI, the core structural disadvantages identified in Chapter IV remain unresolved: Indian tonnage continues to face costlier capital and taxation than foreign flag competitors on the same routes; coastal shipping and inland waterways transport continue to face GST-driven distortions vis-à-vis road transport; seafarers continue to face TDS and social-security disadvantages relative to foreign flag employment; and IRS continues to await RO recognition from key flag States. The Sub-Committee is of the view that these issues require coordinated resolution across DoR, CBIC, CBDT, DEA, MoHA, MEA and MoPSW, rather than piecemeal administrative clarification.

Cruise Shipping:

On further discussion with cruise stakeholders, the Sub-Committee notes that while RBI, CBDT and CBIC reforms have eased certain procedural aspects (outright vessel remittance, operational conditions for non-resident operators, online customs declaration), the more consequential rate and scope issues remain outstanding: the 20% v. 7.5% presumptive-tax disparity under Sections 44BBC/44B; the restrictive Section 10(15B) exemption; the disputed 28% v. 18% GST classification of composite cruise services; the 18% GST on ship leasing; the tonnage-tax exclusion of passenger cruise vessels under Section 115VD; and the limited scope of Article 8 DTAA relief and Rule 6DD(i) for cruise crew. Stakeholders emphasize that resolving these issues is central to enabling India to capture a larger share of the global cruise market, presently just ~1.5%.

CHAPTER IX: VIEWS OF THE DOMAIN EXPERTS

Domain experts consulted by the Sub-Committee, including tax professionals, classification society representatives and shipowners’ associations, have underscored that Indian shipping’s competitiveness problem is predominantly a taxation and cost-of-capital problem rather than an operational-efficiency problem, and that removing the asymmetries identified in Chapter IV – particularly the 5% GST on ship acquisition, double taxation of MRO services, and the seafarer TDS differential – would have an outsized effect on Indian tonnage growth relative to their fiscal cost to the exchequer, several of the changes being revenue-neutral or revenue-positive once the resultant growth in Indian tonnage, employment and freight retention is accounted for.

Cruise Shipping:

Domain experts and tax professionals consulted on cruise-industry issues broadly recommend: removal of the group-company restriction under Section 10(15B) and extension of the exemption to all authorized cruise operators; deletion of Section 44BBC and inclusion of cruise operators within Section 44B at 7.5%, to create parity with other maritime businesses; express statutory clarification that ancillary onboard revenues fall within ‘gross collections’; a GST clarification that cruise services remain taxable as a composite supply at 18%, notwithstanding incidental casino operations; reduction of GST on ship leasing from 18% to 5%; recognition of cruise travel as an eligible mode of transport for LTC; appropriate clarification or policy intervention on the scope of Article 8, DTAA and Rule 6DD(i); inclusion of passenger cruise vessels within the tonnage tax regime; and introduction of duty-free onboard retail facilities for foreign-flagged cruise vessels, in line with global practice. Experts are unanimous that India possesses significant potential to emerge as a major global cruise tourism destination, contingent on rationalization of taxation structures, reduction of compliance burden, greater policy certainty, and sector-specific fiscal support.

CHAPTER X: NATIONAL & GLOBAL BEST PRACTICES TO RESOLVE THE ISSUE

Internationally, competing maritime nations commonly grant infrastructure-linked financing to shipping, exempt ship acquisition and MRO services from indirect tax, apply no or minimal withholding tax on seafarer wages, and extend tonnage-tax regimes broadly across qualifying commercial vessels. India’s own MAKV-2047 and MIV-2030 frameworks, PM Gati Shakti, Ease of Doing Business and Make in India/Atmanirbhar Bharat initiatives already provide the policy architecture within which these global practices can be adopted; the task before the Government is to align specific tax provisions (GST, Customs, Income-tax) administered by DoR/CBIC/CBDT with the stated objectives of these national initiatives.

Cruise Shipping:

Major global cruise jurisdictions adopt cruise-friendly taxation and regulatory frameworks: simplified shipping-taxation regimes; tonnage-tax benefits extended to cruise operators; lower indirect tax on vessel leasing; streamlined customs and remittance procedures; and duty-free onboard retail operations, together with liberal remittance/financing mechanisms for vessel acquisition and leasing, and treatment of cruise tourism as a core component of national tourism policy. By comparison, India presently imposes comparatively higher taxation and compliance burdens in presumptive taxation, GST on leasing, and customs duty on foreign consumables. Nationally, the RBI remittance relaxation, CBDT Notification No. 9/2025 and CBIC’s online customs mechanisms represent positive first steps that should be extended through rationalization of the remaining rate and scope issues identified in this report.

CHAPTER XI: SUGGESTED POLICIES

- Accept the MoPSW/DGS/ICCSA/INSA definition of ‘large’ vessels (24m/500 GT and above, including second-hand vessels) for grant of Infrastructure status, and relax collateral requirements over and above the ship itself.
- Remove or exempt the 5% GST on acquisition of ships (new and second-hand) by Indian shipping companies.
- Remove the 5% GST (RCM) on MRO services consumed overseas, or provide Customs duty exemption on MRO value where GST treatment is evidenced, to eliminate double taxation.
- Issue CBIC clarification excluding take-over bunkers and freight (retaining only pro-rata H&M insurance) from the assessable value of vessels at first import, and exempting duty-paid bunkers/stores from re-levy on FG–Coastal conversion.
- Reverse General Orders No. 1, 2 and 3 of 2018 and reinstate the DGS licence/ROFR requirement for foreign container ships carrying reserved cargoes.
- Bring coastal-vessel bunker fuel (HSD/MGO) under a uniform 5% GST regime, and rationalize GST on multimodal transport to a uniform 5% (with full ITC) wherever a coastal/IWT leg is involved.
- Clarify that terminal handling of GST-exempt agricultural cargo is itself not liable to GST.
- Exempt port/harbor-operation coastal vessels from immigration clearance, and introduce online crew-movement reporting for near-coastal vessels; direct a time-bound SOP for seafarer shore leave.
- Lower TDS on seafarers’ wages on Indian ships from ~27% to about 5% (Section 197A notification), or cast withholding responsibility on RPSL agents for seafarers on foreign ships.
- Expedite the pending SPF Act, 1966 amendment to extend Provident Fund, Gratuity and Pension to all ranks of Indian seafarers.
- Mobilize sustained MoPSW/MEA/Indian-mission support to secure RO recognition for IRS from the UK, Singapore, South Korea, Greece and Saudi Arabia.

- Amend Section 115A to reduce the FTS withholding rate to 10%, and simplify Form 10F/TRC filing for foreign vendors providing time-critical services abroad.
- Amend Section 115VL to treat profit on sale of qualifying ships as core shipping income (outside MAT), and clarify that dry-docking/ship repair does not constitute ‘technical services’ for TDS purposes.
- Restore Chapter 8904 vessels (Tugs/AHTSVs) to List 33 of Notification 50/2017-Customs, and revert the Essentiality Certificate IGST rate to 5%.

Cruise Shipping:

- Simplify RBI remittance procedures for lease-based vessel acquisition structures, including periodic lease-instalment remittances.
- Amend Section 10(15B) to remove the group-company restriction and extend the withholding-tax exemption to all authorised cruise operators.
- Delete Section 44BBC and include cruise operators within Section 44B at a 7.5% presumptive rate, at par with other shipping businesses.
- Clarify that ancillary onboard revenues (dining, retail, entertainment, hospitality) form part of ‘gross receipts’ for presumptive taxation.
- Introduce tax incentives, tax holidays or rebates for domestic cruise operators deploying additional vessels in Indian waters.
- Issue a GST clarification recognizing cruise services as a composite supply taxable at 18%, notwithstanding incidental onboard casino operations.
- Reduce GST on ship-leasing transactions from 18% to 5%, in line with international benchmarks.
- Recognize cruise travel as an eligible mode of transport for LTC under Section 10(5) read with Rule 2B.
- Clarify the applicability of Article 8, DTAA benefits to ancillary revenues intrinsically connected with cruise operations.
- Expand Rule 6DD(i) to adequately cover direct and indirect employment arrangements for seafarers on cruise vessels.
- Include passenger cruise vessels within the tonnage tax scheme under the Income-tax Act, 1961.
- Introduce duty-free onboard retail facilities for foreign-flagged cruise vessels operating in India.

- Periodically review exemptions/incentives presently scheduled to expire in 2030, in light of prevailing industry conditions.

CHAPTER XII: FINAL POLICY RECOMMENDATION TO THE GOVERNMENT TO ACHIEVE MAKV-2047 GOAL

Sub-Committee No. 15 recommends that the Government adopt a coordinated, cross-Ministry roadmap – involving DoR, CBIC, CBDT, DEA, MoHA, MEA and MoPSW – to remove the taxation asymmetries that presently make it costlier to provide shipping services from an Indian company than to import the same service from a foreign one. Specifically, the Government should: (a) rationalize GST and Customs treatment of ship acquisition, MRO services and bunkers so that Indian flag shipping is not taxed more heavily than the foreign flag service it competes against; (b) grant genuine Infrastructure-status financing to Indian tonnage, including second-hand vessels; (c) reverse policy measures (such as General Orders 1–3 of 2018) that have demonstrably diverted investment away from Indian tonnage without achieving their stated objectives; (d) reduce the seafarer TDS differential and expedite social-security reform, to stem the migration of quality Indian seafarers to foreign employers; (e) actively pursue RO recognition for IRS with key flag States; and (f) rationalize coastal shipping/IWT GST treatment to achieve the intended modal shift towards greener transport.

Cruise Shipping:

To realize India’s cruise tourism potential in furtherance of the MAKV-2047 goal to promote the ocean, coastal and river cruise sector, the Government may consider: rationalization of presumptive taxation and withholding-tax exemptions for cruise operators; simplification of RBI remittance procedures for lease-based vessel acquisition; resolution of GST classification uncertainty for composite cruise services and reduction of GST on ship leasing; inclusion of passenger cruise vessels within the tonnage tax framework; clarity on DTAA and Rule 6DD treatment of ancillary revenue and crew payments; and introduction of duty-free onboard retail and other sector-specific incentives, coordinated across RBI, CBDT, CBIC, the Ministry of Tourism and maritime authorities. A stable, internationally aligned regulatory framework would enhance investment, tourism growth, employment generation, port-led development and foreign cruise participation in Indian waters, consistent with the MAKV-2047 vision.

ANNEXURES

Annexure A: INSA Representation on Customs-related Issues (13.03.2025)

[Full text of the INSA representation dated 13.03.2025 on Customs-related issues, as considered in Chapter IV(E) above, to be appended.]

Annexure B: INSA Representation on Direct Tax-related Issues (04.06.2025)

[Full text of the INSA representation dated 04.06.2025 on Direct Tax-related issues, as considered in Chapter IV(F) above, to be appended.]

Annexure C: Comparative Tax/Cost Factors – Foreign Flag v. Indian Flag Vessels

[Tax Difference Master File – full comparative table, summarized in Chapter III above, to be appended.]

Annexure D: Representation on Issues of the Cruise Industry (Cruise Shipping)

Submitted by M/s Waterways Leisure Tourism Ltd. (Cordelia Cruises), dated 16 June 2026, addressed to the Indian National Shipowners’ Association, under the Cruise Bharat Mission. [Full text as summarized in Chapters II, III, IV, V, VI, VII, VIII, IX, X and XI above, to be appended.]

Annexure E: Presentation to Hon’ble Minister, Ports, Shipping and Waterways (20.08.2025)

“Interaction of the Members of National Shipping Board with the Hon’ble Minister, Ports, Shipping and Waterways 2025”, presented on 20.08.2025, summarized in Chapters I and III above. [Full presentation to be appended.]

Annexure A: Indian National Shipowners' Association's issues with Customs levies & procedures

Sr. No	Issue	Suggested Relief Required
1.	Problems relating to First Entry of Indian flag ships at Indian ports a) customs authorities at few custom houses such as Mundra insist that value of takeover bunkers be added to the assessable value of the vessel.	a) Takeover bunkers are the bunkers which remain on board at the time of purchase of a vessel Pursuant to Section 14 of the Customs Act, 1962, the transaction value of the imported goods includes the amount paid or payable for the costs and services to the extent and in the manner specified in the Rules made on this. However, since the amount paid for the value of takeover bunkers do not form part of the condition of sale, Rule 10(1)(e) of the Customs Valuation (Determination of Value of Imported Goods) Amendment Rules, 2007 would not be applicable to the same. Further, in accordance with Section 87 of the Customs Act, 1962, as long as a vessel is a foreign going vessel, the imported bunkers and stores consumed by the vessel will not be liable to payment of any duty. Therefore, takeover bunkers cannot be made part of the assessable value of a vessel and no duty can be made applicable on such bunkers lying on board a vessel which is on a foreign voyage. Hence, for the reasons aforesaid, takeover bunkers should not form part of the assessable value of the vessel.

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		b) Bunkers remaining on board of the vessel at the time of importation Reference is once again made to Section 87, read with Sec 2 (38) of the Customs Act, 1962 which permits consumption of stores without payment of duty during the period such a vessel is a 'foreign going' vessel. In case of a 'foreign going' vessel, the bunkers are neither discharged nor consumed in India and therefore, the customs duty is not required to be paid on the bunkers remaining on board the vessel at the time of importation. However, if the vessel intendeds to convert to a 'coastal' status, the importer/vessel owner shall comply with the requirements of conversion (as is being presently done in compliance with circular 58/97 dated 6.11.1997) by filing a separate Bill of Entry and paying duty only on bunkers that would be consumed during the coastal run. Hence, such bunkers should not form part of the assessable value of the ship during importation.
	b) When a vessel enters an Indian port during its "First Call", it does so on its own steam. Despite this fact, the Customs authorities at some Custom houses such as Mundra insist	Freight: It is submitted that the vessel sails (on its first call to an Indian port or regular voyage) on its own steam and is not loaded on another conveyance to be brought into India. No freight is charged nor is there any payment by the vessel to anybody as freight for bringing the vessel

Annexure A: Indian National Shipowners' Association's issues with Customs levies & procedures

	that Freight and Insurance be added to the assessable value of the vessel.	into an Indian port while making its First entry. We also submit, that under the Customs Valuation (Determination of Price of Imported Goods) Rules, 2007, freight is denoted and referred to in the context of an article being transported by a carrier. There is no concept of 'freight' in respect of a vessel since it sails on its own power. In view of all of the above, it is our submission that adding freight to the assessable value of the vessel is not correct. Hence, Freight, will not form part of the assessable value of the vessel since the vessel sails on its own steam. Insurance: Once a vessel is taken over, the vessel owner obtains an insurance for the Hull and Machinery of the vessel. We submit that we do not have any issue regarding addition of H&M Insurance to the assessable value of the vessel. However, the cost of insurance of the vessel should be ascertained from the amount of time taken by the vessel from entering into the Indian waters i.e 12 nautical miles to the port of first entry. Therefore, the premium paid for the annual insurance policy, (valid as on the date of importation), to be proportionately considered (by dividing
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Annexure A: Indian National Shipowners' Association's issues with Customs levies & procedures

		the annual premium by 365 days) as cost of Insurance for the purpose of assessment of Customs duty. Hence, Insurance, can be included in the assessable value and calculated from the time the vessel enters the Indian waters upto the customs port in India.
2.	Despite paying IGST on Reverse Charge Basis (RCM) on MRO service outside India, Customs is demanding payment of IGST, ONCE AGAIN on the dry dock expenditure incurred outside India including cost of insurance and freight (to & fro)	Indian shipping companies discharge IGST @ 5% on MRO services on Reverse Charge Mechanism (RCM) basis, when such services are procured from outside India. [In terms of Section 5(3) of the Integrated Goods and Services Tax Act, 2017 ('IGST Act') read with Notification No. 10/2017 – IGST (Rate) dated 28.06.2017 and Notification No. 3/2021 - IGST dated 02.06.2021 issued under section 13(13) of the IGST Act]. However, at the point of arrival of vessel at Indian port, the Indian customs authorities seek to levy applicable duties of customs (IGST) on the value of enhancements to the vessel (equivalent to the value of MRO invoice). As per Notification No 45/2017 and Notification No 46/2017 both dated 30th June 2017 it is provided that goods exported for repairs abroad which are reimported into India shall be exempt from payment of Customs duty leviable in the First Schedule, integrated tax and compensation cess, subject to the condition that customs

Annexure A: Indian National Shipowners' Association's issues with Customs levies & procedures

	duty “<i>would be leviable on such re-imported goods as if the value of re-imported goods after repairs were made up of the fair cost of repairs carried out including cost of materials used in repairs (whether such costs are actually incurred or not), insurance and freight charges, both ways.</i>” In terms of the above, IGST is to be paid for re-import of goods sent abroad for repairs on a value equal to the repair value, insurance and freight. However, this results in dual implications under the GST legislations: (1) Payment of IGST by shipping companies upon receipt of the repair/improvement invoice by treating it as service; and (2) IGST demanded by customs authorities at the point of import by treating the repair services as import of goods and liable to Customs-IGST. Indian Flag Vessels which have once been imported into India, operate as conveyances, and are not Goods. Therefore, they cannot be subsequently charged to custom duties including on repairs/MRO. Suggested Solution:
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Annexure A: Indian National Shipowners' Association's issues with Customs levies & procedures

		• Exemption be provided from duties of customs on the vessel to the extent of MRO services, if it can be established by the Indian recipient that appropriate treatment under GST legislation was given. • Necessary documents in this regard may be prescribed. • Removal of levy of GST on RCM for foreign MRO services could also address the issue of double taxation. Rationale for relief sought: • It may be argued that the vessels post importation assume the character of a 'conveyance' and are used in the shipping business, therefore every subsequent movement in and out of India would not be as 'goods' but as conveyance. Reliance in this regard may be placed on Noble Assets Co. Ltd. and Ors. Vs. Commissioner of Customs [2006 (112) EC C 457, 2006 (138) EC 457 (Tri.-Mumbai)] • Further, it may be argued that there being no movement of goods into or outside India, there cannot be said to be any export of goods and much less any re-import of goods exported. Reliance in this regard may be placed on The Great Eastern Shipping Company Limited vs. Union Of India [2022 (379) E.L.T. 318 (Ori.)]
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Annexure A: Indian National Shipowners' Association's issues with Customs levies & procedures

		Further, the Hon'ble Supreme Court has in the case of Union Of India & Anr. Versus M/S Mohit Minerals Pvt. Ltd. 2022 (61) G. S. T. L. 257 (SC) has also stated that levy of IGST as service and subsequent levy under Customs is tantamount to double taxation. Revenue Impact: Nil. The charges are not valid under law.
3.	Customs insist on Indian vessels, returning from a foreign voyage to once again pay duty on bunkers, stores and lube oils which were purchased in India and on which GST is already paid Custom houses are demanding that vessels which are converting from coastal to Foreign Going status should be filing a shipping bill for the bunkers, lubes, stores lying on the vessel. Then, when the vessel comes back, and converts from Foreign Going to Coastal, fresh duties should be paid on the bunkers, lubes, stores again as if they are being exported into India. We explained that this suggestion is fraught with a lot of difficulties.	The Bunkers, stores or lube oil had been originally purchased in India and GST paid on the same. At the time of the vessel going out of India, no drawback or refund of GST is claimed. It is therefore inequitable to impose duty on bunkers, stores and spares on the same items when they are brought back into India. Revenue Impact: Nil since the local duties and taxes have already been paid. Suggested Solution: Suitable clarification should be issued by the CBIC.

Annexure A: Indian National Shipowners' Association's issues with Customs levies & procedures

	Most often, vessels are on Time Charter and the bunkers are supplied by the charterers. They are the ones who have purchased it and not the shipowner. Therefore, they have the invoice, they are the ones who have paid the GST on the purchase and the price of the bunker could have local excise and other duty components. In these circumstances, the shipowner cannot claim drawback.	
4.	Import of Goods for petroleum operations under Essentiality Certificate as per Notification No 50/2017 - Customs notification dated 30 June 2017 (S No 404) is exempted from basic custom duty whereas only IGST is payable at 5%. With effect from 18 July 2022, the said GST rate is increased to 12%. Indian companies have assets that may be owned and operated abroad. They are brought into India for a specific employment, for which the employer/charterer issues an Essentiality Certificate. The equipment/rig as certified by, for example ONGC, used to be Customs Duty free in pre-GST regime.	In the pre-GST regime, import of goods under Essentiality Certificate were exempt from Customs duty (including Additional Customs Duty and Special Additional Customs Duty). IGST in respect of import of goods under Essentiality Certificate should be exempted by way of an amendment to S No 404 of Notification No 50/2017-Customs dated 30 June 2017. Alternatively, the same may be reduced to 5% as was the case prior to July 2022. The introduction of 12% tax on import of goods for petroleum operation has resulted in a sharp increase in working capital requirements of shipping companies. Further, where the vessels are rendering services of time charter for transport of goods, input tax credit on inputs

Annexure A: Indian National Shipowners' Association's issues with Customs levies & procedures

	This exemption mentioned above is available for goods mentioned in List 33 to Notification 50/2017 -Customs.	is not eligible. Accordingly, any GST paid at the rate of 12% (earlier 5%) on import of goods becomes cost to shipowners. However, in the Budget 2022, Tugs (like Anchor Handling Tug Supply Vessels – AHTSVs) having HSN 8904 have been removed from List 33 and therefore they attract the Basic Customs Duty which is payable on fair value of the vessel itself. The same is an incremental cost to shipping companies which was not the case pre-Budget 2022. The vessel being high value capital asset, the same is substantial cost to shipowners. This anomaly needs to be corrected as this issue is impacting P&L and cash flows of companies. Thus, all vessels under Chapter 8904 should be added to List 33 of Notification 50/2017 - Customs. Revenue Impact: The total revenue impact is difficult to quantify but these taxes are impacting the total cost of oil exploration in India and the P&L and cashflows of both ONGC and the Indian shipping companies.
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End of note

Annexure B: Indian National Shipowners' Association (INSA)
Direct tax related issues of Indian Shipping



Sr. no.	Issue	Constraints	Suggestion/Relief required & Justification
1.	▶ Salary income received by Indian Seafarers working on board Indian coastal vessels is subject to provisions of TDS prior to payment. Hence, Indian seafarers working on Indian ships receive their salaries after deduction of TDS. ▶ However, seafarers employed on foreign flag vessels operating within the coastal waters of India are able to receive wages without being subject to the provisions of TDS. ▶ This leads to a disparity in application of taxation laws to the prejudice of the Indian companies. The provisions	Problems faced: ▶ Cost of wages constitutes about 30-33% of the cost of operation of ships. ▶ Since the costs of operating foreign flag vessels do not include tax on seafarers' income, these costs of foreign companies operating on the Indian coast are lower than those of Indian companies engaged in the same business in India. ▶ These lower costs translate into foreign companies being able to offer lower freight rates to Indian trade and they are able to undercut Indian companies. ▶ Given that Indian companies can only obtain business in India by	Suggested Solution: ▶ In order to ensure parity in the operating costs of Indian and foreign shipping companies operating on the coastal waters of India, it is requested that the rate of TDS on seafarers' wages which is on an average of about 27% per monthly wages should be reduced to lower of 5%. Justification/Benefits to industry and economy ▶ This will improve the competitiveness of Indian ships versus foreign flag ships. Today 96% of Indian cargo is carried by foreign ships. ▶ If Indian flag ships are made competitive and are able to carry more cargoes, the entire freight will be retained in India rather than the same being transferred out of India

Annexure B: Indian National Shipowners' Association (INSA)
Direct tax related issues of Indian Shipping



Sr. no.	Issue	Constraints	Suggestion/Relief required & Justification
	discriminate against Indian shipping companies and this lead to a migration of seafarers to foreign shipping companies who pay wages without deducting any tax.	matching the lowest freight as offered by foreign shipping companies, a similar benefit needs to be extended to Indian seafarers working on Indian ships in Indian coastal waters, as it would make Indian shipping competitive. ▶ Due to the TDS and taxation provisions, Indian seafarers prefer to work with foreign shipping companies. Indian companies are required by law to employ ONLY INDIANS. We are finding it difficult to find quality manpower. ▶ Extremely important that our ships rated as being of the highest quality and this can only happen with good seafarers working on our ships.	to foreign flag shipping companies. Savings upto approximately USD 30 billion if Indian ships are made competitive. ▶ This glaring loophole on differential tax treatment to Indian seafarers is impairing FDI investments in the Indian flag. Plugging this gap would lead to higher investments in the sector and result in a growing Indian fleet. ▶ Increase in Indian fleet would lead to several benefits such as (a) modal shift of cargo from road and rail to sea; (b) reduction of carbon emissions by India; (c) increased employment opportunities for Indian seafarers; (d) Improvement in brand value and therefore demand by Charterers internationally;

Annexure B: Indian National Shipowners' Association (INSA)
Direct tax related issues of Indian Shipping



Sr. no.	Issue	Constraints	Suggestion/Relief required & Justification
		► The decarbonisation efforts will enhance the need for well-maintained ships for which we need good and able seafarers.	(d) increase in Indian flag tonnage; (e) increase in tax revenues within India due to larger fleet and higher revenues; (d) savings in logistics costs by Indian industry; and (f) retention of freight revenues in India.
2	a) Requirement for foreign vendor to register on Income Tax Portal - Filing of Form 10F electronically. ► The Central Board of Direct Taxes (CBDT) made some changes in the mode and manner of filing Form 10F electronically in July 2022. ► Earlier, prior to October 2023,	Problems faced: ► Shipping companies because of the nature of their business have non-recurring foreign vendors because a vessel may need repair, survey, agency, security and drydocking services, etc. throughout the world. In many cases, these services are required on an immediate/urgent basis which puts the foreign vendors in a position to dictate terms of engagement.	Suggested Solution: ► Given the nature of business and the scope of operations of Indian foreign going ships, it is requested that the domestic shipping companies should be permitted to obtain TRC and Form 10F from the foreign vendors and file the scanned copies of the same online. ► For this CBDT Notification No. 03/2022 dated 16th July 2022 needs to be amended to give relief to shipping companies.

Annexure B: Indian National Shipowners' Association (INSA)
Direct tax related issues of Indian Shipping



Sr. no.	Issue	Constraints	Suggestion/Relief required & Justification
	shipping companies were permitted to submit the TRC of a foreign vendor who did not have a PAN in India. Effective 1st October, 2023, these foreign vendors are required to themselves register with the Income tax portal and then file their Form 10F. ► This was done vide a CBDT Notification No. 03/2022 dated 16th July 2022. It mandates that Form 10F shall be furnished electronically in the manner prescribed under Rule 131 (1) of the Income-tax Rules, 1962. The notification also specifies the format and the procedure for the electronic filing	► The foreign vendor is unwilling to spend time and register themselves on the Income tax portal. ► Thus, Indian companies are unable to find the most optimum service provider for services to be consumed in foreign countries. ► Indian companies have to depend on vendors who may not be the best available solely because of the reluctance of others to register on the tax portal of a foreign entity (for the vendor).	Revenue impact: ZERO Justification/Benefits to industry and economy ► Almost all foreign vendor payments made by shipping companies in India (as well as other domestic companies for that matter) are net of tax. Thus, the TDS is borne by the shipping companies. ► The foreign vendor wants his payment net of tax and therefore is least bothered about whether DTAA benefit is availed and whether consequently lower tax rate or higher tax rate is applied under the Income-tax Act. ► This change hinders smooth conduct of business and is against the motto of the Government of 'Ease of Doing Business in

Annexure B: Indian National Shipowners' Association (INSA)
Direct tax related issues of Indian Shipping



Sr. no.	Issue	Constraints	Suggestion/Relief required & Justification
	of Form 10F. b) Here, it would be pertinent to mention that the tax rate for Fees for Technical Services (FTS) under Section 115A of the Income-tax Act is 20% (plus surcharge and cess), whereas under most of the DTAA's which India has entered into, the tax rate for FTS is 10% and in some DTAA's, the tax rate is 15%. Section 195A of the Income-tax Act provides that if the TDS is to be borne by the payer, the amount paid is to be grossed up for TDS. This means that the TDS rate of 20% (plus surcharge and cess) when borne by the payer effectively becomes 25%		India" and that the earlier system of physical filing of TRC and Form 10F was working well. Suggested Solution: ► Section 115A of the Income-tax Act has to be amended to reduce the rate of technical services to 10%.

Annexure B: Indian National Shipowners' Association (INSA)
Direct tax related issues of Indian Shipping



Sr. no.	Issue	Constraints	Suggestion/Relief required & Justification
	(plus surcharge and cess) of the amount being remitted.		
3.	Profit on sale of qualifying ships is not considered as core shipping income and is subjected to Minimum Alternate Tax ('MAT'). This needs to be corrected.	► Reduces the available cash reserves which can be used for acquisition and modernization of fleet	Suggested Solution ► Amend the provisions of Section 115VL of the Income Tax Act to include Profit from sale of ships as core shipping income. Revenue impact: ► Negligible since Indian companies sell about 3-4 ships a year. The quantum of profit on sale of a second hand Indian flag ship is not large. Justification/Benefits to industry and economy ► Buying and selling ships is an integral part of the business of shipping and hence

Annexure B: Indian National Shipowners' Association (INSA)
Direct tax related issues of Indian Shipping



Sr. no.	Issue	Constraints	Suggestion/Relief required & Justification
			should be part of the core income. ▶ The shipping industry operates in a globally competitive environment and has to keep pace with its counterparts in terms of quality, technology and operational excellence. ▶ Average age of Indian fleet is 22.5 years. Substantial investments would be required for replacement and renewal of the existing Indian fleet which are more than 20 years old. ▶ In order to meet global decarbonisation targets as set by IMO the shipping industry will need to invest in energy saving devices and other methods to reduce carbon. ▶ The shipping industry has to

Annexure B: Indian National Shipowners' Association (INSA)
Direct tax related issues of Indian Shipping



Sr. no.	Issue	Constraints	Suggestion/Relief required & Justification
			continuously replace its ships to meet other Safety and Marine Pollution prevention laws, international and global best practices and economic viability due to technological advancement.
4.	Repair and dry-docking services are part of the statutory compliance for ships. However, they are treated as “technical services” and Indian shipping company are forced to withhold 10% of drydocking and repair costs.	Problems faced: ▶ This increases the cost of ship repair for ships. ▶ Dry-docking & Ship repair facilities for ships beyond 6400 DWT are not available in India. ▶ Since Foreign going ships trade worldwide, they cannot come to India specifically for ship repairs and dry-docking.	Suggested Solution: ▶ Suitable clarification may be issued in respect of drydocking and ship repair not falling within the meaning of “Technical services” and TDS at a higher rate need not be deducted. Revenue impact: ZERO Justification/Benefits to industry and economy ▶ Indian companies will be able to save the

Annexure B: Indian National Shipowners' Association (INSA)
Direct tax related issues of Indian Shipping



Sr. no.	Issue	Constraints	Suggestion/Relief required & Justification
			withholding tax of 10% which is a large sum of money since drydocking is a costly exercise. ▶ Ship repair and dry docking services are a statutory duty that ships have to comply with. They are simple maintenance processes that are to be undertaken. They do not entail taking technical services. ▶ This provision of the IT Act applies only for payment for the rendering of any managerial, technical or consultancy services (including the provision of services of technical or other personnel) but does not include consideration for any construction, assembly, mining or like project undertaken by the recipient or consideration which would be income of the recipient chargeable under the head

Annexure B: Indian National Shipowners' Association (INSA)
Direct tax related issues of Indian Shipping



Sr. no.	Issue	Constraints	Suggestion/Relief required & Justification
			“Salaries”(Income tax Act). ▶ The services of ship repair and drydocking are not in the nature of technical consulting services. ▶ Technical services are generally Services involving specialized knowledge, experience, skill and expertise in areas of technical and science and may include professional services. Mere provision of standard facility/services cannot be termed as technical. Suggested Solution: A suitable clarification may be issued in respect of drydocking and ship repair not falling within the meaning of “Technical Services” for the purpose of taxation.

Annexure B: Indian National Shipowners' Association (INSA)
Direct tax related issues of Indian Shipping



Sr. no.	Issue	Constraints	Suggestion/Relief required & Justification																				
5.	Bunker Fuel rates are higher in India as compared to other nations. This makes shipping services costly when compared to foreign ships. <table border="1"> <thead> <tr> <th></th><th>VLSFO</th><th>HSFO</th><th>MGO</th></tr> </thead> <tbody> <tr> <td>Sin</td><td>587</td><td>451</td><td>757</td></tr> <tr> <td>Mum</td><td>685</td><td>615</td><td>1180</td></tr> <tr> <td>Fuj</td><td>589</td><td>420</td><td>886</td></tr> <tr> <td>Rot</td><td>541</td><td>448</td><td>470</td></tr> </tbody> </table> (Source: Trade Winds, 18Dec, All figs in USD) VLSFO: Very Low Sulphur Oil HSFO: High Fuel Sulphur Oil MGO: Marine Gas Oil		VLSFO	HSFO	MGO	Sin	587	451	757	Mum	685	615	1180	Fuj	589	420	886	Rot	541	448	470	Problems faced: ► This adversely impacts Indian ships when they are providing services since fuel is about 30-40% of the cost of operation of a ship.	Suggested solution ► Supply of bunker fuel to vessels regardless of their flag should be Zero rated for the purposes of GST. ► Net selling price of bunker fuel should at least match Singapore prices and should be linked to Singapore Platts rate. Revenue Impact: Negligible. ► The rationalization of rates will lead to a big jump in bunkering in India. The increase in bunkering in India will more than offset the small revenue loss due to rationalization of taxes. Justification/Benefits to industry and economy ► Indian ships can compete with foreign
	VLSFO	HSFO	MGO																				
Sin	587	451	757																				
Mum	685	615	1180																				
Fuj	589	420	886																				
Rot	541	448	470																				

Annexure B: Indian National Shipowners' Association (INSA)
Direct tax related issues of Indian Shipping



Sr. no.	Issue	Constraints	Suggestion/Relief required & Justification
			ships due to efficient fuel prices. ▶ Foreign ships will begin bunkering in India which will bring a huge spin off in terms of economic gain. ▶ Increase in building of bunker barges in India ▶ Increase in other services for vessels such as stores supplies etc.

Annexure C: Comparative cost factors for ships under Foreign Flag and Indian flag

S.No.	Cost factors	Foreign Co. Foreign Flagged (%)	Indian Co. Foreign Flagged (%)	Indian Co. Indian Flagged (%)	Frequency of Cost incurred (Monthly/ Yearly / per Voyage etc.)
1	Financing cost	SOFR + 2.5 - 4% ; ~7–11% p.a. (USD)	SOFR + 2.5 - 4% ; ~7–11% p.a. (USD)	9 to 13 depending on Bank and size of the company	Monthly interest and quarterly loan repayment
2	Taxation on Acquisition of ship (e.g. IGST, Import Duties etc)	0% (generally no import duty / GST); one-time registry & documentation fees	5% IGST on import of all vessels. BCD+Surcharge ranging between 5.5% to 27.5% on all vessels except those that fall within HSN 8901	5% IGST on import of all vessels. BCD+Surcharge ranging between 5.5% to 27.5% on all vessels except those that fall within HSN 8901	One-time at acquisition / registration; annual renewal fees
3a	Taxation on Maintenance, Repairs & Overhaul (MRO) Services including Dry-Dock service availed in India	Typically 0% as foreign vessels are treated under export of services	5% GST	5% GST	Per repair event / per invoice
3b	Taxation on Maintenance, Repairs & Overhaul (MRO) Services including Dry-Dock service availed abroad	Typically 0% VAT/sales tax on ship repair for international shipping (many jurisdictions exempt/zero-rate); otherwise local VAT may apply	5% IGST	5% IGST	Per repair event / per invoice

S.No.	Cost factors	Foreign Co. Foreign Flagged (%)	Indian Co. Foreign Flagged (%)	Indian Co. Indian Flagged (%)	Frequency of Cost incurred (Monthly/ Yearly / per Voyage etc.)
4	Taxation on Seafarers' wages.	No TDS/withholding by flag state in most open registries; crew taxed (if at all) in their home jurisdiction	As per Indian Income tax applicable rates slab wise in case of those who are not eligible to be treated as NRIs.	As per Indian Income tax applicable rates slab wise in case of those who are not eligible to be treated as NRIs. On an Indian flag FG vessel average TDS deducted by the employer is about 27% of wages overall.	Monthly (payroll)
5	Taxation on fuel oil (Bunker)	Duty-free for international voyages; and bunkering in India may apply 5% GST	5% GST on Coastal Bunkers Indian flag container vessels engaged in transportation of EXIM and Coastal cargo are exempt.	5% GST on Coastal Bunkers Indian flag container vessels engaged in transportation of EXIM and Coastal cargo are exempt.	Invoice / payment

S.No.	Cost factors	Foreign Co. Foreign Flagged (%)	Indian Co. Foreign Flagged (%)	Indian Co. Indian Flagged (%)	Frequency of Cost incurred (Monthly/ Yearly / per Voyage etc.)
6	Taxation as per tonnage of the Vessel (Taxes on Income)*	Taxation basis tonnage tax	Qualifying Ship having NT Annual of Daily Tonnage Income Up to 1,000Tons- INR 70 for each 100 tons Exceeding 1,000 but not more than 10,000 tons - INR 700 plus INR 53 for each 100 tons >1,000 tons Exceeding 10,000 but not more than 25,000 tons - INR 5,470 plus INR 42 for each 100 tons > 10,000 tons Exceeding 25,000 tons- INR 11,770 plus INR 29 for each 100 tons > 25,000 tons	Qualifying Ship having NT Annual of Daily Tonnage Income Up to 1,000Tons- INR 70 for each 100 tons Exceeding 1,000 but not more than 10,000 tons - INR 700 plus INR 53 for each 100 tons >1,000 tons Exceeding 10,000 but not more than 25,000 tons - INR 5,470 plus INR 42 for each 100 tons > 10,000 tons Exceeding 25,000 tons- INR 11,770 plus INR 29 for each 100 tons > 25,000 tons	Yearly / per payment (as applicable) to flag state /Advance tax to Indian tax authorities

S.No.	Cost factors	Foreign Co. Foreign Flagged (%)	Indian Co. Foreign Flagged (%)	Indian Co. Indian Flagged (%)	Frequency of Cost incurred (Monthly/ Yearly / per Voyage etc.)
	Minimum Alternate Tax,	Requirement is as per resident countries local tax laws	As per existing Indian Income tax rates	As per existing Indian Income tax rates	Yearly / per payment (as applicable)/Advance tax

S.No.	Cost factors	Foreign Co. Foreign Flagged (%)	Indian Co. Foreign Flagged (%)	Indian Co. Indian Flagged (%)	Frequency of Cost incurred (Monthly/ Yearly / per Voyage etc.)
	Withholding Tax on the payments to non-residents,	NIL	As per Indian Income Tax laws, the person making a payment (other than salary) to a non-resident must deduct Withholding Tax (TDS) at source if the income is taxable in India. For payment to non-residents, there is no single uniform withholding tax rate; the rate depends on the nature of the payment, whether a tax treaty applies, and whether the payee has a PAN. However, regardless of the above, non-residents do not recognise and requires Indian companies to gross up withholding tax. Generally the rate ranges between 20% on Interest, Dividends (other than from IFSC units) and Royalty and Fees for Technical Services to 30% on any other income.	As per Indian Income Tax laws, the person making a payment (other than salary) to a non-resident must deduct Withholding Tax (TDS) at source if the income is taxable in India. For payment to non-residents, there is no single uniform withholding tax rate; the rate depends on the nature of the payment, whether a tax treaty applies, and whether the payee has a PAN. However, regardless of the above, non-residents do not recognise and requires Indian companies to gross up withholding tax. Generally the rate	Yearly / per payment (as applicable)/Advance tax

S.No.	Cost factors	Foreign Co. Foreign Flagged (%)	Indian Co. Foreign Flagged (%)	Indian Co. Indian Flagged (%)	Frequency of Cost incurred (Monthly/ Yearly / per Voyage etc.)
				ranges between 20% on Interest, Dividends (other than from IFSC units) and Royalty and Fees for Technical Services to 30% on any other income.	

S.No.	Cost factors	Foreign Co. Foreign Flagged (%)	Indian Co. Foreign Flagged (%)	Indian Co. Indian Flagged (%)	Frequency of Cost incurred (Monthly/ Yearly / per Voyage etc.)
	Withholding Tax on the receipt from non-resident	NIL			
	Minimum Alternate Tax	Subject to jurisdictional tax	As per Indian income tax laws, the basic rate of Minimum Alternate Tax (MAT) is 15% of the company's book profit. This rate is applied along with applicable surcharge and a 4% Health and Education Cess	As per Indian income tax laws, the basic rate of Minimum Alternate Tax (MAT) is 15% of the company's book profit. This rate is applied along with applicable surcharge and a 4% Health and Education Cess	Yearly / per payment (as applicable)/Advance tax
7	GST on freight services:				
	Import	NIL	5% GST only under FOB i.e. Indian service recipient	NIL	Per voyage / per invoice
	Export	NIL	Export of services; no GST	NIL	Per voyage / per invoice
	Between two Indian port	Goods & Services Tax as applicable as per Indian laws	5% GST	5% GST	Per voyage / per invoice
	Time Charter services	NIL	5% GST	5% GST	Per voyage / per invoice
8	Insurance Cost (P&I, Hull etc)	NIL	5% IGST RCM BASIS	5% IGST RCM BASIS	Yearly/Quarterly

S.No.	Cost factors	Foreign Co. Foreign Flagged (%)	Indian Co. Foreign Flagged (%)	Indian Co. Indian Flagged (%)	Frequency of Cost incurred (Monthly/ Yearly / per Voyage etc.)
9	Any other Cost Component	Registry fees, annual safety/tonnage fees, local agent fees; generally lower statutory compliance burden than Indian flag. License permits required from DGS if vessels is calling India	1. Tonnage tax training 2. Cost of compliance in ship management costs. 3. Vessels more than 15 years the vessels must undergo FSI every year. 4. Compulsory CCTV system installation on ships 5. Additional SAT-C instead of 1 allowed by other flags. 6. Participation Survey of MMD during Drydocking 7. Mandatory PHO Certification costs 8. Loss of hire due to need to bring vessels alongside for inspection by Surveyors.	1. Tonnage tax training 2. Cost of compliance in ship management costs. 3. Vessels more than 15 years the vessels must undergo FSI every year. 4. Compulsory CCTV system installation on ships 5. Additional SAT-C instead of 1 allowed by other flags. 6. Participation Survey of MMD during Drydocking 7. Mandatory PHO Certification costs 8. Loss of hire due to need to bring vessels alongside for inspection by Surveyors.	per call/monthly

Date: 16th June 2026

To,
Mr. Anil Devliji
Indian National Shipowners' Association
Mumbai

Subject: Submission of Policy Representation on Taxation, Regulatory and Operational Reforms for Promotion of Cruise Tourism in India
Ref.: Cruise Bharat Mission

Hon'ble Sir,

We, M/s. Waterways Leisure Tourism Ltd. having registered office at A-1601, Marathon Futurex, NM Joshi Marg, Lower Parel East, Delisle Road, Mumbai have established our presence in the Indian Cruise Industry under our brand "Cordelia Cruises".

We are pleased to submit herewith a policy representation highlighting certain taxation, regulatory, customs, foreign exchange, and operational issues impacting the growth and competitiveness of the cruise tourism sector in India.

While the Government has undertaken several progressive initiatives to promote maritime tourism and cruise operations, certain challenges continue to affect ease of doing business, investment attractiveness, and operational efficiency within the sector. The enclosed representation outlines these issues and proposes policy measures based on stakeholder inputs and international best practices.

We respectfully request your kind consideration of the matters set out in the enclosed representation and would be pleased to provide any further information that may be required.

Thank you for your time and consideration.

Yours faithfully,

For Waterways Leisure Tourism Limited

CA Nishikant Upadhyay
Chief Financial Officer

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➤ Chapter I Introduction

The cruise tourism industry in India is emerging as a significant contributor to tourism, hospitality, maritime trade, and regional economic development. The Government of India has undertaken several initiatives to promote cruise tourism under various maritime and tourism policies. However, despite the sector's substantial growth potential, the industry continues to face multiple taxation, regulatory, and operational challenges.

The present representation consolidates key grievances and recommendations relating to foreign exchange remittances, income tax provisions, GST applicability, customs duty, leasing structures, and operational compliance issues impacting cruise operators in India. The objective is to create a competitive, investment-friendly, and globally aligned regulatory ecosystem for the cruise industry.

➤ Chapter II Statement of the problem

The cruise tourism industry in India is presently confronted with multiple taxation, regulatory, and operational challenges under the purview of the Reserve Bank of India (RBI), Central Board of Direct Taxes (CBDT), and Central Board of Indirect Taxes and Customs (CBIC). These challenges adversely impact the ease of doing business, increase operational costs, create uncertainty in tax treatment, and

reduce India's competitiveness as a global cruise tourism destination. The major issues presently affecting the industry are elaborated below:

A. Foreign Exchange Remittance Challenges under RBI

Prior to 13th June 2025, RBI approval was required for remittance of advance lease payments to foreign ship owners for acquisition of new vessels, which often took up to one year for approval. Outward remittances for vessel charters are governed by RBI Master Direction No. 17/2016-17, requiring extensive documentation including invoices, valuation reports, and approval from DG Shipping before remittance of refundable security deposits.

Although RBI Circular No. RBI/2025-26/55 dated 13th June 2025 has eased advance remittance norms for outright acquisition of vessels up to USD 50 million without bank guarantee, leasing arrangements involving option-to-purchase structures remain outside the present framework. Companies acquiring vessels through leasing structures continue to face approval requirements for remittance of lease instalments, resulting in delays and operational difficulties.

B. Restrictive Exemption under Section 10(15B)

Under the present provisions of Section 10(15B) of the Income-tax Act, 1961, exemption from withholding tax on lease rentals paid to foreign companies is available only where the foreign company and Indian operator are subsidiaries of the same holding company.

This restriction creates substantial hardship in cases where Indian cruise operators enter into leasing arrangements with unrelated foreign ship owners. In such cases, withholding tax becomes applicable, increasing the cost of operations and making Indian cruise businesses less competitive. The existing exemption framework is therefore too narrow and does not adequately accommodate prevailing commercial leasing structures in the cruise industry

C. Higher Presumptive Taxation under Section 44BBC

Section 44BBC of the Income-tax Act, 1961 prescribes a presumptive income rate of 20% of gross receipts **from carriage of passengers** for non-resident cruise operators. In contrast, Section 44B applicable to other non-resident shipping businesses prescribes a significantly lower presumptive rate of 7.5% of **gross receipts from carriage of passengers**, livestock, mail or goods shipped.

This disparity in taxation places cruise operators at a substantial competitive disadvantage despite the similarity in commercial risks and maritime

operations. The higher tax burden discourages foreign participation in India's cruise tourism sector and adversely impacts the sector's growth potential.

D. Ambiguity regarding “Gross Collections” under Section 44BBC

The current framework under Section 44BBC defines gross collections primarily with reference to revenues from carriage of passengers. However, modern cruise operations involve substantial ancillary revenues from dining, entertainment, retail sales, gaming, and onboard hospitality services.

The absence of explicit clarity regarding inclusion of such ancillary revenues creates ambiguity in tax compliance and may result in differing interpretations by tax authorities. This lack of certainty increases the possibility of disputes and inconsistent treatment in computation of taxable income.

E. Fiscal Inequity between Domestic and International Operators

Domestic cruise operators are taxed under regular provisions of the Income-tax Act, 1961 and are required to maintain detailed books of accounts and comply with standard corporate taxation requirements. On the other hand, non-resident cruise operators are covered under presumptive taxation provisions.

Although the present legal framework is operationally functional, domestic cruise operators continue to face significant financial and expansion challenges. India presently caters to only a very small percentage of global cruise passengers, demonstrating the need for policy support and incentives to promote deployment of additional cruise vessels in Indian waters.

F. Classification of Cruise Services under GST

Cruise services including transportation, accommodation, food services, recreational and other entertainment services are classifiable under SAC 996424 as all such services are bundled together as a composite supply. However, GST authorities are presently seeking to apply GST at the rate of 28% on the entire cruise revenue thereby proposing classification of underlying service under SAC 9996 (Recreational, cultural and sporting services) basis the rationale that the dominant intention is luxury tourism and entertainment and not transportation of passengers.

Further, the access to casino provided onboard the vessel is ancillary to cruising as the casino operations are generally ancillary in nature and are often operated by independent third-party vendors in international waters beyond Indian territorial limits. Application of the highest GST slab on the entire cruise

package disregards the composite nature of cruise services and significantly increases tax burden on cruise operators.

G. High GST Burden on Ship Leasing Transactions

At present, GST at the rate of 18% is applicable on ship leasing transactions in India. In contrast, several international jurisdictions adopt a considerably lower indirect tax incidence on ship leasing and maritime operations in order to promote competitiveness of the domestic shipping and cruise sectors.

The high GST burden substantially increases operational and financing costs for India-based cruise companies and adversely affects the commercial viability of leasing arrangements, which are commonly adopted in the cruise industry due to the capital-intensive nature of vessel acquisition.

H. Double taxation on onboard sales during International sailings

Under Section 12(10) of the CGST Act, 2017, the place of supply for services provided onboard a conveyance is deemed to be the location of the first scheduled point of departure. Since international cruise sailings generally commence from Indian ports, onboard services and sales become subject to GST in India even where such services are provided in international waters.

Simultaneously, foreign jurisdictions may also levy VAT or similar indirect taxes on onboard goods and services sold during international sailings. This results in double taxation on onboard sales and adversely impacts market competitiveness and onboard revenue generation.

I. Eligibility of LTC for Cruise Travel

Section 10(5) of the Income-tax Act, 1961 read with Rule 2B of the Income-tax Rules prescribes the conditions and eligible modes of transport for claiming Leave Travel Concession (LTC) exemption. However, cruise travel is not specifically recognized as an eligible mode of transport under the existing framework.

Absence of express recognition leads to ambiguity in cases where employees undertake travel through cruise itineraries covering domestic destinations and limits wider adoption of cruise tourism despite its emergence as a legitimate segment of travel.

J. Exclusion of passenger Cruise Ships from Tonnage Tax Scheme

Under Section 115VD of the Income-tax Act, 1961, “pleasure crafts” are excluded from the definition of “qualifying ships” for purposes of the tonnage tax scheme.

As a result, passenger cruise vessels do not receive the benefits of the tonnage tax regime that are otherwise available to commercial shipping businesses. This exclusion discourages investment in cruise tourism despite the substantial economic contribution generated by the sector in terms of tourism, hospitality, employment, and local business development.

K. Customs Duty on Foreign Consumables onboard Cruise Vessels

Pursuant to CBIC Instruction No. 15/2018 dated 04.10.2018, foreign-flagged cruise vessels are required to pay customs duty on foreign-sourced consumables such as liquor, cigarettes, bunkers, and provisions consumed within Indian territorial waters.

Although CBIC has introduced online declaration and duty payment systems, the industry continues to consider the requirement burdensome and inconsistent with prevailing international practices. Cruise operators have represented that no comparable global jurisdiction imposes such duties in the same manner, thereby placing India at a competitive disadvantage.

L. Limited Applicability of Article 8 of Double Taxation Avoidance Agreement (DTAA) to Passenger Transportation Revenue

Article 8 of the Double Taxation Avoidance Agreements (“DTAA”) entered into between India and various Contracting States such as Singapore, Malaysia and Thailand provides concessional tax treatment only in respect of profits derived from the operation of ships in international traffic.

The term “operation of ships” under the relevant DTAA specifically refers to the business of transportation of passengers, mail, livestock or goods in international traffic. Accordingly, the benefit of Article 8 is restricted only to revenue directly attributable to passenger transportation and core shipping operations. Accordingly, only transportation-related revenue would qualify for the beneficial DTAA provisions, whereas ancillary onboard revenues would remain taxable in accordance with the applicable domestic tax provisions and other relevant treaty provisions, as applicable.

The exclusion of ancillary onboard revenues from the scope of Article 8 also results in higher effective tax incidence on cruise operators despite such revenues being intrinsically connected with the overall cruise operations. This adversely impacts commercial viability and increases compliance and reporting obligations.

M. Applicability of Rule 6DD(i) of Income Tax Act 1961 to Maritime Crew Serving Onboard Cruise Ships

We employ seafarers (direct and indirect employment) both Indian nationals and foreign nationals who serve as crew members on board our vessels. In accordance with the Maritime Labour Convention (MLC), 2006 to which India is a signatory, and applicable Directorate General of Shipping (DGS) guidelines, we are obligated to ensure the financial welfare of our crew members including the timely disbursement of wages and cash advances while vessels are in port.

Seafarers work in uniquely isolated conditions often weeks or months at sea without access to conventional banking infrastructure. The onboard cash facility is not merely a matter of convenience; it is a critical element of crew welfare and an internationally recognised right of seafarers under MLC, 2006

As the maritime industry operates under unique employment arrangements wherein a substantial number of seafarers are engaged not only directly by shipowners but also indirectly. While Rule 6DD presently provides relief in specific circumstances for employees serving onboard ships, its practical applicability remains limited and does not adequately cover the diverse employment structures

➤ Chapter III Present Status of the issue under consideration globally and nationally

Globally, cruise tourism is supported through liberal taxation regimes, reduced leasing taxes, tonnage tax schemes, and simplified customs procedures. Many jurisdictions recognize cruise tourism as a major economic driver and extend fiscal incentives accordingly.

In India, various reforms have been introduced under the purview of RBI, CBDT, and CBIC to facilitate cruise operations and vessel acquisition, including:

A. RBI Reforms relating to Vessel Acquisition and Leasing

RBI vide Circular No. RBI/2025-26/55 dated 13th June 2025 amended the RBI Master Direction – Import of Goods and Services permitting advance remittance up to USD 50 million for import of shipping vessels without bank guarantee or standby letter of credit.

This reform has substantially addressed concerns relating to outright acquisition of vessels. However, lease-based acquisition structures with option-to-purchase arrangements continue to face remittance-related approval challenges.

B. Present Income Tax Framework for Cruise Industry

The taxation framework applicable to cruise operators is primarily governed by Sections 10(15B), 44BBC, 44B, 10(4F), and 80LA of the Income-tax Act, 1961.

Section 10(15B)

The provision presently grants exemption from withholding tax on lease rentals received by foreign companies only where both entities are subsidiaries of the same holding company. The exemption is currently available up to 31 March 2030.

Section 44BBC

Section 44BBC prescribes presumptive taxation at 20% of gross receipts for non-resident cruise operators, which is significantly higher than the 7.5% presumptive taxation applicable to other shipping businesses under Section 44B.

CBDT Notification No. 9/2025

CBDT has prescribed operational conditions for non-resident cruise operators through Rule 6GB under the Income-tax Rules, 1962.

Sections 10(4F) and 80LA

Tax incentives available to IFSC units engaged in ship leasing have been extended up to 31st March 2030.

Leave Travel Concession (LTC) Framework

At present, Section 10(5) of the Income-tax Act, 1961 read with Rule 2B of the Income-tax Rules prescribes the conditions and eligible modes of transport for claiming Leave Travel Concession (LTC) exemption. However, cruise travel has not been specifically recognized as an eligible mode of transport under the existing framework, resulting in lack of clarity regarding availability of LTC benefits for domestic cruise travel.

Article 8 of DTAA Framework

Article 8 of India's DTAA's with various jurisdictions provides concessional tax treatment for profits derived from operation of ships in international traffic. However, the benefit is generally restricted to passenger transportation and core shipping revenue, resulting in uncertainty regarding tax treatment of ancillary onboard revenues generated during cruise operations.

Rule 6DD Framework

Rule 6DD of the Income-tax Rules provides exceptions to cash payment restrictions in specified circumstances, including payments made to employees serving onboard ships. However, stakeholders have represented that the present framework does not adequately address the practical realities of modern maritime employment structures involving direct and indirect engagement of seafarers.

C. Present GST Framework applicable to Cruise Industry

The GST framework presently governs cruise ticketing, onboard services, casino operations, vessel leasing, and onboard sales.

GST on Composite Cruise Services

Cruise operators contend that cruise services constitute a composite supply where transportation, accommodation, dining, and entertainment form the principal supply. However, GST authorities are reportedly seeking to levy 28% GST on entire cruise revenue due to onboard casino operations.

GST on Ship Leasing

GST at 18% is presently applicable on ship leasing transactions, which is comparatively higher than global jurisdictions.

Liquor Taxation

Alcoholic liquor remains outside the GST framework, resulting in state-wise excise duty and VAT variations across India.

D. Present Customs Framework applicable to Cruise Industry

Under CBIC Instruction No. 15/2018, foreign-flagged cruise vessels are required to pay customs duty on foreign-sourced consumables used within Indian territorial waters.

CBIC has introduced online declaration and duty payment mechanisms which have eased procedural compliance. However, stakeholders continue to maintain that similar customs burdens are generally not imposed by major international cruise jurisdictions.

However, compared to global standards, India continues to impose comparatively higher tax and compliance burdens on cruise operations.

➤ Chapter IV Present Status & Challenges faced by stakeholder's

The key challenges presently faced by stakeholders include:

A. Foreign Exchange Remittance Challenges under RBI

Present Status

RBI vide Circular No. RBI/2025-26/55 dated 13th June 2025 amended the RBI Master Direction – Import of Goods and Services permitting advance remittance for import of shipping vessels up to USD 50 million without bank guarantee.

Challenges

- Leasing arrangements involving option-to-purchase structures are still not adequately covered.
- Companies acquiring vessels through leasing structures continue to face remittance approval issues for lease instalments.

B. Withholding Tax on Lease Payments and Exemption under Section 10(15B)

Present Status

Section 10(15B) presently grants exemption only where the foreign company and specified company are subsidiaries of the same holding company.

Challenges

- Transactions with unrelated foreign entities continue to attract withholding tax.
- This increases operational costs for Indian cruise operators chartering foreign vessels.

C. Presumptive Taxation under Section 44BBC

Present Status

Section 44BBC prescribes presumptive taxation at 20% of gross receipts for non-resident cruise operators

Challenges

- Rate is significantly higher than 7.5% applicable under Section 44B for other shipping businesses.

- This creates competitive disadvantage for cruise operators.

D. GST Issues relating to Cruise Industry

Present Status

GST authorities are presently seeking to levy 28% GST on entire cruise revenue due to onboard casino operations.

Challenges

- Casino operations are ancillary in nature.
- Highest GST slab is being applied on composite cruise packages.

E. Ship Leasing GST Burden

Present Status

GST at 18% is presently applicable on ship leasing transactions.

Challenges

- GST rates are substantially higher than global jurisdictions.
- Increased financial burden on India-based cruise operators.

F. Eligibility of LTC for Cruise Travel

Present Status

Section 10(5) of the Income-tax Act, 1961 read with Rule 2B prescribes conditions and eligible modes of transport for LTC exemption. However, Cruise travel is presently not specifically included within the eligible modes of transport.

Challenges

- Absence of specific recognition creates ambiguity regarding eligibility of cruise travel for LTC benefits.
- Lack of clarity restricts wider adoption and promotion of domestic cruise tourism despite the sector's growth potential.

G. Customs Duty on Foreign Consumables

Present Status

CBIC Instruction No. 15/2018 requires payment of customs duty on foreign-sourced items consumed within Indian territorial waters.

Challenges

- Significant compliance burden on operators.
- India remains comparatively restrictive vis-à-vis global cruise jurisdictions.

H. Applicability of Article 8 of DTAA to Cruise Revenue

Present Status

Article 8 of the relevant DTAA provides relief in respect of profits derived from operation of ships in international traffic. The benefit is generally available only in respect of passenger transportation and core shipping income.

Challenges

- Ancillary onboard revenues may not qualify for Article 8 benefits.
- Higher effective tax incidence on cruise operators.
- Increased compliance and reporting obligations.
- Lack of parity between transportation revenue and other cruise-related revenue streams.

I. Applicability of Rule 6DD(i) to Maritime Crew

Present Status

Rule 6DD presently provides relief in certain circumstances for payments made to employees serving onboard ships.

Challenges

- Existing provisions do not adequately cover indirect employment arrangements.
- Practical difficulties in disbursement of wages and cash advances to seafarers.
- Compliance challenges arising from unique working conditions onboard vessels.
- Need to align tax provisions with obligations under the Maritime Labour Convention, 2006.

➤ Chapter V Past policies of the Government and their Efficacy

A. RBI Framework governing Vessel Acquisition and Remittances

Historically, outward remittances for vessel acquisition and charter arrangements were governed under RBI Master Direction No. 17/2016-17.

Under the earlier framework:

- advance remittances often required RBI approval,
- refundable security deposits required extensive documentation,
- DG Shipping approvals were mandatory prior to remittance processing,
- approval timelines were considerably lengthy.

Efficacy

The framework ensured regulatory oversight and foreign exchange compliance. However, stakeholders considered the process time-consuming and restrictive, particularly for time-sensitive vessel acquisition and leasing arrangements.

B. Introduction of Section 10(15B)

Section 10(15B) of the Income-tax Act, 1961 was introduced to provide withholding tax exemption on lease rentals received by foreign companies leasing cruise vessels to specified Indian operators.

Efficacy

The provision provided relief in intra-group leasing arrangements and supported certain cruise financing structures. However, the exemption remained restricted only to group companies, limiting its applicability for independent cruise operators dealing with unrelated foreign lessors.

C. Introduction of Section 44BBC

Section 44BBC introduced a presumptive taxation regime for non-resident cruise operators whereby 20% of gross receipts are deemed taxable income.

Efficacy

The provision created a dedicated taxation framework for cruise operators and simplified tax administration. However, stakeholders represented that the 20% presumptive rate is significantly higher than the 7.5% rate applicable to other shipping businesses under Section 44B, thereby increasing tax burden and reducing competitiveness.

D. CBDT Notification No. 9/2025 and Rule 6GB

CBDT prescribed Rule 6GB under the Income-tax Rules, 1962 laying down operational conditions applicable to non-resident cruise operators.

Efficacy

The notification provided operational clarity regarding eligibility conditions and implementation of the statutory framework. Stakeholders have generally viewed the framework positively.

E. Tax Incentives for IFSC Units

Sections 10(4F) and 80LA introduced tax incentives for IFSC units engaged in ship leasing and maritime financing activities. These benefits were subsequently extended up to 31st March 2030.

Efficacy

The provisions strengthened IFSC-based ship leasing structures and provided policy certainty for maritime financing activities.

F. GST Framework for Cruise Operations

The GST framework presently governs cruise ticketing, onboard services, casino operations, and leasing transactions. Sections 2(30) and 8 of the CGST Act introduced the concept of composite supply for bundled services.

Efficacy

While the framework established statutory guidance for bundled services, stakeholders continue to face ambiguity regarding GST applicability on onboard casino operations and composite cruise packages.

G. GST on Ship Leasing Transactions

Ship leasing transactions have historically been subjected to GST at the rate of 18%.

Efficacy

Although administratively functional, stakeholders have consistently represented that the GST burden remains significantly higher than global jurisdictions and adversely impacts commercial viability of cruise leasing arrangements.

H. Customs Duty Framework under CBIC Instruction No. 15/2018

CBIC Instruction No. 15/2018 introduced customs duty requirements on foreign-sourced consumables used onboard foreign-flagged cruise vessels within Indian territorial waters.

Efficacy

CBIC subsequently introduced online declaration and payment systems which eased procedural compliance. However, stakeholders continue to consider the underlying customs burden comparatively restrictive vis-à-vis international practices.

I. Exclusion of Passenger Cruise Ships from Tonnage Tax Scheme

Passenger cruise vessels continue to remain excluded from the tonnage tax scheme under Section 115VD of the Income-tax Act, 1961 as “pleasure crafts”.

Efficacy

While the tonnage tax scheme supports commercial shipping activities, stakeholders have represented that exclusion of cruise vessels discourages investment and creates disparity between cruise operators and other shipping businesses.

➤ Chapter VI Current policies of the Government & their efficacy

The Government of India has recently undertaken several reforms under the purview of RBI, CBDT and CBIC to facilitate growth of the cruise tourism sector and address concerns relating to vessel acquisition, taxation, leasing, customs compliance, and maritime financing.

While these reforms have improved operational clarity and compliance mechanisms, stakeholders continue to face certain taxation and procedural challenges requiring further rationalization.

A. RBI Reforms relating to Advance Remittances

RBI vide Circular No. RBI/2025-26/55 dated 13th June 2025 amended the RBI Master Direction – Import of Goods and Services permitting advance remittance up to USD 50 million for import of shipping vessels without bank guarantee or standby letter of credit.

Efficacy

The amendment has substantially addressed concerns relating to outright acquisition of vessels and eased remittance procedures for cruise operators.

However, stakeholders continue to represent that:

- lease-based acquisition models are still not adequately covered,
- approval requirements for lease instalment remittances continue in certain cases, and
- further clarity is required for leasing arrangements commonly adopted in the cruise industry.

B. Current Income Tax Framework for Cruise Operators

The present taxation regime governing cruise operators is regulated through Sections 10(15B), 44BBC, 44B, 10(4F), and 80LA of the Income-tax Act, 1961.

CBDT Notification No. 9/2025 prescribing Rule 6GB has also provided operational clarity regarding eligibility conditions applicable to non-resident cruise operators.

Efficacy

The framework has introduced sector-specific taxation provisions and strengthened tax certainty for cruise operations.

However, stakeholders continue to raise concerns regarding:

- the higher presumptive tax rate of 20% under Section 44BBC compared to 7.5% under Section 44B,
- limited applicability of exemption under Section 10(15B), and
- ambiguity regarding inclusion of ancillary onboard revenues within “gross receipts”.

C. Current GST Framework applicable to Cruise Industry

The GST framework presently governs cruise ticketing, onboard hospitality services, casino operations, ship leasing transactions, and onboard sale of goods and services. Sections 2(30) and 8 of the CGST Act provide the statutory framework for taxation of composite supplies.

Efficacy

The framework has streamlined indirect taxation and provided statutory recognition to bundled cruise services.

However, stakeholders continue to face:

- disputes regarding applicability of 28% GST on entire cruise revenue due to onboard casino operations,
- high GST burden of 18% on ship leasing transactions, and
- ambiguity relating to tax treatment of onboard ancillary services.

D. Customs Compliance Framework under CBIC

CBIC presently regulates customs compliance for foreign-flagged cruise vessels through Instruction No. 15/2018 requiring payment of customs duty on foreign-sourced consumables used within Indian territorial waters.

CBIC has also introduced online declaration and duty payment mechanisms for stakeholders.

Efficacy

The online compliance mechanism has eased procedural compliance and improved administrative efficiency.

However, stakeholders continue to represent that:

- the customs duty framework remains comparatively restrictive vis-à-vis global practices, and
- compliance burden continues for foreign cruise operators operating in Indian waters.

E. IFSC Incentives and Maritime Financing Policies

The Government has extended benefits under Sections 10(4F) and 80LA up to 31 March 2030 for IFSC units engaged in ship leasing and maritime financing activities.

Efficacy

These provisions have strengthened India's maritime financing ecosystem, encouraged ship leasing structures through IFSCs, and provided policy certainty for maritime financing activities.

F. Overall Assessment of Current Policies

The present policy framework reflects the Government's intent to promote cruise tourism and maritime growth through sector-specific reforms and procedural simplification.

Recent initiatives have improved:

- remittance procedures,
- operational clarity,
- maritime financing structures, and
- customs compliance mechanisms.

However, stakeholders continue to seek:

- rationalization of presumptive taxation,
- reduction in GST burden,
- broader withholding tax exemptions,
- inclusion of passenger cruise vessels under tonnage tax regime, and
- greater alignment with international cruise taxation practices.

➤ Chapter VII Discussions with Stakeholder's

Discussions with cruise operators, leasing companies, maritime stakeholders, tax professionals, and industry participants reveal broad consensus on the following concerns:

1. Need for parity between cruise shipping and other shipping sectors.
2. Requirement of internationally competitive tax structures.
3. Necessity for GST certainty and simplification.
4. Importance of reducing compliance burdens for foreign operators.
5. Need to incentivize deployment of additional cruise vessels in Indian waters.
6. Requirement for policy stability and long-term regulatory certainty.

Stakeholders have particularly emphasized the need for harmonization with global cruise taxation practices to improve India's attractiveness as a cruise destination.

➤ Chapter VIII Present Status & Challenges faced by the stakeholders

The cruise industry ecosystem comprises cruise operators, foreign ship owners, leasing companies, passengers, tourism stakeholders, port authorities, and government agencies. Although several reforms have recently been introduced by

the Government, stakeholders continue to face taxation, compliance, and operational challenges impacting growth and competitiveness of the Indian cruise industry.

A. Foreign Exchange Remittance Challenges

Present Status

RBI has eased remittance procedures through Circular No. RBI/2025-26/55 dated 13 June 2025 permitting advance remittance up to USD 50 million for import of shipping vessels without bank guarantee.

Challenges

Stakeholders continue to face:

- delays in remittances for lease-based acquisition structures,
- approval requirements for lease instalments,
- documentation-related compliance burden, and
- operational uncertainty in charter and leasing arrangements.

B. Withholding Tax on Lease Rentals

Present Status

Section 10(15B) of Income Tax Act presently grants withholding tax exemption only where both entities are subsidiaries of the same holding company.

Challenges

Stakeholders have represented that:

- the exemption is too restrictive,
- unrelated-party leasing arrangements continue to attract withholding tax,
- operational costs increase significantly for Indian operators, and
- independent operators remain disadvantaged compared to group companies.

C. Presumptive Taxation under Section 44BBC

Present Status

Section 44BBC presently prescribes presumptive taxation at 20% of gross receipts for non-resident cruise operators.

Challenges

Stakeholders continue to face:

- higher tax burden compared to other shipping businesses covered under Section 44B,
- reduced competitiveness,
- increased operational costs, and
- lower attractiveness of Indian waters for foreign cruise operators.

D. Challenges faced by Domestic Cruise Operators

Present Status

Domestic cruise operators continue to be taxed under normal provisions of the Income-tax Act, 1961.

Challenges

Domestic operators continue to face:

- high capital expenditure,
- operational and financing constraints,
- limited fiscal incentives for fleet expansion, and
- low domestic cruise penetration.

The report notes that domestic cruise operators presently cater to only around 5 lakh passengers annually, constituting approximately 1.5% of global cruise passengers.

E. Taxation of Ancillary Onboard Revenues

Present Status

Cruise operations generate substantial ancillary revenues from dining, entertainment, retail sales, gaming, and hospitality-related services.

Challenges

Stakeholders have represented that:

- ambiguity persists regarding inclusion of ancillary revenues within “gross collections”,
- lack of clarity creates compliance uncertainty, and
- differing interpretations may lead to disputes.

F. GST on Composite Cruise Services

Present Status

Cruise operators contend that cruise services constitute a composite supply where casino operations are merely ancillary.

Challenges

Stakeholders continue to face:

- proposed applicability of 28% GST on entire cruise revenue,
- increased tax burden on cruise packages,
- uncertainty in classification and tax treatment, and
- potential disputes and litigation.

G. GST on Ship Leasing

Present Status

GST at the rate of 18% is presently applicable on ship leasing transactions.

Challenges

Stakeholders have represented that:

- GST burden is significantly higher than global jurisdictions,
- leasing costs increase substantially, and
- India's competitiveness as a cruise destination is adversely impacted.

H. Liquor Taxation Framework

Present Status

Alcoholic liquor presently remains outside the GST framework, with excise duty and VAT being levied independently by states.

Challenges

Stakeholders continue to face:

- varying tax structures across states,
- operational complexities in procurement and compliance, and
- multiple indirect taxation structures.

I. Customs Duty on Foreign Consumables

Present Status

Under CBIC Instruction No. 15/2018, foreign-flagged cruise vessels are required to pay customs duty on foreign-sourced consumables used within Indian territorial waters.

Challenges

Stakeholders continue to represent that:

- customs compliance involves substantial administrative effort,
- comparable global jurisdictions generally do not impose similar duties, and
- the framework adversely impacts profitability of cruise operators.

J. Exclusion from Tonnage Tax Scheme

Present Status

Passenger cruise vessels continue to remain excluded from the definition of “qualifying ships” under Section 115VD of the Income-tax Act, 1961.

Challenges

Stakeholders have represented that:

- exclusion from tonnage tax benefits creates disparity with other shipping businesses,
- the framework discourages investment in cruise tourism, and
- passenger cruise vessels should receive equal treatment from a taxation perspective.

K. Applicability of Article 8 of DTAA to Cruise Revenue

Present Status

Article 8 of the relevant DTAA provides relief in respect of profits derived from operation of ships in international traffic.

Challenges

- Ancillary onboard revenues may not qualify for Article 8 benefits.
- Higher effective tax incidence on cruise operators.
- Increased compliance and reporting obligations.

L. Applicability of Rule 6DD(i) to Maritime Crew

Present Status

Rule 6DD presently provides relief in certain circumstances for payments made to employees serving onboard ships.

Challenges

- Existing provisions do not adequately cover indirect employment arrangements.
- Practical difficulties in disbursement of wages and cash advances to seafarers.
- Need to align tax provisions with maritime employment practices.

➤ Chapter IX Views of the domain experts

Domain experts, cruise operators, maritime stakeholders, and tax professionals broadly emphasized the need for a more competitive and globally aligned regulatory framework for the cruise industry in India.

Experts acknowledged the recent reforms introduced by RBI, CBDT, and CBIC, but highlighted that several operational and taxation-related issues continue to affect the growth and competitiveness of the sector.

A. Foreign Exchange Remittance Framework

Experts appreciated the RBI Circular dated 13 June 2025 permitting advance remittance up to USD 50 million for import of shipping vessels without bank guarantee.

However, experts emphasized the need for simplified remittance procedures for lease-based vessel acquisition models commonly used in the cruise industry.

B. Section 10(15B) and Withholding Tax Exemption

Experts observed that the present exemption under Section 10(15B) is too restrictive as it applies only to group company structures.

Experts recommended removal of the group ownership condition and extension of the exemption to all authorized cruise operators in India.

C. Presumptive Taxation under Section 44BBC

Experts highlighted that the presumptive taxation rate of 20% under Section 44BBC is substantially higher than the 7.5% rate applicable to other shipping businesses under Section 44B.

Experts recommended deletion of Section 44BBC and inclusion of cruise operators within Section 44B to create parity with other maritime businesses.

D. Taxation of Ancillary Onboard Revenues

Experts observed that modern cruise operations generate substantial ancillary revenues from dining, entertainment, retail sales, gaming, and hospitality-related services.

Experts recommended express statutory clarification regarding inclusion of ancillary revenues within “gross collections” to avoid ambiguity and disputes.

E. Domestic Cruise Industry Growth

Experts noted that domestic cruise tourism in India remains significantly underdeveloped, with domestic operators presently catering to only around 5 lakh passengers annually.

Experts emphasized the need for fiscal incentives, tax support, and policy encouragement for deployment of additional cruise vessels in Indian waters.

F. GST on Composite Cruise Services

Experts emphasized that cruise services constitute a composite supply involving transportation, accommodation, dining, and entertainment, where casino operations are merely ancillary.

Experts recommended issuance of a clarification providing that cruise services should be taxable at 18% as composite supply.

G. GST on Ship Leasing

Experts highlighted that GST at 18% on ship leasing transactions is significantly higher than international benchmarks.

Accordingly, experts recommended reduction of GST on ship leasing transactions from 18% to 5%.

H. Views regarding eligibility for LTC for Cruise Travel

Experts observed that domestic cruise tourism should be treated at par with other recognized modes of domestic travel for purposes of Leave Travel Concession under Section 10(5) of the Income-tax Act, 1961.

Experts recommended issuance of a clarification recognizing cruise travel as an eligible mode of transport for LTC benefits in order to promote domestic cruise tourism and remove ambiguity in tax treatment.

I. Applicability of Article 8 of DTAA

Experts observed that ancillary onboard revenues form an integral part of modern cruise operations and should receive tax treatment consistent with passenger transportation revenue. Experts recommended appropriate clarification or policy intervention to reduce uncertainty and litigation relating to applicability of Article 8 benefits.

J. Applicability of Rule 6DD(i) to Maritime Crew

Experts noted that seafarers operate under unique employment conditions and often lack access to conventional banking infrastructure while onboard vessels. Experts recommended appropriate clarification under Rule 6DD to accommodate prevailing maritime employment practices and ensure compliance with crew welfare obligations.

K. Customs Duty Framework

Experts acknowledged that CBIC's online declaration and payment mechanism has eased procedural compliance.

However, experts continued to express concern regarding customs duty on foreign consumables onboard cruise vessels and recommended introduction of duty-free onboard retail facilities in line with global practices.

L. Tonnage Tax Scheme

Experts strongly recommended inclusion of passenger cruise vessels within the tonnage tax regime under the Income-tax Act, 1961.

Experts observed that exclusion of cruise vessels from the definition of “qualifying ships” discourages investment and creates disparity with other shipping businesses.

M. Overall View of Experts

Overall, domain experts unanimously emphasized that India possesses significant potential to emerge as a major global cruise tourism destination. However, achievement of this objective would require:

- rationalization of taxation structures,
- reduction of compliance burden,
- greater policy certainty,
- alignment with global maritime practices, and
- sector-specific fiscal support for the cruise industry.

➤ Chapter X National & Global Best practices to resolve the issue

Globally, major cruise jurisdictions have adopted cruise-friendly taxation and regulatory frameworks to promote maritime tourism, attract foreign cruise operators, and encourage investment in cruise infrastructure. International best practices generally focus on ease of doing business, reduced compliance burden, and long-term policy certainty for cruise operators.

Several jurisdictions provide:

- simplified shipping taxation regimes,
- tonnage tax benefits for cruise operators,
- lower indirect tax burden on vessel leasing,
- streamlined customs and remittance procedures,
- duty-free onboard retail operations

Globally, cruise operators are also provided greater flexibility in vessel acquisition and leasing arrangements through liberal remittance and financing mechanisms.

Also, cruise tourism is treated as an important component of domestic and leisure tourism policy frameworks. Tourism-linked incentive frameworks are commonly used to promote domestic travel and tourism-related sectors.

In comparison, stakeholders have represented that India continues to impose comparatively higher taxation and compliance burdens in areas such as presumptive taxation, GST on leasing transactions, and customs duty on foreign consumables onboard cruise vessels.

The report also notes that comparable international jurisdictions generally do not impose customs duty on foreign consumables in the manner presently applicable in India. Further, several countries extend favorable tax treatment to cruise operators through tonnage tax schemes and rationalized indirect taxation structures.

Nationally, the Government has recently introduced positive reforms such as:

- RBI relaxation for advance remittance up to USD 50 million for shipping vessel acquisition,
- CBDT Notification No. 9/2025 prescribing operational conditions for cruise operators, and
- CBIC's online customs declaration and payment mechanisms.

These initiatives have improved operational clarity and compliance efficiency. However, further alignment with global maritime practices through rationalization of taxation structures, simplified compliance procedures, and sector-specific incentives would significantly strengthen India's competitiveness as a global cruise tourism destination.

➤ Chapter XI Suggested policies

In order to promote growth of the cruise tourism sector and align India with global maritime practices, the following policy measures are suggested:

1. Simplification of RBI remittance procedures for lease-based vessel acquisition structures, including relaxation for periodic lease remittances.
2. Amendment of Section 10(15B) of the Income-tax Act, 1961 to remove the group company restriction and extend withholding tax exemption to all authorized cruise operators.
3. Rationalization of presumptive taxation by deleting Section 44BBC and including cruise operators within Section 44B with a presumptive taxation rate of 7.5%.
4. Clarification regarding inclusion of ancillary onboard revenues such as dining, retail, entertainment, and hospitality services within "gross receipts".
5. Introduction of tax incentives, tax holidays, or rebates for domestic cruise operators deploying additional cruise vessels in Indian waters.
6. Issuance of a GST clarification recognizing cruise services as composite supply taxable at 18%, notwithstanding onboard casino operations.
7. Reduction of GST on ship leasing transactions from 18% to 5% in line with international benchmarks.

8. Clarification may be issued recognizing cruise travel as an eligible mode of transport for LTC under Section 10(5) read with Rule 2B of the Income-tax Rules.
9. Clarification may be considered regarding applicability of Article 8 benefits under relevant DTAA to ancillary revenues intrinsically connected with cruise operations.
10. Clarification may be issued expanding the applicability of Rule 6DD(i) to adequately cover direct and indirect employment arrangements of seafarers serving onboard cruise vessels.
11. Inclusion of passenger cruise vessels within the tonnage tax scheme under the Income-tax Act, 1961.
12. Introduction of duty-free onboard retail facilities for foreign-flagged cruise vessels operating in India.
13. Periodic review of exemptions and incentives expiring in 2030 based on prevailing economic and industry conditions.

➤ **Chapter XII Final policy recommendation to the Government to achieve MAKV-2047 Goal**

In order to achieve the MAKV-2047 vision and position India as a globally competitive cruise tourism destination, it is essential to adopt a balanced, growth-oriented, and internationally aligned regulatory framework for the cruise industry.

The Government may consider:

- rationalization of taxation structures applicable to cruise operators,
- simplification of compliance and remittance procedures,
- reduction in GST and withholding tax burdens,
- inclusion of passenger cruise vessels within the tonnage tax framework,
- addressing uncertainties relating to international taxation and treaty benefits applicable to cruise operators,
- facilitating practical compliance requirements relating to maritime crew welfare and seafarer employment.
- encouragement of vessel leasing and maritime financing through IFSCs, and
- introduction of sector-specific incentives for domestic cruise operators.

Promotion of domestic cruise tourism through tourism-linked incentives such as recognition of cruise travel under LTC framework may further support passenger growth and mainstream adoption of cruise tourism in India.

Further alignment with global maritime practices, coupled with long-term policy certainty and ease of doing business, would significantly enhance investment, tourism growth, employment generation, port-led development, and foreign cruise participation in Indian waters.

A coordinated policy approach involving RBI, CBDT, CBIC, Ministry of Tourism, and maritime authorities would play a crucial role in strengthening India's cruise ecosystem and supporting sustainable long-term growth of cruise tourism in India.

* * * * *

Interaction of the members of National Shipping Board with the Hon'ble Minister Ports, Shipping and Waterways 2025

20.08.2025

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1

Introduction

Constitution of the National Shipping Board, New Delhi

- Board Notified on 30.04.2025
- Board commenced functioning on 01.05.2025
- First Interaction of the Board Members with the Hon'ble Minister, PSW on 10.05.2025 at Mumbai

Details of Board Interactions

Chairperson and the other Members have been interacting at the Ministry of PSW, New Delhi/National Shipping Board office at Janpath, New Delhi/Online/During the Board Meetings since the constitution of the Board on 30.04.2025

Board formally held meetings on

- 30th May, 2025 (At Mumbai)
- 16th July, 2025 (At Mumbai)
- 25th August, 2025 (Proposed at Kandla, Gujarat)

20/08/2025

National Shipping Board, New Delhi

5

Key Government Initiatives discussed by the Board

- Maritime Amrit Kal Vision (MAKV)- 2047
- Maritime India Vision (MIV)- 2030
- PM Gati shakti (National Masterplan for Multimodal Connectivity)
- Ease of Doing Business/ Ease of Living
- Make In India/ Aatma Nirbhar Bharat



20/08/2025

National Shipping Board, New Delhi

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Key Themes under MAKV-2047 discussed by the Board

1. Strengthen India's global maritime presence
2. Enhance India's Tonnage
3. Promote Ocean, Coastal & River Cruise Sector
4. Enhance Modal Share of Coastal Shipping & Inland Water Transport
5. Become a global player in Shipbuilding, Repair & Recycling
6. Promote Maritime Clusters
7. Provide Maritime Professional Services
8. Develop world class education, research & Training facility
9. Develop world class next generation ports
10. Enhance efficiency through technology & innovation
11. Lead the World in safe, sustainable & Green Maritime Sector

20/08/2025

National Shipping Board, New Delhi

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2

Theme - Increase in Indian Tonnage

Grant infra status to Indian ships (DEA) (ICCSA/INSA).

- Currently ships which have a useful between 12 to 25 years gets short term (5-6 years) funding for acquiring assets.
- Shipping requires low cost, long term funding
- FM announced granting of “Infrastructure” status for “large” ships. This will help ships access funds with repayment tenors of about 70% of useful life.
- DG, Shipbuilders and shipowners recommended that new and second hand vessels having length of 24m or 500 GT and above be defined as large vessel.
- However, DEA wants to link it to value and not provide it to second hand vessels.
- However majority Indian tonnage is second hand vessel and will be for some time to come.

Need to prevail on DEA to

- (A) *accept the definition proposed by MoPSW/DGS/SAI/ICCSA and INSA; and*
- (B) *Also include second-hand ships. This, along with the demand of collaterals-other than the ship itself, works as major deterrent for existing and new entrants.*

20/08/2025

National Shipping Board, New Delhi

9

Remove 5% GST on acquisition of ships (DoR) (INSA)

1. 5% GST being levied on ship acquisition (new or 2nd hand) in India
2. This discourages flagging in India
3. This does not apply to non-Indian flag
4. For a vessel of, say 100 crore, a locked-up capital of 5 crore can be better utilized for operation of the ship.
5. No loans are available for payment of taxes
6. Recover through input credit takes significant time
7. Needless cash flow burden on Indian shipowners
8. Indian companies only buy second hand ships

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National Shipping Board, New Delhi

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Remove 5% GST on MRO services consumed overseas (DoR) (INSA)

1. 5% GST is levied on MRO services consumed outside India.
2. Indian ships on the coast are fully utilizing ship repair in India.
3. But ships which are trading internationally cannot come to India and will repair where they are
4. These ships are needlessly penalized with 5% on RCM
5. Ship repair facilities for ships more than 6500 GT are very fees
6. Not applicable to non-Indian ships – need level playing field

20/08/2025

National Shipping Board, New Delhi

11

Double taxation by Customs on MRO services consumed overseas (DoR) (INSA)

1. 5% GST is levied on MRO services consumed outside India.
2. On arrival in India, Customs again charge 5% IGST on value of ship repairs despite paying on RCM basis
3. This is charged on the basis that we are importing repair services into India and hence liable to Customs duty (where applicable) and IGST too!
4. This is Double Taxation by the GoI, taxing the same transaction twice.

20/08/2025

National Shipping Board, New Delhi

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Duty being charged on locally procured bunkers on board a vessel when converting from FG to Coastal (CBIC) (INSA)

1. When an Indian ship goes out on a Foreign going voyage it may have Indian made bunkers on board. These are duty paid, GST paid.
2. There is no 'export' of bunkers since it is fuel not cargo

Clarification needed from CBIC

That the Indian origin/locally procured bunkers lying on board an Indian flag ship converting from FG to coastal are not liable to be charged any customs duty on the said bunkers.

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National Shipping Board, New Delhi

13

Duty being charged on assumed "freight" when vessel is first imported into India (CBIC) (INSA)

1. Unlike other goods which are being imported into India, a vessel is propelled with its own power and is not loaded on another conveyance or transported into India. Therefore no freight is paid for bringing ship into India
2. This legal position has been confirmed by DG Valuation in writing to the CBIC that there is no concept of 'freight' in respect of a vessel since it sails on its own power.
3. However, certain Custom Houses are adding **assumed Freight and Insurance** to value of the vessel when demanding Customs duty (where applicable) and IGST

Clarification sought from CBIC

That freight should not and cannot form part of the assessable value of a vessel at the time of importation. Insurance should be the H&M Insurance value taken by the owner.

20/08/2025

National Shipping Board, New Delhi

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Remove General Orders No. 1, 2 and 3 of 2018 (MoPSW) (INSA) – Promote investment in Indian Container fleet

In 2018 permission was given for foreign flag container ships to carry Fertilizer/UREA, EXIM, empties, agriculture, horticulture, fisheries and animal husbandry without a license or ROFR for Indian Ships.

1. Objectives of the Orders

- Reduce transshipment of India's EXIM containers via Colombo.
- Reduce freight costs for Indian exporters and importers.
- Increase coastal shipping.

2. Problem

- These Orders have stopped investment in Indian container ships thereby subjugating Indian trade to the mercy of the foreign container lines. (USD 14.3 Bill freight paid)
- Transshipment over foreign ports has not reduced but has gone up
- Freight rates for Indian exporters have shot through the roof
- Indian companies completely STOPPED purchasing container vessels – ZERO vessels acquired since 2019 except replacement

3. Solution

- Reverse General Order nos. 1, 2 and 3 and reinstate requirement to obtain licence from DG after providing ROFR to Indian flag ships.

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National Shipping Board, New Delhi

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3

Theme - Promote Coastal Shipping and Inland Waterways Transport

Request to bring fuel used by coastal ships under GST.

- Fuel constitutes to be the largest cost in ship operation.
- Indian ships consumed about 1.47 MMT of fuel in 2020 and out of which coastal ships, using HSD/MGO, consumed 3.7 lakh MT.
- National fossil fuel consumption is above 200 MMT
- Bringing fuel used by Indian coastal ship (HSD/MGO) under 5% GST regime would reduce operating cost and promote modal shift with negligible loss in revenue to the GOI.
- To address the concerns of misuse, if any, there is an existing regime of reporting fuel consumed by Indian ships to the D G shipping which can be further strengthened.

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National Shipping Board, New Delhi

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Rationalisation of GST rates on multimodal transport (DoR) – (RM)

Problem:

- Coastal shipping attracts only 5% GST when limited to the sea leg. But once road/rail is added for first or last mile, the same service as MMT is taxed at 12%.
- Coastal shipping and IWT are naturally multimodal since they always require road/rail linkage.
- Levying 12% GST cancels the benefit of 5% GST on coastal and exemption on IWT, discouraging cargo shift from road to greener, cost-effective modes.

Suggested Solution:

- Levy 5% GST with full ITC on all MMT services having at least one leg of coastal or IWT.
- This will remove tax distortion, protect intended benefits, and promote wider adoption of coastal and IWT-based multimodal logistics in India.

20/08/2025

National Shipping Board, New Delhi

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Clarification regarding GST on handling of Agri products at terminals – DoR (RM)

Problem:

Transportation of agricultural products is exempt from GST across all modes.

- However, port terminals are levying 18% GST on handling charges for containers carrying agricultural products. Their contention is that GST is applicable on handling of the container, not the agricultural cargo inside.
- This creates a distortion: since agricultural traders do not have input tax credit (ITC) to offset, the exemption benefit on transportation is effectively nullified.
- As a result, agri trade is discouraged from using coastal multi modal transport services.

Suggested Solution:

- Issue a clarification that handling services of agricultural products by terminal operators are not liable to GST
- This will align the treatment of agricultural products in handling with their exempt status in transportation and encourage modal shift to coastal and multimodal logistics.

20/08/2025

National Shipping Board, New Delhi

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4

Theme - Develop world class facilities for Seafarers at our ports

Request to exempt Indian coastal ships from the provisions of Immigration laws

Indian crew engaged on Indian ships operating on the coast of India are subjected the similar immigration checks and controls as vessels engaged in foreign trade.

The problem is further compounded by the fact that many non major ports in India do not have immigration check posts (ICP). As a result:

- No crew change (or shore leave) is allowed in such ports.
- Shipowner has to take the ship to a port which has ICP. This a huge unnecessary cost on coastal owners operating at low margins.
- There is also a serious violation of MLC 2006 (convention ratified by India)

The coastal vessels can be broadly subdivided in to two categories:

- Vessels (tugs and dredgers) engaged in a port/harbour operations for extended periods.
- Vessels operating within 12 to 20 NM of Indian coast.

To start crew on Cat. a) vessels shall be exempted from immigrations checks/clearances.

For Cat b) vessels, an online system of reporting the movement of crew to/from the vessels should be developed as done by the DG Shipping.

Incidentally, passengers travelling on Indian vessel operating between mainland and Island are not subject to any immigration clearances/checks.

20/08/2025

National Shipping Board, New Delhi

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Shore leave for Indian seafarers at Indian Ports (MoHA/MoPSW) – (NUSI)

Problem

- Indian Seafarers serving on Indian or foreign flags ships do not get shore leave easily in Indian ports.
- Procedures are time consuming exhausting and rent seeking and a humiliation of the Seafarer.
- India has ratified the Maritime Labour Convention and is mandated to implement Regulation 2.4 Entitlement to Leave, 4.4 Access to shore-based welfare facilities.

Suggested Solution

- Direct that an SOP be created for granting shore leave to Indian seafarers arriving at Indian ports. This should be time bound so that there are no more delays.

20/08/2025

National Shipping Board, New Delhi

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Lower TDS on payment of Salaries to Seafarers – (CBDT) (INSA)

Problem

- Indian ships are OBLIGATED BY LAW to employ only Indian seafarers.
- Indian company is OBLIGATED BY LAW to withhold tax on Salaries paid.
- Foreign company employing Indian seafarer has no OBLIGATION to withhold tax on salaries. Therefore Indian Seafarer take larger take home when employed on foreign ships leading to shortage of quality seafarers on Indian ships.

Suggested Solution

- Lower the rate of TDS on Wages paid to Seafarers from the present 27% to about 5%

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Social Security benefits for Indian Seafarers – (MoPSW) - MK

- India has ratified the Maritime Labour Convention and is mandated to implement Social Security measures as per MLC Regulation and Guideline 4.5 respectively.
- NUSI demanded statutory benefit of Provident Fund, Gratuity and Pension for all ranks of our seafarers serving on Indian and all foreign flag ships by amendment of the SPF Act, 1966
- On 11th January 2021, the SPF Board of Trustees had agreed to the NUSI proposal and sent the same to the Ministry of PSW for further procedures
- Sadly, no progress has been made and this is pending for more than three years due to procedural delays.
- There is a need to hasten the amendment and provide social benefits to Seafarers and their families who are waiting for this for long.

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Theme - Providing Professional Maritime Services – IRS related

Recognition of IRS as RO

Problem: Key foreign flag states - UK, Singapore, South Korea, Greece and Saudi Arabia - have not authorised IRS as RO

Solution: Active support from MoPSW, MEA, and Indian missions to obtain RO status for IRS with UK, Singapore, South Korea, Greece and Saudi Arabia

Justification:

- Recognition boosts IRS-classed tonnage and global presence
- Strengthens India's voice in global maritime governance
- Aligns with India's diplomatic efforts and maritime growth ambitions

Additional Context

- UK flag (MCA) has specifically sought reciprocity as a condition for RO authorization which is fulfilled by Indian flag recognizing UK based class society (LR), yet the RO authorisation is not considered.
- Singapore flag (MPA) has been approached by IRS several times since 1993 towards RO authorisation. Matter was also taken up by Hon'ble Minister – MoPSW during his visit to Singapore in March 2025
- South Korea: Matter has been taken up with MoPSW earlier vide letter 18th Oct 2024.
- **Saudi Arabia:** Matter has been taken up with MoPSW earlier vide letter May 28th 2025. MoPSW has recommend MEA to take it up with the Saudi Administration.
- **Greece:** Matter has been taken up with MoPSW earlier vide letter Jan 17th 2022. MoPSW took it up with MEA in Jan 2022. Matter also discussed in India Greece JWG on 20th Apr 2022

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Additional Context

- IRS has demonstrated technical competence and global reach, but political and diplomatic support is critical for international flag recognition
- Many foreign flags (e.g., Singapore, UK, South Korea Greece, Saudi Arabia) are conservative in adding ROs without home nation advocacy
- Support from MEA, MoPSW, Indian missions abroad, and active dialogue with counterpart administrations is essential
- Recognition by these key flags will boost Indian classification tonnage, enhance credibility, and support India's maritime ambitions
- Builds on India's growing global maritime stature and aligns with Atmanirbhar Bharat in maritime services

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Thank You

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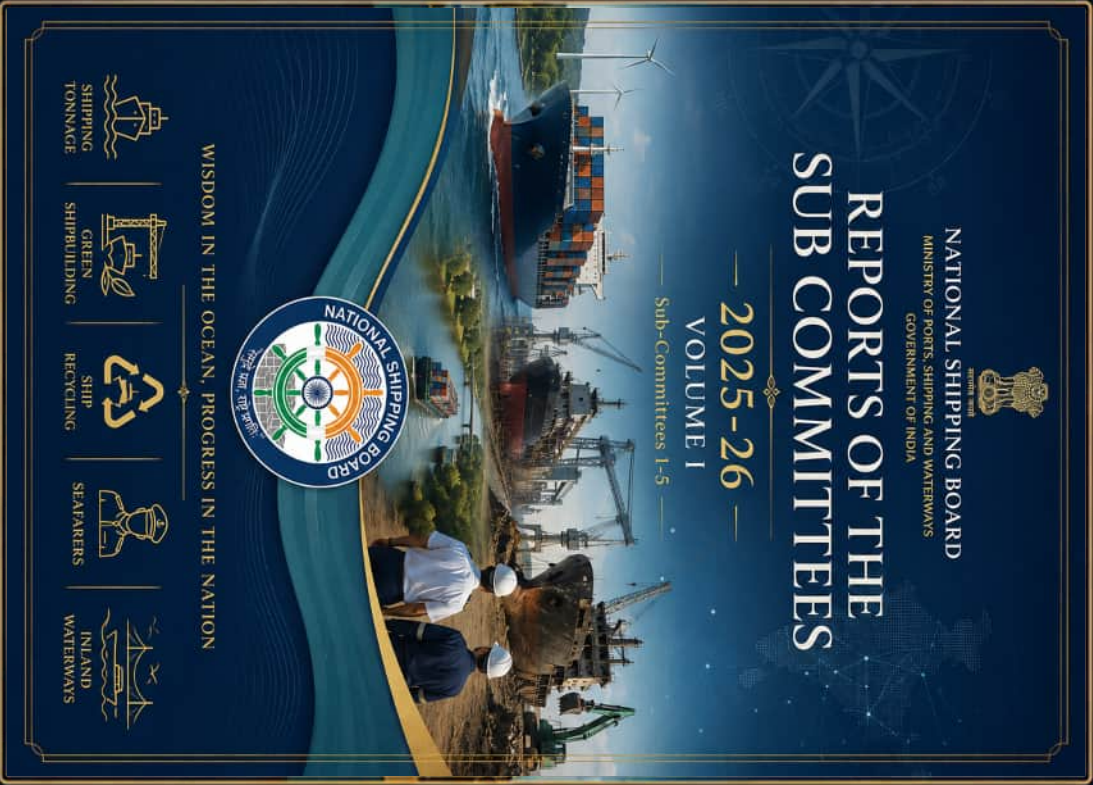
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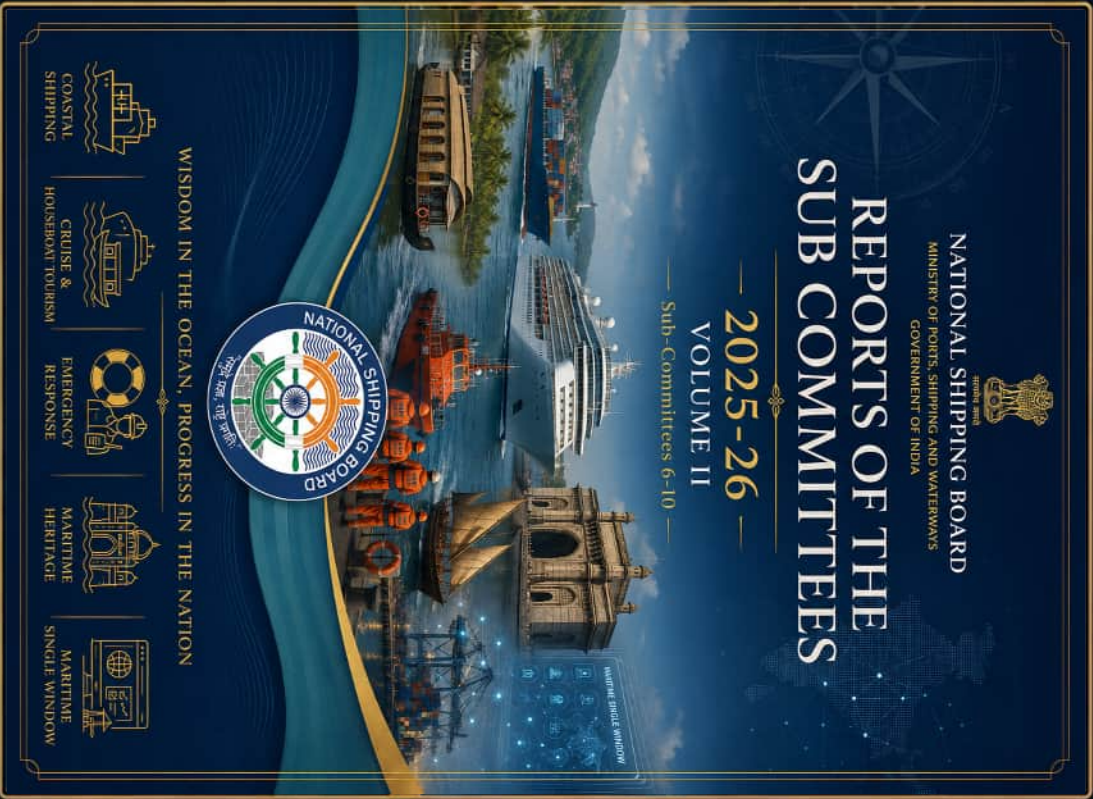
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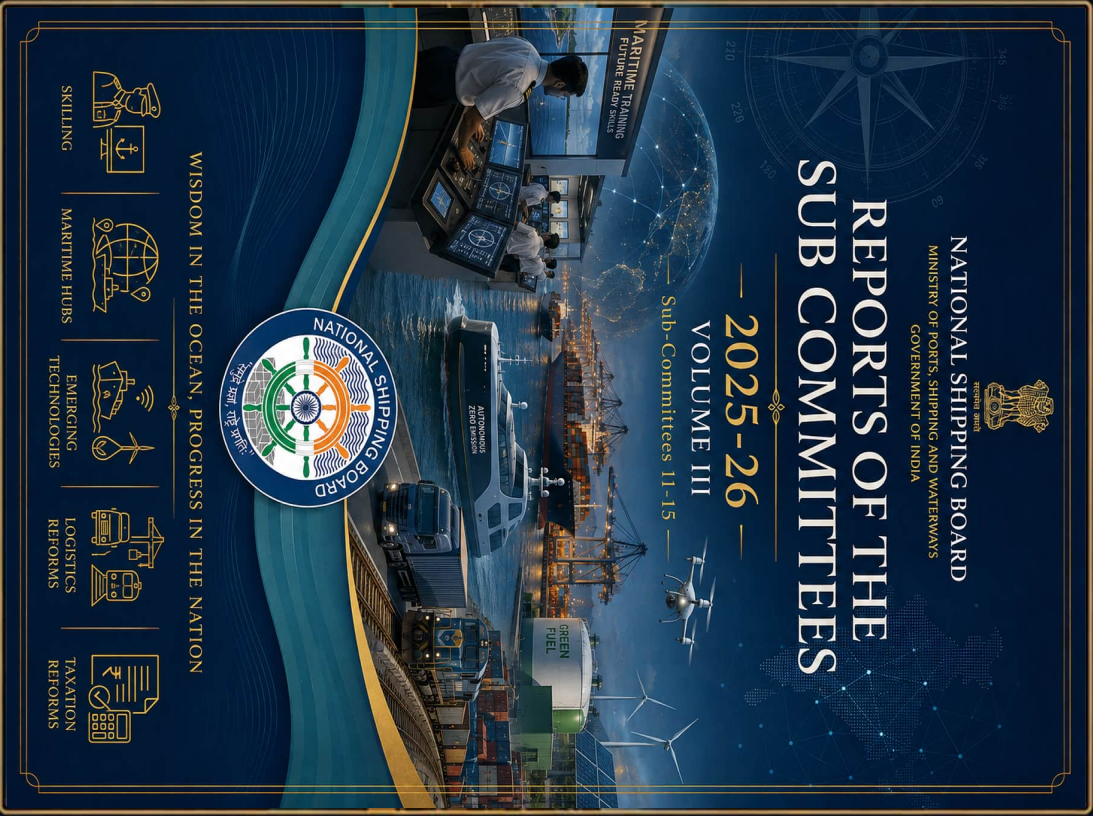
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