



Coastal State Workshop- Andhra Pradesh

Pillar 1- Maritime Safety and Casualty Response

Directorate General of Shipping

2025

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1. Context and Purpose

Andhra Pradesh, with a 1,053 km coastline—nearly 9.5% of India’s total coast—is among the country’s most maritime-active states. Its economy is driven by an expanding network of major and non-major ports, a vibrant fisheries sector, and significant offshore and nearshore shipping movement. The state’s maritime profile combines dense fishing activity, intensive port operations, and cyclone-prone coastal geography, making maritime safety a critical policy and operational priority.

The coastal and marine ecosystem of Andhra Pradesh faces overlapping risks:

- Frequent **fishing vessel–merchant ship collisions**, particularly near **Visakhapatnam, Kakinada, and Krishnapatnam**, due to shared operational zones.
- **Legal and procedural challenges** in casualty response and compensation.
- **Cyclone-induced port disruptions** and associated marine safety hazards.

These factors necessitate an integrated approach combining incident prevention, legal clarity, and disaster readiness across all maritime sectors.

The Pillar 1 Workshop on Maritime Safety and Casualty Response under the Directorate General of Shipping (DGS) aims to sensitize coastal administrations, port operators, and maritime stakeholders to implement uniform protocols for safety, reporting, and response. The workshop serves as a platform to consolidate lessons from recent incidents, assess preparedness gaps, and operationalize a coordinated response framework across central and state agencies.

1.1. Objectives of the Workshop

The workshop objectives are structured around three interlinked thematic areas — Fishing Vessel Collision Prevention, Maritime Casualty Legal Framework, and Port Disaster Preparedness and Response.

1.1.1. Strategic Objectives

1. **Enhance Safety Governance:** Strengthen institutional and procedural mechanisms for maritime incident prevention and management across coastal jurisdictions.

2. **Standardize Reporting and Coordination:** Establish uniform incident reporting, communication, and data-sharing protocols among ports, the Indian Coast Guard, Fisheries Departments, and DGS.
3. **Build Legal and Technical Capacity:** Improve understanding of the Merchant Shipping Act 2025, Admiralty Act 2017, and related conventions among state officials to ensure timely and adequate casualty response.
4. **Promote Equipment and Compliance Upgradation:** Ensure fishing vessels, port operators, and coastal administrations adhere to DGS safety circulars, navigational equipment standards, and communication system requirements.
5. **Strengthen Cyclone and Disaster Preparedness:** Reinforce the implementation of the DGS SOP for Cyclones (2021) and MoPSW checklists to minimize operational disruption and safeguard life and property during adverse weather events.
6. **Facilitate Stakeholder Awareness and Coordination:** Sensitize fishing communities, maritime associations, and coastal industries on preventive safety practices, legal obligations, and response procedures.

1.1.1. Workshop Agenda

Sr. No.	Agenda	Key Focus Areas
1	Fishing Vessel Collisions and Safety Awareness	Overview of collision trends (2023–2025); reporting delays; equipment gaps (AIS/VHF); awareness on COLREGs and safe navigation practices.
2	Maritime Casualty Legal Advisory and Institutional Roles	Legal framework under Merchant Shipping Act 2025 and Admiralty Act 2017; claims procedures; insurance and liability systems; inter-agency coordination.
3	Cyclone Preparedness and Port Disaster Response	Implementation of DGS Cyclone SOP; SITREP procedures; communication protocols; lessons from Cyclone Montha (2025) case study.
4	Consolidation and Way Forward	Summary of key decisions, next steps for operationalization, and adoption of follow-up mechanisms for state-level implementation.

2. State Maritime Profile

Andhra Pradesh is a major maritime state on India's east coast, with a coastline of **1,053 kilometres**, accounting for nearly **9.5% of India's total coastline**. The state's maritime sector plays a central role in regional trade, fisheries, and coastal livelihoods. It is positioned as a critical gateway for cargo movement on the eastern seaboard and serves as an anchor for India's "Port-led Development" vision.

2.1. Ports and Coastal Infrastructure

The state hosts one **major port- Visakhapatnam Port**, and a rapidly expanding network of **non-major ports** developed under the public and private sector. The operational and emerging port network includes:

- **Operational Ports:** Visakhapatnam, Gangavaram, Kakinada Deep Water, Kakinada Anchorage, Krishnapatnam, Machilipatnam, Mulapeta, and Ramayapatnam.
- **Ports under Development:** Nizampatnam, Bhavanapadu, and Kalingapatnam.

Collectively, Andhra Pradesh handles approximately **12% of national cargo throughput**, representing a key share of east coast maritime trade. The state's port network facilitates both domestic coastal shipping and international traffic, supported by strong hinterland connectivity through the **Golden Quadrilateral**, dedicated freight corridors, and industrial corridors aligned with port clusters.

2.2. Fishing Harbours and Coastal Communities

The fisheries sector forms an integral component of the state's maritime economy. Andhra Pradesh has:

- **4 operational fishing harbours:** Visakhapatnam, Kakinada, Machilipatnam, and Nizampatnam.
- **350 fish landing centres** distributed across coastal districts.
- Marine fish production capacity of approximately **0.3 MMTPA** from harbours and another **0.3 MMTPA** from landing centres.

- A fishing community comprising nearly **6.3 lakh** individuals dependent on marine and coastal fishing activities.

The close proximity of fishing harbours to commercial port approaches creates overlapping zones between small-scale fishing operations and high-tonnage vessel routes, heightening collision risks including damage to the fishing gear.

2.3. Maritime Trade and Economic Significance

The maritime economy of Andhra Pradesh is structured around three principal drivers:

1. **Port-led industrialisation:** Cluster-based industrial development and logistics parks around Kakinada, Krishnapatnam, and Ramayapatnam.
2. **High cargo throughput:** Non-major ports account for a significant portion of state trade, with ongoing expansions to increase handling capacity.
3. **Blue economy integration:** The state's policy direction emphasises integration of fisheries, port infrastructure, and coastal tourism under a unified maritime development framework.

3. Fishing Vessels Collision

Collisions between fishing vessels and merchant ships remain one of the most persistent safety concerns in India's coastal waters. The eastern seaboard, including Andhra Pradesh, experiences dense fishing activity in proximity to commercial shipping routes, particularly near Visakhapatnam, Kakinada, and Krishnapatnam. The operational overlap between small-scale fishing vessels and high-tonnage cargo ships significantly elevates collision risks.

These incidents often result from a combination of limited detectability, inadequate communication systems, non-adherence to appropriate display lights and shapes during night and day as required by COLREGS and delays in reporting, which in turn hinder timely rescue and investigation. The Directorate General of Shipping (DGS), in coordination with the Indian Coast Guard (ICG), has been monitoring such incidents to enhance early warning, improve inter-agency communication, and strengthen safety compliance among fishing vessels.

The objective of this section is to sensitize coastal stakeholders and fishing communities on the importance of timely reporting, navigational safety measures, and coordination with maritime authorities to prevent loss of life and property.

3.1. Historical Incident Trends

Analysis of collision data for **2023 to 2025** indicates a **recurring pattern of incidents** concentrated in specific maritime zones and seasonal windows. A broader review extending through 2025 recorded **28 collisions** (8 in 2023, 11 in 2024, and 9 in 2025), showing a gradual increase in frequency.

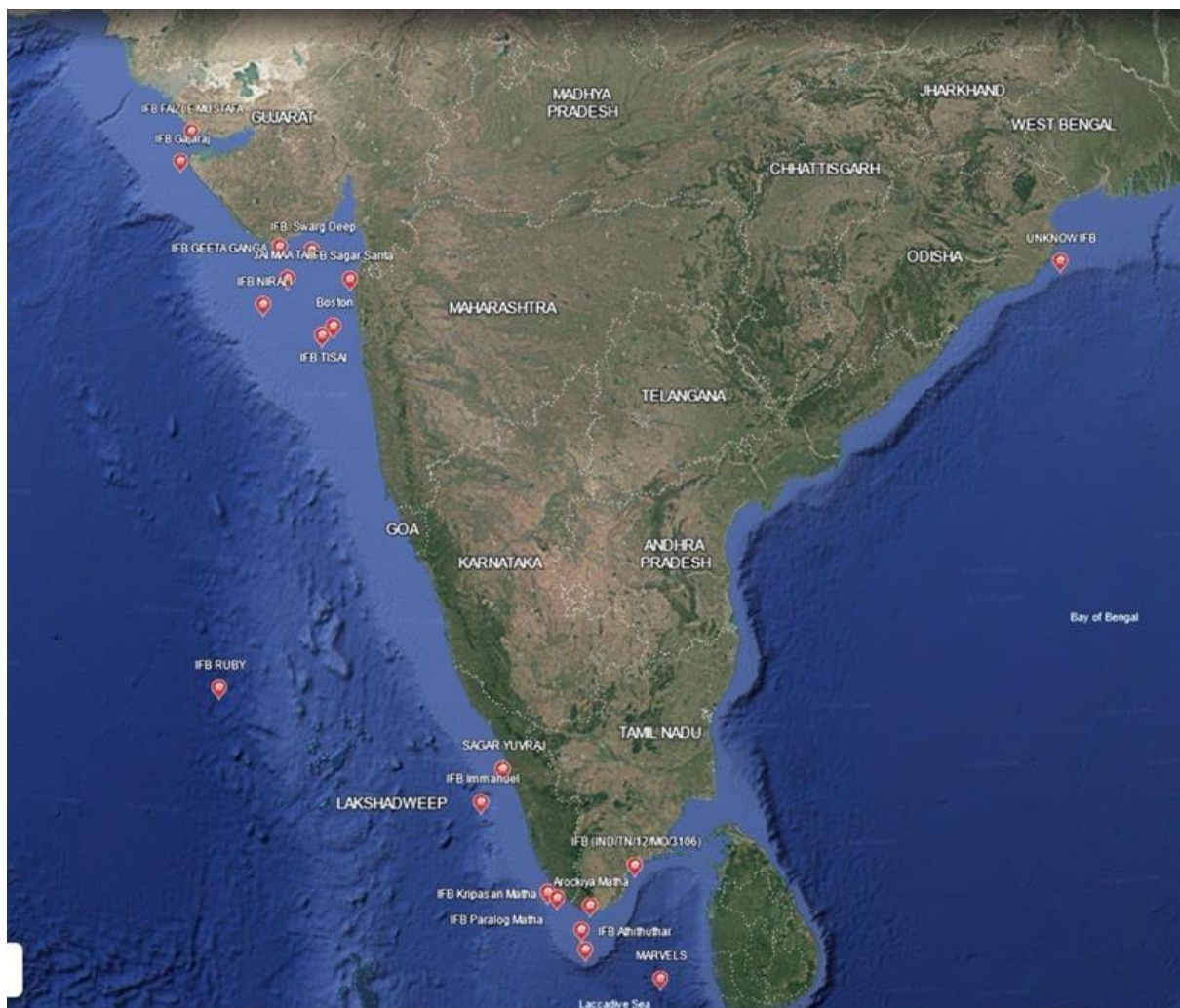


Figure 1 Location of Fishing Vessel Collision Between 2023 to 2025

Key Observations:

- **Incident frequency:** 28 collisions recorded between 2023–2025, showing rising trend.

- **Seasonality:** Majority of incidents occurred during **winter months**, coinciding with peak fishing season.
- **Time of occurrence:** 11 collisions took place during **daylight hours**, 5 during **nighttime**.
- **Jurisdictional distribution:** **Kandla MMD** reported the highest number (7 of 16 in 2023–24), followed by **Kochi (3)** and **Chennai (3)**.
- **Flag of colliding vessel:** Both **Indian and foreign-flag vessels** were involved. Of the 16 incidents in 2023–24, **10 involved Indian vessels** and **6 involved foreign-flag vessels**.
- **Reporting delay:** Time between occurrence and reporting ranged from **4 to 196 hours**, revealing inconsistencies in communication.
- **Consequences:** Four fatalities and four non-fatal injuries were recorded.

These findings confirm that collisions are **recurrent, geographically concentrated**, and frequently underreported in a timely manner, particularly within specific maritime jurisdictions.

3.2. Case Observations and Patterns

Incident analyses indicate that most fishing vessels involved in collisions operate without essential **navigational aids** such as radar reflectors, AIS transponders, or adequate navigation lights required as per COLREGS. Communication equipment such as **VHF radios** is often absent or non-functional, limiting the vessel's ability to warn or respond to approaching traffic.

Moreover, incident reporting mechanisms remain fragmented, with fishermen often relying on informal communication rather than structured reporting to port authorities, Coast Guard stations, or the DGS. The lack of uniformity in documenting vessel particulars, including dimensions, crew strength, and operational status, hinders root-cause analysis and follow-up investigations.

Often the insurance certificate of the fishing boat is not valid which thereby effects securing adequate compensation for the fishermen and the boat owner in case of any damage to the craft or loss lives.

3.3.Gaps and Issues Identified

The analysis identifies the following systemic gaps that require urgent attention:

1. **Delayed Reporting:** Reporting delays of up to 196 hours after an incident obstruct timely rescue, investigation, and accountability.
2. **Low Detectability:** Many fishing vessels lack radar reflectors, AIS devices, or high-visibility lighting, reducing their visibility to merchant ships during navigation.
3. **Weak Communication Framework:** Absence of a centralised location-sharing and distress communication mechanism between fishing boats and merchant traffic limits situational awareness.
4. **Incomplete Data Collection:** Essential details such as vessel type, crew count, and navigation conditions are inconsistently recorded in post-incident reports.
5. **Jurisdictional Concentration:** The clustering of incidents under certain MMD jurisdictions (notably Kandla, Kochi, and Chennai) underscores the need for region-specific preventive strategies.
6. **Mixed-Flag Involvement:** Frequent involvement of foreign-flag vessels necessitates enhanced coordination with flag states and port authorities to ensure compliance with international collision-prevention norms.
7. **Inadequate Insurance cover and oversight & Inadequate inspection and certification regime of fishing vessels by the Fisheries department**

These issues collectively highlight the need for regulatory oversight, structured detection systems, consistent reporting practices, and targeted awareness among fishing communities.

3.4.Recommended Actions

To address the recurring nature of fishing vessel collisions, the following **action points** are recommended for consideration by coastal-state authorities, port administrations, and fishing associations in Andhra Pradesh:

1. **Establish a Unified Reporting Protocol:** Introduce a single-window communication channel through the Maritime Rescue Coordination Centre (MRCC) for all collision and near-miss reports.
2. **Mandate Basic Navigational Equipment:** Ensure all mechanised and motorised fishing vessels operating near port approaches are fitted with radar reflectors, VHF sets, and navigation lights as per DGS safety circulars.
3. **Capacity Building for Fishermen:** Conduct periodic safety workshops through State Fisheries Departments and Port Authorities on navigation, collision prevention, and emergency response.
4. **Integrate Fishing Vessel Data:** Link fishing vessel registries with DG Shipping's central database to enable traceability and data sharing with MMDs and Coast Guard stations.
5. **Strengthen Zone-Based Monitoring:** Deploy coastal radar and AIS-based tracking near congested zones, particularly Visakhapatnam–Kakinada corridor, for real-time vessel monitoring.
6. **Enhance Coordination with Foreign Vessels:** Ensure enforcement of COLREGs (Collision Regulations) and establish coordination mechanisms for investigation of incidents involving foreign-flag ships.
7. **Establish Inspection regime and issuance of certificates to the fishing vessels** to ensure compliance with base safety requirements.

3.5.Expected Outcomes

Implementation of these measures is expected to:

- Reduce the frequency and severity of fishing vessel collisions.
- Strengthen real-time monitoring and early warning systems.
- Improve coordination between coastal fishing communities, ports, and maritime authorities.

- Promote a culture of safety, compliance, and accountability within the artisanal and mechanised fishing sectors.

4. Maritime Casualty Legal Advisory

4.1. Background

India's maritime domain has undergone rapid growth with increasing trade volumes, dense vessel movement, and expanding coastal industrial activities. The magnitude of these operations, particularly along the western and eastern seaboard, has heightened the risk of **marine casualties** such as collisions, groundings, wrecks, and pollution incidents. The safety and sustainability of maritime operations therefore depend on robust coastal-state management and a clear understanding of the legal framework governing post-incident actions.

The Maritime Casualty Legal Advisory seeks to sensitize coastal administrations, ports, and maritime stakeholders about the procedural, legal, and institutional steps to be taken following a marine incident. It establishes a unified framework enabling coastal states to respond in coordination with the Central Government, ensuring that the interests of sovereign authorities, local ecosystems, and affected communities are protected.

Recent legislative reforms including the Indian Ports Act 2025, Coastal Shipping Act 2025, Carriage of Goods by Sea Bill 2025, and the revised Merchant Shipping Act 2025 represent a modernized and integrated legal framework for India's maritime governance. These enactments provide clearer mandates for coastal-state implementation, strengthen institutional accountability, and streamline procedures for casualty response and environmental protection.

However, experiences from past marine incidents along the Indian coastline have shown gaps in the clarity of agency roles, claims prioritization, and liability enforcement. In several cases, incomplete awareness of legal and reporting procedures delayed effective coordination and compensation. This advisory seeks to remove such ambiguities and establish a standardized, informed, and time-bound response mechanism for managing maritime casualties.

4.2. Purpose and Intent

The purpose of this advisory is to provide an integrated legal and operational framework for the management of marine casualties at the state level. It aims to:

- Clarify the legal basis and procedural framework applicable to marine incidents.
- Define the roles and responsibilities of central, state, and port-level authorities.
- Guide operators, shipowners, and coastal communities on correct reporting, documentation, and claims processes.
- Establish coordination protocols for uniform implementation and accountability across coastal states.

By consolidating the relevant provisions of national laws and international conventions, the advisory seeks to enhance institutional readiness, procedural clarity, and efficiency in maritime casualty management.

4.3. Objectives and Scope

The advisory outlines the legal, technical, and operational dimensions of marine casualty management, with the following key objectives:

- Establishment of Preparedness Standards-** Define minimum standards of technical readiness, response infrastructure, and coordination capacity at both state and district levels.
- Role Clarification and Stakeholder Mapping-** Identify and delineate the roles of key entities including the Directorate General of Shipping, State Maritime Boards, Indian Coast Guard, Port Authorities, State Disaster Management Authorities, Pollution Control Boards, and Fisheries Departments. It also recognises the role of shipowners, insurers, and P&I Clubs in liability management.
- Incident Reporting and Communication Protocols-** Standardise reporting formats and establish real-time communication channels between the Directorate General of Shipping, Maritime Rescue Coordination Centres, and **state-level crisis management groups**.

- d. **Insurance and Liability Regimes-** Clarify mandatory insurance requirements, liability limits, and compensation pathways under the Merchant Shipping Act 2025, the Civil Liability Convention, and the International Oil Pollution Compensation Fund (IOPC).
- e. **Multi-Agency Coordination and Enforcement-** Define clear coordination protocols and escalation mechanisms among maritime, environmental, and disaster-response agencies.

4.4. Legal Framework Governing Maritime Casualties

4.4.1. Admiralty (Jurisdiction and Settlement of Maritime Claims) Act, 2017

The Admiralty Act, 2017 provides the legal foundation for instituting and adjudicating maritime claims in the aftermath of marine incidents. Under Section 4, it recognises several categories of maritime claims relevant to casualty management, including:

1. **Wreck Removal Costs:** Expenses incurred in raising, removing, recovering, or rendering harmless a wrecked, stranded, or abandoned vessel and its contents. Such claims may be subject to limitation under the Convention on Limitation of Liability for Maritime Claims (LLMC).
2. **Salvage Services:** Compensation for salvage operations, including special compensation for preventing or mitigating environmental harm.
3. **Environmental Damage:** Claims arising from damage or threat of damage caused by a vessel to the environment, coastline, or related interests, including costs of preventive or remedial measures and associated third-party losses.

The Act also defines the priority and ranking of maritime claims as follows:

- **Section 9:** Establishes the hierarchy of maritime liens
 - wages and crew entitlements;
 - loss of life or personal injury directly connected to vessel operations;
 - salvage and related compensation;
 - claims arising from torts for damage or loss caused by vessel operation.

- **Section 10:** Defines the inter se priority of maritime claims in the order of (a) maritime liens, (b) registered mortgages, and (c) all other claims. Further, Section 10(2)(b) specifies that salvage claims rank in inverse order of time, meaning later salvages take precedence over earlier ones.

This structure ensures transparency and fairness in the adjudication of competing claims, providing legal certainty to shipowners, salvors, and affected parties following a marine incident.

4.4.2. Merchant Shipping Act, 2025 — Framework for Marine Incident Management

The **Merchant Shipping Act, 2025** consolidates and modernises legal provisions on marine safety, casualty response, wreck management, and compensation. It introduces new parts, Part X (Marine Incidents and Emergency Response) and Part XII (Wreck and Salvage) that codify procedures for reporting, investigation, and recovery.

Key Provisions:

- **Immediate Notification:** Masters and operators are obligated to report incidents to the Directorate General of Shipping and Maritime Rescue Coordination Centre without delay.
- **Preliminary Inquiry and Investigation:** Authorised officers conduct inquiries, followed by investigations by designated authorities, in alignment with SOLAS and IMO casualty codes.
- **Wreck Management:** Shipowners must mark and remove hazardous wrecks at their own expense, supported by compulsory insurance for such liabilities.
- **Salvage Operations:** Aligned with the Salvage Convention, ensuring environmental protection and fair compensation.
- **Limitation of Liability:** Establishes liability caps based on tonnage, as per LLMC 1976, for personal injury, property damage, and pollution claims.
- **Oil Pollution Compensation:** Ensures supplementary redress through the IOPC Fund beyond shipowner limits.

4.5. Insurance and Liability Framework

Maritime incidents are covered under a multi-layered insurance and liability system ensuring financial accountability and compensation:

- **Protection and Indemnity (P&I) Insurance-** mandatory for all seagoing vessels above 300 GT, covering third-party liabilities including death, injury, pollution, wreck removal, and cargo damage.
- **Hull, Machinery, and Freight Insurance-** covers direct physical and operational losses.
- **Domestic P&I Club Development-** underway to provide sovereign coverage and reduce dependence on foreign insurers.

The liability regime is harmonised with international conventions such as LLMC 1976, CLC 1992, Bunker Oil Convention 2001, and Wreck Removal Convention 2007. Compensation claims are processed through High Courts with admiralty jurisdiction, ensuring transparent and time-bound adjudication.

4.6. Technical and Legal Preparedness of Coastal States

Coastal states are required to maintain both technical and legal preparedness through coordination among the following entities:

- **State Maritime Boards / Port Authorities-** maintain incident registers, coordinate with DGS, and ensure harbour safety.
- **State Disaster Management Authority (SDMA)-** integrate marine casualties into coastal disaster plans by jointly working as per the Plan for Marine Incidents and Emergency Response and conducting periodic workshops and drills with the SDMA. (please clarify how it will be done)
- **Indian Coast Guard-** lead pollution and oil spill response under the National Oil Spill Disaster Contingency Plan (NOS-DCP).
- **State Pollution Control Boards-** oversee shoreline protection, waste management, and post-incident monitoring.

- **Fisheries and Local Administrations-** support early reporting and assist in resource mobilisation.

Port Authorities must also maintain critical equipment (booms, dispersants, shoreline protection systems), identify disposal sites for debris, and convene State-level Crisis Management Groups for rapid decision-making during emergencies.

4.7.Claims, Compensation, and Enforcement

The legal framework enables affected parties to pursue claims for:

- Loss of life and personal injury;
- Damage to property and cargo;
- Environmental degradation and remediation costs;
- Wreck removal and salvage expenses; and
- Economic losses due to disruption of port or fishing activity.

Claims are filed before the **designated High Courts** under admiralty jurisdiction, following the order of priority under the Admiralty Act. For pollution and environmental damage, the **Merchant Shipping Act 2025** and related conventions provide recourse through domestic and international compensation mechanisms, including the **IOPC Fund**.

4.8.Role of Nodal Authorities

The Central Government, through the Directorate General of Shipping, designates Nodal Authorities to coordinate maritime-incident response and legal management. These authorities:

- Direct central and state agencies during incidents
- Oversee use of pollution-control resources
- Ensure compliance with statutory reporting and insurance obligations and
- Supervise claim settlement and legal follow-up.

This centralised coordination mechanism ensures uniformity in legal processes and supports states in executing statutory responsibilities.

4.9.Expected Outcomes

The effective implementation of this advisory will:

- Establish a clear and consistent legal response framework for marine casualties
- Reduce jurisdictional ambiguity and improve coordination among agencies
- Ensure timely and transparent compensation to victims and affected communities
- Strengthen institutional capacity and accountability in maritime governance and
- Reinforce public confidence in the state's maritime safety and environmental protection systems.

5. Disaster preparedness and Response in Indian Ports

5.1.Background:

Andhra Pradesh, with its extensive eastern coastline along the Bay of Bengal, is highly susceptible to cyclones, depressions, and coastal storms. The region faces recurrent extreme weather events during both the southwest and northeast monsoon seasons, leading to disruption of port operations, risks to vessels and offshore installations, and potential loss of life and property. The state's strategic ports — Visakhapatnam, Gangavaram, Kakinada, Krishnapatnam, and Gopalpur — handle substantial maritime and industrial traffic, making preparedness and coordinated disaster response essential to safeguarding maritime and coastal assets.

Recognising the high-risk environment, the Directorate General of Shipping (DGS), under the Ministry of Ports, Shipping and Waterways (MoPSW), has institutionalised a Standard Operating Procedure (SOP) for Cyclones (2021) aligned with the National Disaster Management Plan (NDMP-2019). The SOP provides a structured framework for communication, coordination, and on-ground action during the formation, intensification, and landfall of cyclonic systems.

This agenda aims to sensitize coastal state administrations, ports, and maritime operators on the cognizant measures to be taken during cyclonic events and to reinforce adherence to the prescribed DGS and MoPSW checklists for effective disaster management and response.

5.2.Coordination Framework and Objectives

The DGS functions as the central coordinating authority during cyclone events, ensuring seamless communication between the Indian Meteorological Department (IMD), Indian Navy, Indian Coast Guard (ICG), Maritime Rescue Coordination Centres (MRCC), Directorate General of Hydrocarbons (DGH), Oil Industry Safety Directorate (OISD), port authorities, and shipping stakeholders.

Objectives of the cyclone preparedness and response framework include:

- Ensuring **timely dissemination of IMD advisories** to all maritime stakeholders.
- Establishing **real-time coordination** through the DGS Communication Centre (DGComm Centre).
- Mandating **proactive actions by ports and shipping companies** in accordance with the approved SOPs.
- Maintaining **situational reporting (SITREPs)** at regular intervals.
- Facilitating **inter-agency review meetings** under the chairmanship of the Director General of Shipping.
- Ensuring adherence to the **MoPSW Cyclone Preparedness Checklist and Casualty SOP**.

The coordination framework ensures that each entity — central or state, public or private — performs its defined responsibilities to safeguard maritime operations and coastal infrastructure.

5.3.Standard Operating Procedures (SOP) for Cyclones

The Standard Operating Procedures for Cyclones (2021) issued by the DGS form the operational foundation for disaster management in the maritime domain. These SOPs establish

step-by-step protocols for early warning, stakeholder coordination, monitoring, and post-event reporting.

Key SOP Actions:

1. Forwarding Weather Warnings:

- DGComm Centre circulates IMD weather advisories to Indian shipping companies, charterers, port authorities, Maritime Boards, and offshore agencies (DGH, ONGC, OISD).
- Simultaneous communication is made to ICG, MRCC, and the Indian Navy.

2. Designation of Local Coordinators:

- Jurisdictional Principal Officers (POs) nominate **MMD Surveyors** to coordinate activities at the local level.

3. Port and Operator Responsibilities:

- Ports and oil operators are responsible for issuing vessel advisories within their jurisdiction.
- In case of non-compliance, the ICG enforces necessary safety measures.

4. High-Risk Vessel Identification:

- Shipping companies identify high-risk vessels such as non-propelled, passenger, arrested, or low-powered vessels and inform DGComm and ICG for priority sheltering.

5. Situation Reporting (SITREP):

- Regular SITREPs are issued every 12 hours (increasing to 6–8 hourly for severe cyclones) summarizing updates from IMD, ports, and offshore installations.

6. Coordination Meetings:

- The Director General of Shipping chairs coordination meetings with oil companies, ports, industry associations (INSA, ICCSA, MASSA, FOSMA, MANSASHIP), and government agencies to ensure unified action.

7. **Emergency Towing Vessels (ETV):**

- ETVs are mobilised to strategic locations for rapid response and salvage readiness.

8. **Standing Orders and Enforcement:**

- Standing orders are reviewed every six hours.
- Vessels within **50–70 nautical miles** of the cyclone's path are warned and monitored for compliance through ICG enforcement.

9. **Action Taken Reports:**

- Affected ports submit detailed **Action Taken Reports** in the prescribed format covering marine, land, and personnel safety measures, infrastructure security, and coordination with state disaster authorities.

5.4. Case Study: Cyclone Montha (October 2025)

5.4.1. Background and Initial Response

Upon receiving an early warning from the IMD regarding a developing depression in the Bay of Bengal expected to intensify into **Cyclone Montha**, the **Directorate General of Shipping** convened a coordination meeting at **1800 hrs IST on 25 October 2025**. Participants included **major and non-major east coast ports** (Kolkata, Paradip, Visakhapatnam, Chennai, Kakinada, Gopalpur, Krishnapatnam, Gangavaram), along with **ONGC, OISD, RIL, ICG, IN, MoPSW, and maritime associations** (INSA, MASSA, FOSMA, ICCSA, MANSASHIP, and the Sailing Association).

A preparedness checklist was circulated to all stakeholders through the **DGComm Centre** to ensure early compliance with cyclone SOPs.

Situation Updates and Reporting Mechanism

- DGComm Centre issued **seven SITREPs** during the critical phase, compiling IMD bulletins and port status reports.
- Updates were shared with all stakeholders, including IMD's hourly bulletins and National Bulletins Nos. 9 and 38 on the day of landfall.
- Regular 12-hourly SITREPs were increased to 8-hourly as the cyclone intensified.

Meteorological Overview

As of **1900 hrs IST on 28 October 2025**, Cyclone Montha had intensified into a **Severe Cyclonic Storm** with maximum sustained winds of **90–100 km/h**, gusting up to **110 km/h**, and made landfall near **Kakinada, Andhra Pradesh**.

IMD issued **Red Alerts** for coastal Andhra Pradesh, with heavy rainfall, storm surge, and localised flooding reported in multiple districts.

Coordination and Stakeholder Action

- The DGComm Centre maintained round-the-clock liaison with ports, ICG, IN, and MRCC Chennai.
- Ports implemented standard cyclone protocols and submitted Action Taken Reports detailing vessel safety, cargo operations suspension, and personnel evacuation.
- Offshore installations were monitored by DGH and OISD, ensuring suspension of non-critical operations.
- ETVs were placed on alert and mobilised where necessary.

Key Observations

- Effective early coordination and constant information exchange ensured no major casualties or pollution incidents.
- Timely SITREP dissemination strengthened situational awareness and operational readiness.

- The incident demonstrated the operational effectiveness of the **DGS Cyclone SOP** and its integration with NDMP protocols.

5.5. Safety in Port Operations: Entry into Enclosed Spaces

Following recent fatal incidents at Indian ports, the Directorate General of Shipping issued a safety circular highlighting the hazards associated with entry into enclosed cargo spaces such as booby hatches and Australian ladders without adequate atmospheric checks.

Two incidents involving stevedores and an excavator operator resulted in loss of life due to oxygen-deficient and methane-rich environments within enclosed holds. Investigations revealed lack of access markings, insufficient coordination with shore personnel, and non-compliance with enclosed space entry procedures.

Mandatory Safety Measures:

1. Access Control:

- Unused or enclosed cargo spaces must remain locked. Access to shore personnel only after authorisation by ship staff.

2. Marking and Identification:

- All access points (booby hatches, ladders) must be clearly numbered and identified.

3. Interface with Shore Personnel:

- Cargo operation briefings must include discussion on restricted areas and emergency procedures.

4. Medical Equipment and Training:

- Vessels must maintain accessible oxygen resuscitators and ensure crew are trained in first aid and CPR.

5. Briefing of Shore Workers:

- Stevedores and port workers must receive detailed safety briefings on hazardous spaces prior to commencement of work.

6. Availability of Medical and Emergency Services:

- Ports to ensure ambulance and trauma support at operational berths.

7. Training and Records:

- All port authorities must maintain updated records of authorised stevedores and ensure mandatory training on confined-space hazards.

Compliance with these measures is mandatory for all Indian ports and vessels. Non-compliance will attract enforcement action under applicable maritime safety regulations.

5.6.Integration with National and International Frameworks

This sub-pillar aligns with the following institutional and international frameworks:

- **National** Disaster Management Plan (NDMP-2019) — Government of India.
- DGS Disaster Management Plan and SOP for Cyclones (2021 & 2022 updates).
- IMD's Cyclone Warning SOP (2021) — for standardised weather bulletins and four-stage alerts (Pre-Cyclone Watch, Cyclone Alert, Cyclone Warning, Post-Landfall Outlook).
- IMO and WMO protocols under the Worldwide Met-Ocean Information and Warning Service (WWMIWS) ensuring that ships at sea receive and report storm data as per SOLAS obligations.

5.7.Expected Outcomes

Implementation of the disaster preparedness framework will:

- Strengthen **port and coastal-state readiness** for cyclonic events.
- Ensure **real-time coordination** between maritime, meteorological, and disaster agencies.

- Enhance **personnel safety** and compliance during port operations.
- Minimise **loss of life, environmental damage, and disruption** to maritime trade.
- Reinforce the role of DGS as the **national coordinating authority** for maritime disaster management.

6. Expected Outcomes and Conclusions

6.1.Expected Outcomes

Implementation of recommendations and inter-agency coordination through this workshop is expected to result in:

1. **Enhanced Safety at Sea:** Reduction in fishing vessel collisions and improved navigation safety across congested maritime zones.
2. **Legal and Administrative Clarity:** Clear understanding of agency responsibilities, claims handling, and enforcement processes.
3. **Improved Data and Communication Systems:** Establishment of centralized reporting, AIS integration, and digital linkage of fishing vessel registries.
4. **Strengthened Disaster Preparedness:** Port-level readiness aligned with DGS cyclone SOPs and NDMP guidelines.
5. **Stakeholder Sensitization:** Increased awareness among fishing communities, port authorities, and operators regarding their roles in safety and casualty management.
6. **Institutional Coordination:** Stronger operational linkages between DGS, coastal states, and central agencies for real-time response and policy alignment.

6.2.Conclusion

The **Pillar 1 Workshop on Maritime Safety and Casualty Response** aims to translate policy direction into operational readiness for Andhra Pradesh's maritime sector. The discussions on **Fishing Vessel Collision, Maritime Casualty Legal Advisory, and Port Disaster**

Preparedness will jointly build a comprehensive understanding of maritime safety challenges and institutional responsibilities.

The outcomes of this workshop will feed into a **national framework of coastal-state coordination**, aligning with the Directorate General of Shipping's broader objectives of promoting **safe, sustainable, and resilient maritime operations**.

By reinforcing compliance, legal preparedness, and cross-sector cooperation, this initiative will contribute to safeguarding India's maritime domain, ensuring that the coastal and fishing communities of Andhra Pradesh are better protected and integrated into a unified maritime safety architecture.



Coastal State Workshop- Andhra Pradesh

Pillar 2- Shipbuilding and Ship Recycling

6.1.Introduction: Why Shipbuilding Matters

Shipbuilding is a strategic pillar of India's maritime and industrial ecosystem, with far-reaching implications for economic growth, national security, and self-reliance. As a mother industry for heavy engineering, shipbuilding drives demand across steel, machinery, electricals, design, and advanced manufacturing, creating strong industrial linkages. It is a major generator of direct and indirect employment, supporting a wide spectrum of skilled and semi-skilled jobs. From a strategic perspective, shipbuilding enables the creation of critical maritime assets required for trade, energy security, defence, and coastal connectivity. With India's growing dependence on energy imports and rising seaborne trade, strengthening domestic shipbuilding capacity is essential to reduce reliance on foreign-built vessels, curb foreign exchange outflow, and enhance control over national tonnage. Recognising these imperatives, shipbuilding forms a core focus area under the Shipbuilding Pillar, aimed at building resilient, competitive, and globally integrated shipbuilding capabilities in India.

6.2.National Vision for Shipbuilding: From MIV 2030 to MAKV 2047

India's national vision for shipbuilding is anchored in a long-term, phased transformation of the sector, aligned with the objectives of **Maritime India Vision (MIV) 2030** and **Maritime Amrit Kaal Vision (MAKV) 2047**. This vision recognises shipbuilding as a strategic industry critical to economic growth, industrial deepening, employment generation, and maritime self-reliance. The approach envisages a calibrated scale-up of capacity, capability, and global competitiveness over the next two decades.



Under **MIV 2030**, India aims to emerge among the **top 10 shipbuilding nations globally**, with an annual shipbuilding production capacity of approximately **0.6 million gross tonnage (GT)**. This phase focuses on laying strong foundations through targeted policy support, development of shipbuilding and ship repair clusters, modernisation of existing shipyards, and creation of a robust domestic supply chain for key inputs such as steel, marine equipment, and design services. A significant emphasis is placed on skill development, technology adoption, and improving ease of doing business to attract both domestic and global players. By 2030, the sector is expected to generate **over 20 lakh direct and indirect jobs**, reflecting its high employment multiplier across manufacturing, logistics, and ancillary industries. The estimated investment requirement during this phase is in the range of **₹3 lakh to ₹3.5 lakh crore**, largely driven by infrastructure creation, technology upgradation, and capacity expansion.

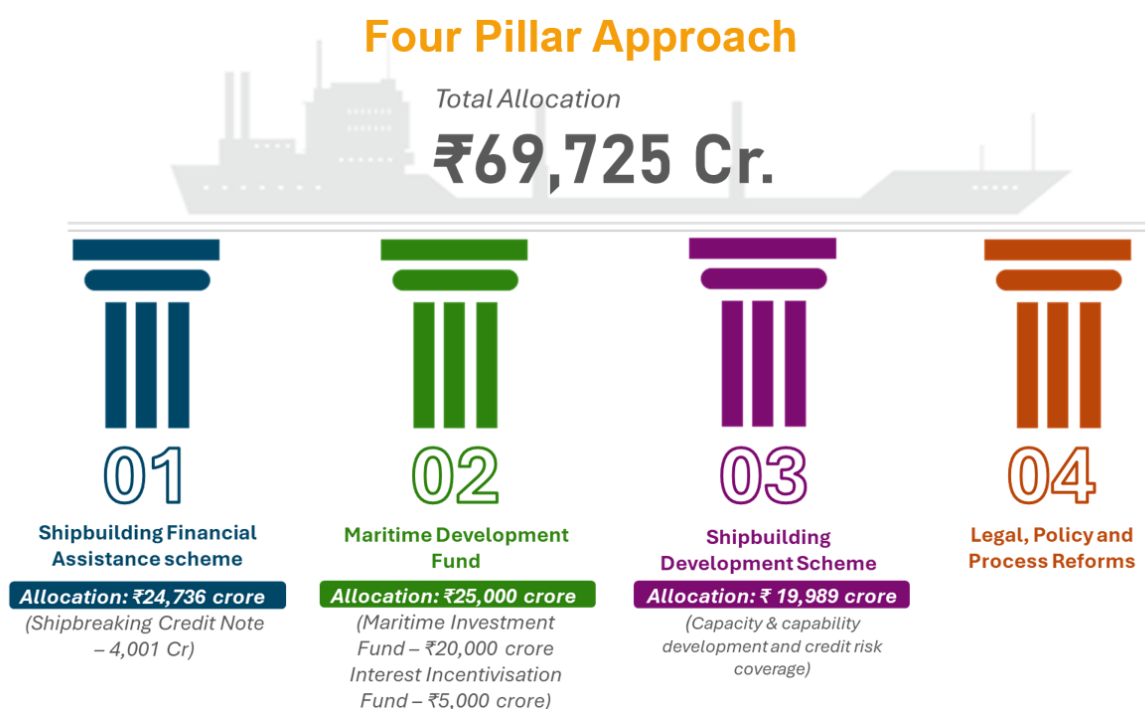
Building on these foundations, **MAKV 2047** presents a bold and aspirational roadmap aligned with India's centenary of independence. The vision targets positioning India among the **top 5 global shipbuilding nations**, with a quantum leap in annual production capacity to about **4.5 million GT**. This phase envisages India becoming a global hub for construction of large, technologically advanced vessels, including container ships, tankers, gas carriers, cruise

vessels, and specialised ships. The sector is expected to support employment generation of nearly **1.5 crore jobs**, reflecting the maturation of domestic manufacturing ecosystems, advanced engineering capabilities, and export-oriented growth. Achieving this scale will require substantial investments estimated at **₹75 lakh to ₹80 lakh crore**, driven by mega shipbuilding clusters, advanced dry docks, automation, green ship technologies, and integrated industrial townships around shipbuilding hubs.

Together, MIV 2030 and MAKV 2047 articulate a clear, outcome-oriented national vision that transitions India from a modest shipbuilding presence to a globally competitive maritime manufacturing powerhouse. This vision underscores the strategic importance of coordinated policy action, Centre–State collaboration, private sector participation, and sustained investment to unlock India’s full shipbuilding potential.

6.3.Four Pillar Approach for Strengthening India’s Shipbuilding Ecosystem

To achieve the ambitious national targets set out under Maritime India Vision 2030 and Maritime Amrit Kaal Vision 2047, the Government of India has adopted a **Four Pillar Approach** for holistic development of the shipbuilding and ship repair sector. This approach recognises that shipbuilding is a capital-intensive, long-gestation industry requiring coordinated financial support, institutional mechanisms, capacity augmentation, and regulatory reforms. Accordingly, a total allocation of **₹69,725 crore** has been earmarked to support the sector through four mutually reinforcing pillars.



6.3.1. Pillar I: Shipbuilding Financial Assistance Scheme (Allocation: ₹24,736 crore)

The Shipbuilding Financial Assistance (SFA) Scheme is designed to enhance the global competitiveness of Indian shipyards by addressing cost disadvantages vis-à-vis leading international shipbuilding nations. The scheme provides direct financial support to shipyards for the construction of vessels, thereby reducing the effective cost of production and encouraging domestic as well as export-oriented shipbuilding.

A key component under this pillar is the **Shipbreaking Credit Note** mechanism, with an allocation of **₹4,001 crore**, which incentivises environmentally compliant ship recycling and links shipbreaking activity with new ship construction. This creates a circular economy within the maritime sector, promotes sustainable practices, and supports domestic yards through credit offsets. Overall, Pillar I plays a critical role in stimulating demand, improving order books of Indian shipyards, and attracting private investment into the sector.

6.3.2. Pillar II: Maritime Development Fund (Allocation: ₹25,000 crore)

The Maritime Development Fund (MDF) addresses one of the most persistent challenges faced by the shipbuilding industry—**access to affordable and long-term finance**. Under this pillar, a dedicated **Maritime Investment Fund of ₹20,000 crore** has been envisaged to catalyse investments in shipbuilding, ship repair, ports, and allied maritime infrastructure.

In addition, an **Interest Incentivisation Fund of ₹5,000 crore** has been provided to reduce borrowing costs for shipyards and maritime enterprises. By lowering financial risk and improving credit availability, this pillar aims to crowd in private capital, encourage large-scale infrastructure creation, and support technology-intensive investments such as automation, advanced dry docks, and green ship technologies. Pillar II thus strengthens the financial backbone of the maritime sector and ensures sustained investment momentum.

6.3.3. Pillar III: Shipbuilding Development Scheme (Allocation: ₹19,989 crore)

Pillar III focuses on **capacity and capability development** across the shipbuilding value chain. This includes support for the creation of **mega shipbuilding clusters**, modernisation and expansion of existing shipyards, development of common infrastructure, and enhancement of ancillary and supplier ecosystems.

A significant emphasis is placed on **credit risk coverage mechanisms**, which reduce lender exposure and enable shipyards to undertake large and complex vessel construction projects. This pillar also supports technology upgradation, skill development, and adoption of global best practices in design, production, and quality assurance. By addressing structural and operational gaps, Pillar III aims to transform Indian shipyards into globally competitive facilities capable of building large, sophisticated vessels.

6.3.4. Pillar IV: Legal, Policy and Process Reforms

The fourth pillar underpins the entire framework by focusing on **systemic reforms** required to improve ease of doing business and long-term sectoral sustainability. This includes streamlining approval processes, simplifying contracting and procurement norms, harmonising regulatory frameworks, and aligning policies across central and state governments.

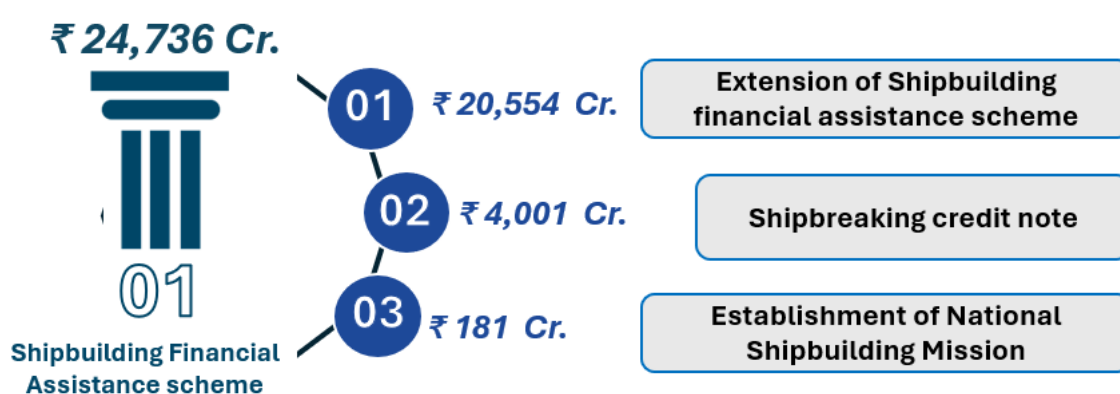
Pillar IV also emphasises rationalisation of taxation, standardisation of contracts, dispute resolution mechanisms, and greater clarity in land acquisition and environmental clearances. These reforms are essential to reduce project delays, improve investor confidence, and ensure efficient implementation of shipbuilding projects. By creating a predictable and transparent policy environment, this pillar enables the effective functioning of the financial and developmental instruments introduced under the other pillars.

6.3.5. Integrated Impact of the Four Pillars

Together, the Four Pillar Approach provides a comprehensive and balanced framework that addresses financial viability, institutional support, physical capacity creation, and regulatory efficiency. The integrated design ensures that short-term demand stimulation is complemented by long-term structural reforms, positioning India to emerge as a globally competitive shipbuilding hub while advancing the national objectives of *Atmanirbhar Bharat*, employment generation, and maritime self-reliance.

6.4. Shipbuilding Financial Assistance Scheme (SFAS): Structure, Incentives and State-Level Relevance

The **Shipbuilding Financial Assistance Scheme (SFAS)** constitutes a critical component of the Four-Pillar Approach under Pillar 2 – Shipbuilding, with a total allocation of **₹24,736 crore**. The scheme is designed to enhance the cost competitiveness of Indian shipyards, stimulate domestic shipbuilding demand, promote circular economy practices through ship recycling, and establish robust institutional mechanisms for sectoral coordination. For coastal States, SFAS provides a direct lever to attract shipbuilding investments and accelerate the development of shipbuilding clusters.

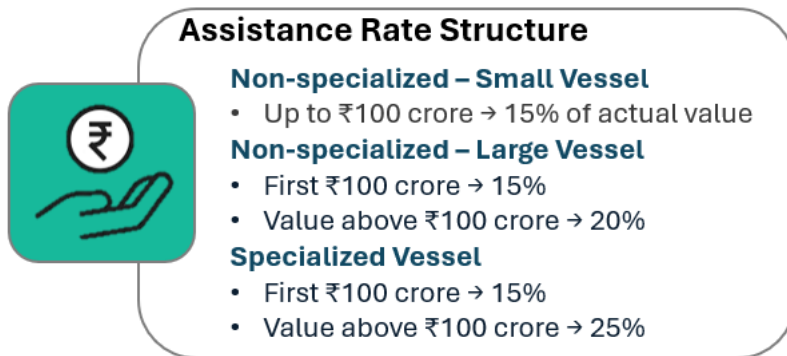


6.4.1. Key Components of the Scheme

The total allocation under SFAS is distributed across three major components:

- 1. Extension of Shipbuilding Financial Assistance Scheme – ₹20,554 crore:** This component extends the existing financial assistance framework to new shipbuilding contracts. Assistance is linked to the actual contract value of vessels constructed in Indian shipyards and is aimed at offsetting cost disadvantages arising from higher capital costs, taxation, and input prices compared to global competitors.
- 2. Shipbreaking Credit Note – ₹4,001 crore:** To promote integration between shipbreaking and shipbuilding, a credit note equivalent to **40% of the scrap value** of a vessel is issued to the ship-owner when the ship is scrapped at an Indian yard. This credit note can be reimbursed against the cost of constructing a new vessel at an Indian shipyard. This mechanism encourages recycling of end-of-life vessels within India while creating a direct pipeline for new ship orders.
- 3. Establishment of National Shipbuilding Mission – ₹181 crore:** This component supports the creation of a dedicated institutional framework to coordinate policy implementation, monitor outcomes, and align central and State-level initiatives related to shipbuilding.

6.4.2. Assistance Rate Structure



The scheme provides differentiated assistance based on vessel type and contract value:

- **Non-specialised Small Vessels (up to ₹100 crore)**
 - Assistance of **15% of actual contract value**
- **Non-specialised Large Vessels**
 - First ₹100 crore: **15% assistance**
 - Value above ₹100 crore: **20% assistance**
- **Specialised Vessels** (such as LNG carriers, dredgers, offshore vessels)
 - First ₹100 crore: **15% assistance**
 - Value above ₹100 crore: **25% assistance**

This graded structure incentivises construction of larger and more technologically complex vessels in Indian yards.

6.4.3. Domestic Content Requirement (DCR)

SFAS strongly promotes localisation and domestic manufacturing through a defined Domestic Content Requirement:

- **Less than 30% domestic content:** No SFAS support
- **30% to less than 40% domestic content:** Pro-rata assistance
- **40% or more domestic content:** Full assistance

This provision encourages the development of indigenous component manufacturing, vendor ecosystems, and MSME participation around shipyards.

6.4.4. Implications for Coastal States

For coastal States, SFAS presents an opportunity to position their shipyards as preferred destinations for new vessel orders. States can play a facilitative role by ensuring timely approvals, supporting vendor park development, enabling ship recycling facilities, and aligning skilling initiatives with specialised vessel requirements. Effective State-level implementation will be essential to fully leverage the financial incentives under SFAS and translate them into sustained industrial and employment growth.

6.5. Shipbuilding Development Scheme (SBDS): Relevance and Opportunities for Coastal States

The Shipbuilding Development Scheme (SBDS) is a critical pillar of India's shipbuilding strategy, designed to address structural gaps in capacity, capability, technology, and risk mitigation within the domestic shipbuilding ecosystem. With a total outlay of **₹19,989 crore**, SBDS directly supports the creation and expansion of shipbuilding infrastructure while reducing financial and operational risks for investors. For coastal states, the scheme presents a strategic opportunity to anchor maritime-led industrial growth, employment generation, and regional economic diversification.

Capital support for greenfield shipbuilding capacity (₹9,930 crore) is a core component of SBDS and is particularly relevant for coastal states with available waterfront land, deep-draft access, and proximity to ports. This support enables states to attract private investment for establishing new shipyards, including facilities capable of building large commercial vessels, specialised ships, and future-ready green vessels. Coastal states can leverage this component to develop maritime industrial clusters aligned with port-led development and Sagarmala objectives.

Capital assistance for existing and brownfield shipyards (₹8,261 crore) allows coastal states with legacy shipbuilding facilities to modernise and expand production capacity. This includes investments in advanced fabrication infrastructure, dry docks, automation, and digital shipbuilding technologies. By supporting upgradation, SBDS helps coastal states revive underutilised assets, enhance productivity, and improve the global competitiveness of existing yards, while retaining skilled local workforces.

A forward-looking element of the scheme is the **capability development initiative through the India Ship Technology Centre (ISTC) (₹305 crore)**. ISTC is envisioned as a national hub for ship design, engineering, technology standardisation, and R&D. Coastal states stand to benefit from access to advanced design capabilities, technology transfer, and skilling support, enabling local shipyards and MSMEs to move up the value chain and participate in complex vessel construction.

To address risk perceptions in shipbuilding, SBDS provides **shipbuilding risk coverage (₹1,443 crore)** through pre-shipment insurance, post-shipment insurance, and vendor default insurance. This component is especially significant for coastal states seeking to attract first-time investors or expand MSME participation, as it lowers financial risks across the supply chain and improves access to institutional finance.

Finally, **administrative support (₹50 crore)** ensures effective scheme implementation, monitoring, and coordination between the Centre, states, and industry stakeholders.

Overall, SBDS empowers coastal states to play a proactive role in India's shipbuilding resurgence by providing targeted financial support, technology access, and risk mitigation—enabling them to position shipbuilding as a cornerstone of coastal economic development.

6.6. Brownfield and Greenfield Expansion under the Shipbuilding Development Scheme

The Shipbuilding Development Scheme (SBDS) adopts a dual-track approach to capacity creation by supporting both **brownfield expansion of existing shipyards** and **greenfield development of new shipbuilding clusters**. This balanced framework ensures rapid scale-up of India's shipbuilding capacity while simultaneously building long-term, world-class infrastructure aligned with global standards.

6.6.1. Brownfield Expansion: Modernising Existing Shipyards

Brownfield expansion focuses on strengthening and upgrading **existing Indian shipyards** to enhance efficiency, productivity, and competitiveness. The objective is to enable operational shipyards to scale up capacity, adopt modern technologies, and handle more complex and higher-value vessel construction.

Eligibility under the brownfield component is limited to Indian shipyards that have been **operational for a minimum of three years**, with expansion undertaken under the same legal entity. Capital assistance is provided up to **25% of the fair assessed project cost**, based on duly appraised DPRs, IEAs, or CA-certified estimates. This ensures fiscal discipline while supporting genuine capacity augmentation.

The scheme supports a wide range of critical infrastructure components, including:

- Channel and basin development to improve navigability and vessel access
- Construction and upgradation of dry docks and slipways
- Installation of ship lifts and floating docks
- Development of piers, jetties, and material handling systems
- Procurement of heavy cranes and yard equipment
- Creation of block and modular fabrication facilities

For coastal states with legacy shipyards, this component provides a pathway to **revitalise underperforming assets**, attract new orders, retain skilled manpower, and integrate local MSMEs into the shipbuilding value chain.

6.6.2. Greenfield Expansion: Creating World-Class Shipbuilding Clusters

The greenfield component of SBDS is aimed at developing **integrated shipbuilding clusters** with shared infrastructure and advanced technologies. These clusters are envisioned as large-scale, globally competitive ecosystems capable of constructing large commercial vessels, specialised ships, and next-generation green vessels.

A key feature of greenfield development is the presence of an **Anchor Shipyard** with a **minimum annual capacity of 0.5 million GT**, ensuring scale, credibility, and long-term viability. The scheme provides **100% upfront grant support for eligible common infrastructure components**, significantly reducing entry barriers for large investments.

Supported components include:

- Breakwaters, wave breakers, and tide-independent basins
- Channel and basin development
- Internal road, power, water, and utility infrastructure
- Common maritime assets and shared facilities
- Regional Shipbuilding Capability Centres for design, skilling, and technology support

Greenfield clusters are implemented through an **SPV structure**, involving Central and State Government agencies along with shipyard and private partners. While the SPV develops trunk infrastructure, individual shipyards focus on core production facilities, ensuring efficient risk sharing and governance.

For coastal states, greenfield shipbuilding clusters offer a transformational opportunity to anchor **port-led industrialisation**, generate large-scale employment, and position themselves as global shipbuilding hubs.

Together, brownfield and greenfield expansion under SBDS provide a comprehensive framework for accelerating India's shipbuilding growth while enabling coastal states to align infrastructure development with national maritime priorities.

6.7.Cluster-Based Approach: Concept, Relevance and Governance Imperatives

6.7.1. Concept and Rationale of a Maritime Industrial Cluster

A maritime industrial cluster is a geographically co-located ecosystem comprising **anchor shipyards, ancillary and supplier units, shared infrastructure, and supporting social and urban facilities**, planned and operated as an integrated whole. The core idea of the cluster approach is to move away from fragmented, stand-alone facilities towards a **shared-capacity, network-driven model** that enhances productivity, reduces costs, and accelerates capability development.

In the context of greenfield capacity creation, clustering allows multiple shipyards and ancillary units to leverage **common maritime frontage, breakwaters, dredging, utilities, testing facilities, and logistics infrastructure**, thereby improving capital efficiency and operational viability.

6.7.2. Relevance of Clusters in Achieving Capacity and Capability Targets

The cluster-based approach is critical for achieving national targets related to **shipbuilding, ship repair, and maritime industrial expansion** due to the following reasons:

- **Optimised Asset Utilisation:** High-cost marine infrastructure such as dry docks, heavy-lift cranes, waterfront access, and testing facilities can be shared across multiple players, improving utilisation and reducing duplication.
- **Scalable Capacity Creation:** Clusters allow phased expansion of yards and ancillaries, enabling rapid scaling of capacity in response to market demand.
- **Strengthening Domestic Value Chains:** Proximity of Tier 1, Tier 2, and Tier 3 suppliers supports localisation of components, reduces lead times, and enhances self-reliance.
- **Technology and Skill Upgradation:** Shared R&D centres, training institutes, and testing facilities accelerate technology absorption and workforce skilling.
- **Improved Global Competitiveness:** Integrated clusters reduce production costs, improve delivery timelines, and enhance quality standards, positioning Indian yards competitively in global markets.

By aggregating demand, skills, and infrastructure, clusters serve as **multipliers**, enabling faster and more sustainable achievement of sectoral growth targets.

6.7.3. Idea and Key Components of a Maritime Cluster

A well-functioning maritime cluster typically comprises the following components:

1. **Anchor Shipyard(s)**
Large shipbuilding and/or ship repair yards that act as demand generators and technology anchors for the cluster.
2. **Ancillary and Supplier Ecosystem**
Tier 1, Tier 2, and Tier 3 suppliers providing hull fabrication, machinery, electrical systems, coatings, outfitting, logistics, and specialised services.
3. **Common Cluster Facilities**
 - Shared dry docks and wet berths
 - Testing and certification facilities
 - R&D and design centres
 - Skill development and training institutes
 - Warehousing and logistics hubs
4. **Maritime and Connectivity Infrastructure**
 - Breakwaters, dredging, and navigational channels
 - Road, rail, and utility connectivity
 - Digital and communication infrastructure
5. **Trunk and Social Infrastructure**

- Housing, healthcare, education, and urban amenities
- Worker accommodation and transport systems

The integration of these elements ensures **operational efficiency, workforce stability, and long-term sustainability** of the cluster.

6.7.4. Importance of State Collaboration and Institutional Coordination

State collaboration is a **foundational requirement** for the success of maritime clusters, given the scale, complexity, and cross-sectoral nature of interventions involved. Effective cluster development requires:

- **Land Assembly and Zoning Support:** States play a key role in providing contiguous land parcels, coastal zoning approvals, and environmental clearances.
- **Infrastructure Provisioning:** Development of external connectivity, utilities, and social infrastructure largely falls within the State's mandate.
- **Policy Alignment and Incentives:** Harmonisation of central and state policies, fiscal incentives, and regulatory frameworks to improve investor confidence.
- **Single-Window Governance Mechanisms:** Coordinated approvals across departments to reduce timelines and transaction costs.
- **Public–Private Collaboration:** States act as facilitators, enabling private investment while ensuring long-term regional development objectives are met.

Strong Centre–State coordination ensures that clusters evolve not merely as industrial enclaves, but as **integrated maritime growth hubs** aligned with national strategic and economic priorities.

6.8. Maritime Infrastructure of Andhra Pradesh

Andhra Pradesh possesses one of the most strategically significant maritime ecosystems in India, underpinned by extensive port capacity, strong hinterland connectivity, and ongoing port-led industrial development. The State contributes **approximately 25% of India's existing port capacity**, positioning it as a critical node in national and regional maritime trade.

7. Port Infrastructure and Capacity

Andhra Pradesh has a well-distributed mix of major and non-major ports along its coastline:

- **1 Major Port:** Visakhapatnam Port
- **5 Operational Non-Major Ports**
- **4 Greenfield Ports under Construction**

The **operational port capacity exceeds 330 MMTPA**, driven by established ports such as:

- **Visakhapatnam (136 MMTPA)** – a diversified major port handling bulk, breakbulk, and containerized cargo

- **Krishnapatnam (98 MMTPA) and Gangavaram (64 MMTPA)** – key private ports supporting energy, minerals, and industrial cargo
- **Kakinada Deep Sea Port (26 MMTPA) and Kakinada Anchorage (4 MMTPA)** – catering to offshore, industrial, and captive requirements

In addition, greenfield port developments significantly enhance future capacity:

- **108+ MMTPA planned under Phase I**
- **Over 350 MMTPA envisaged under long-term Master Plans**
Key upcoming ports include **Ramayapatnam, Machilipatnam, and Mulapeta**, reinforcing Andhra Pradesh's long-term maritime growth trajectory.

The State ranks **2nd nationally in cargo handling at non-major ports**, with throughput of approximately **118 MMTPA**, reflecting strong private sector participation and operational efficiency.

Shipbuilding and Maritime Industrial Ecosystem

Andhra Pradesh hosts identified **existing shipyard locations**, supporting ship repair, offshore services, and marine fabrication activities. Proximity to ports, availability of coastal land, and industrial corridors provide strong potential for expansion into ship repair clusters and ancillary maritime manufacturing.

Hinterland Connectivity and Logistics

The maritime infrastructure is supported by robust surface connectivity:

- **Over 1.6 lakh km of road network**
- **More than 9,000 km of railway network**

This extensive connectivity enables seamless cargo evacuation from ports to industrial clusters, hinterland markets, and energy infrastructure, reinforcing Andhra Pradesh's role as a logistics gateway for eastern and southern India.

Strategic Significance

With its scale of port capacity, diversified cargo base, expanding greenfield developments, and strong hinterland linkages, Andhra Pradesh stands as a **cornerstone of India's port-led development strategy**, offering significant opportunities for infrastructure resilience, lifecycle asset management, and adoption of advanced maritime technologies.

7.1. Dugarajapatnam Maritime Cluster: Strategic Overview and Significance

The **Dugarajapatnam Maritime Cluster** is envisaged as a flagship, integrated maritime-industrial ecosystem for Andhra Pradesh, designed to position the State as a **global hub for shipbuilding, ship repair, and allied marine industries**. The project represents a shift from standalone port development toward **cluster-based, value-chain-driven maritime infrastructure**.

8. Project Scale and Investment Profile

- The cluster spans approximately **2,000 acres**, planned as an integrated **port–shipyard–industrial ecosystem**.
- An indicative investment of **₹29,254 crore (≈ USD 3.29 billion)** has been envisaged, reflecting the scale and long-term strategic importance of the project.
- The development is structured to support **large-scale shipbuilding**, heavy marine engineering, fabrication yards, and downstream industrial units.

9. Strategic Location and Connectivity

- Dugarajapatnam is located at the convergence of two major industrial corridors:
 - **CBIC (Chennai–Bengaluru Industrial Corridor)**
 - **VCIC (Visakhapatnam–Chennai Industrial Corridor)**
- This unique positioning provides direct access to manufacturing clusters, skilled labour pools, and domestic as well as export markets.
- Proximity to **Krishnapatnam Port** and **Nellore port facilities** strengthens multimodal logistics integration, enabling efficient movement of raw materials, project cargo, and finished vessels.

10. Planned Functional Components

The master plan indicates a clearly demarcated and integrated layout comprising:

- Dedicated **shipbuilding and ship repair zones**
- Port and marine infrastructure, including berths, docks, and turning basins
- Industrial and fabrication areas for marine equipment, steel processing, and ancillary units
- Logistics, storage, and utility zones
- Green buffers and environmental management areas to support sustainable development

This functional zoning enables **operational efficiency, scalability, and phased development**, while reducing inter-sectoral conflicts.

11. Economic and Industrial Impact

- The cluster is expected to act as a catalyst for:
 - Domestic shipbuilding capacity enhancement

- Import substitution in marine equipment and components
- Employment generation across skilled, semi-skilled, and ancillary sectors
- It aligns with national initiatives such as **Atmanirbhar Bharat, Make in India**, and India's ambition to emerge as a **global maritime manufacturing hub**.

12. Strategic Relevance for Asset Protection and Sustainability

Given the coastal and heavy-industrial nature of the cluster, long-term performance will depend on:

- Adoption of **high-performance anti-corrosion and antifouling systems**
- Lifecycle-based asset management for docks, jetties, yards, and utilities
- Integration of **environmentally compliant and durable coating technologies**

Overall, the Dugarajapatnam Maritime Cluster represents a **transformational maritime infrastructure initiative** for Andhra Pradesh, combining scale, connectivity, and industrial depth, while creating strong opportunities for technology adoption, sustainability, and global competitiveness.



Coastal State Workshop- Andhra Pradesh

Pillar 3- Maritime Training and Skilling

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1. Directorate General of Shipping (DGS) – Role & Responsibilities

The Directorate General of Shipping (DGS) is the central authority for merchant shipping in India, functioning under the Ministry of Ports, Shipping, and Waterways (MoPSW). It serves as the administrative and regulatory body responsible for ensuring the safe, efficient, and sustainable growth of the nation's maritime sector.

DGS plays a crucial role in upholding India's international maritime obligations while promoting the welfare of seafarers, the quality of maritime education, and the safety of shipping operations. Its mandate is aligned with both national maritime policies and global conventions, particularly those set by the International Maritime Organization (IMO).

Core Responsibilities of DGS

The responsibilities of the Directorate General of Shipping cover the entire lifecycle of maritime activity from training and certification of seafarers to regulation of shipping operations and safety oversight. These can be summarized as follows:

a) Safety of Life and Ships at Sea

- DGS ensures compliance with international conventions such as SOLAS (Safety of Life at Sea) and MARPOL (Marine Pollution Prevention).
- It implements policies and technical standards to safeguard life, property, and the marine environment.

b) Promotion of Maritime Education and Training

- DGS oversees the approval, regulation, and quality assurance of all Maritime Training Institutes (MTIs) in India.
- Works in coordination with the International Maritime Organization (IMO) to maintain STCW 2010 compliance for all training, certification, and watchkeeping activities.
- Promotes initiatives like digitalization of training records, e-governance for certification, and competency-based learning.

c) Regulation of Employment and Welfare of Seafarers

- DGS monitors crew recruitment and placement agencies, ensuring ethical practices and fair employment standards.
- Protects seafarers' rights under the Maritime Labour Convention (MLC 2006) and provides grievance redressal mechanisms.
- Supports welfare initiatives including medical fitness, repatriation, and financial security systems.

d) Development of Coastal Shipping and Augmentation of Shipping Tonnage

- Facilitates the growth of India's shipping fleet and supports coastal and inland waterway connectivity.
- Encourages public-private partnerships in shipbuilding, repair, and port-related logistics to enhance India's maritime self-reliance.

e) Examination and Certification of Merchant Navy Officers

- Conducts examinations and issues Certificates of Competency (CoCs) and Continuous Discharge Certificates (CDCs) through its e-governance platforms.
- Ensures the credibility and global acceptance of Indian seafarer qualifications.

f) Supervision of Allied Offices and Regional Authorities

- Oversees Maritime Boards, Mercantile Marine Departments (MMDs), and allied offices functioning across major coastal cities.

- Provides technical guidance, policy direction, and uniform regulatory enforcement nationwide.

Strategic Role and Global Importance

- DGS represents India in IMO deliberations, contributing to global policymaking on safety, training, and maritime environment.
- It drives the implementation of Maritime India Vision 2030, focusing on increasing India's share of global seafarers and enhancing training infrastructure.
- Acts as a nodal agency for integrating technology and transparency in maritime governance, including digital certification, automated approvals, and fraud prevention systems.

The Directorate General of Shipping is at the core of India's maritime framework combining regulation, development, safety, and human capital management under a unified authority. Through its regional presence and collaborative approach with state maritime boards and training institutions, DGS continues to ensure that India remains a trusted and globally recognized maritime nation, producing competent, ethical, and safety-oriented seafarers while fostering sustainable maritime growth.

2. Training Branch of the Directorate General of Shipping (DGS)

The Training Branch of the Directorate General of Shipping (DGS) is the regulatory, administrative, and quality assurance authority responsible for overseeing Maritime Training Institutes (MTIs) across India. Its core objective is to ensure that maritime education and training in India are of the highest quality, fully compliant with STCW (Standards of Training, Certification, and Watchkeeping) 2010 Convention, and aligned with International Maritime Organization (IMO) standards.

The branch manages the approval, accreditation, inspection, and monitoring of all MTIs while continuously improving systems of training delivery, assessment, and certification. It also plays a key role in ensuring transparency, technology adoption, and integrity within India's maritime training ecosystem.

Key Functions of the Training Branch

A. Administration of all Maritime Training Institutes (MTIs)

The DGS Training Branch is responsible for the approval and regulation of all maritime training institutions operating in India. Institutes must comply with STCW and DGS standards and Periodic inspections and audits for accreditation renewal. The objective is to ensure uniformity in training quality, ethical conduct, and global recognition of Indian seafarers. Oversight covers curriculum standards, infrastructure, faculty competence, and student welfare.

B. MTI Module (Digital Management System)

A dedicated online platform used by DGS for managing courses, records, faculty approvals, and student certifications. It ensures full digital tracking of training activity in compliance with

DGS norms and STCW standards. The existing system is being upgraded into a new, robust digital module with enhanced:

- Data handling capability,
- Integration with DGS e-governance systems, and
- Scalability for higher user volumes.

The upgraded system aims to resolve issues in data processing, usability, and interoperability, ensuring transparency and efficiency in MTI operations.

C. Continuous Improvement Programme (CIP)

MTIs are subjected to structured inspections and evaluations under the Continuous Improvement Programme (CIP). Conducted by Recognized Organizations (ROs) or Mercantile Marine Departments (MMDs) under a three-year inspection cycle, consisting of:

- Initial Inspection – before approval,
- Annual Inspections – for ongoing compliance, and
- Renewal Inspection – every three years for continued accreditation.

These inspections are carried out as per Quality Management System (QMS) guidelines to ensure institutes maintain consistent standards in infrastructure, teaching, and safety.

D. STCW Compliance Board

The STCW Compliance Board acts as a strategic advisory and governance body under DGS. It reviews Implementation of STCW standards, Compliance of MTIs with training quality norms, and Overall governance in maritime education. The Board meets bi-weekly to assess progress, address non-compliance, and recommend policy improvements. This mechanism ensures India's training system remains fully aligned with IMO conventions and global maritime benchmarks.

E. MTI Exit Examination & Ratings Exit Examination

The DGS Training Branch manages exit examinations for both officers and ratings to validate learning outcomes and competency levels. Several digital initiatives have been introduced to make the process efficient, transparent, and fair, including:

- Learning Management System (LMS): For online learning, progress tracking, and content delivery.
- Web-Based Simulator Assessments: To evaluate real-time decision-making and technical proficiency.
- Centralized Attendance System (CAS): Ensures authenticity in attendance and course completion.
- Faculty Development Programme (FDP): Regular capacity-building sessions for instructors to enhance pedagogy and compliance awareness.

These measures ensure that every candidate completing a course is assessed based on objective, technology-based evaluation systems, reinforcing integrity and consistency.

3. Rationale for the Coastal State Workshop

The Coastal State Workshop aims to strengthen coordination between central and state maritime authorities for capacity building, skill enhancement, and transparency in maritime

training and skilling. The workshop provides a platform to align Andhra Pradesh's maritime ecosystem with national objectives under the Maritime India Vision 2030 focusing on human resource development, ethical training, and employment generation through maritime and coastal sectors.

The slide presents the core rationale for this collaboration through six interlinked focus areas: seafaring expansion, trade strength, state advantage, skilling potential, collaborative governance, and national vision alignment.

1. Seafarers – From 12% to 20% Global Share

- India currently contributes approximately 12% of the global seafarer workforce, making it one of the top five seafaring nations in the world.
- The goal under Maritime India Vision 2030 is to increase this share to 20% by 2030 through quality training and youth engagement.
- Andhra Pradesh, with its long coastline and maritime awareness among youth, is well-positioned to contribute significantly to this national goal by promoting career pathways in seafaring and port-linked employment.

2. Trade and Coastal Strength

- Andhra Pradesh's strategic location on the east coast, with major ports like Visakhapatnam, Gangavaram, and Krishnapatnam, makes it a key contributor to India's maritime trade.
- The state's ports handle a significant portion of India's coastal and international cargo contributing to 95% of the nation's trade by volume.
- Expanding maritime training in the state will support the growing port and logistics ecosystem, providing skilled manpower for trade and coastal operations.

3. Strategic State Advantage

- Andhra Pradesh possesses strong maritime infrastructure — including ports, shipyards, and training institutions concentrated in Visakhapatnam and nearby coastal districts.
- This provides an opportunity to attract investments in shipbuilding, repair, and port-led skilling.
- By leveraging its coastal geography and industrial base, the state can become a regional maritime hub, supporting both national and international shipping needs.

4. Skilling Potential

- The state has immense potential to expand maritime skilling programs in line with DGS quality and compliance standards.
- Integration of Industrial Training Institutes (ITIs), state skill development programs, and DGS-approved maritime courses can create a seamless career pathway from basic vocational training to seafaring employment.
- This ensures inclusive skill development, reaching coastal youth and aligning with national competency frameworks.

5. Collaborative Governance

- The workshop emphasizes the creation of a joint DGS–APMB coordination framework (Andhra Pradesh Maritime Board) for governance and oversight.
- This collaboration will strengthen:
 - Transparency in training operations,
 - Digital oversight through e-governance systems, and
 - Ethical compliance in training, certification, and placement.
- The approach reflects the DGS’s policy of “Zero Tolerance for Fraud” and its mission to ensure accountable maritime administration at the state level.

6. National Vision Alignment

- The initiative supports the national objective under Maritime India Vision 2030 to build a competent, ethical, and globally employable maritime workforce.
- By aligning state-level initiatives with central regulatory frameworks, Andhra Pradesh can emerge as a model coastal state in maritime skilling and governance.
- This partnership strengthens India’s overall maritime competitiveness and contributes to blue economy development, sustainable growth, and job creation.

The Coastal State Workshop is a step toward harmonizing national and state maritime strategies. It focuses on building a transparent, skill-oriented, and future-ready maritime ecosystem that will empower youth, enhance employment, and reinforce India’s status as a global seafaring leader.

4. Vision and Focus Areas of the Directorate General of Shipping

1. National Alignment

DGS aims to align all state-level maritime skilling and training initiatives with national maritime visions — particularly the Maritime India Vision 2030 and the Maritime Amrit Kaal Vision 2047. This alignment seeks to create a unified national approach to maritime education, ensuring consistent standards, improved employability, and efficient governance across states. The objective is to enable coastal states such as Andhra Pradesh, Gujarat, Maharashtra, and Tamil Nadu to play a stronger role in building India’s maritime human capital under a shared developmental framework. By doing so, DGS contributes directly to India’s ambition of becoming a maritime superpower and global seafarer hub by 2047.

2. Transparency & Governance

DGS is committed to ensuring a corruption-free, transparent, and accountable maritime training system. Through the implementation of e-Governance, digital monitoring, and data-driven oversight, the Directorate enhances visibility across all Maritime Training Institutes (MTIs). Every stage from institute approval, student registration, faculty validation, to certification is managed through digital systems and real-time monitoring. This promotes accountability, fairness, and integrity while also reducing human intervention and administrative delays. The initiative aligns with DGS’s policy of “Zero Tolerance for Fraud” in training, certification, and placement.

3. Innovation & Collaboration

The DGS encourages a culture of innovation and collaboration to make India's maritime training globally competitive. It promotes industry-academia partnerships to ensure that training programs meet evolving technological and operational requirements of the shipping industry. These efforts help bridge the skill gap between classroom training and real-world shipboard operations, preparing seafarers for smart ships, automation, and green technologies.

4. Human Element & Ethics

DGS recognizes that the human element is the cornerstone of maritime safety, productivity, and global reputation. The focus is on developing not just technical competence but also ethical values, professional discipline, and emotional intelligence among seafarers. Initiatives include:

- Incorporating ethics and professionalism modules in training.
- Promoting crew welfare programs, mental health awareness, and fair treatment at sea.
- Encouraging diversity and inclusion within the maritime workforce.

By strengthening the human element, DGS ensures that Indian seafarers are technically skilled, morally grounded, and globally respected.

5. Workshop Objectives and Expected Coordination Mechanism

The Coastal State Workshop between the Directorate General of Shipping (DGS) and the Government of Andhra Pradesh is designed to strengthen maritime governance, enhance training quality, and promote employability through coordinated policy implementation. The workshop focuses on building a transparent, skill-oriented, and youth-driven maritime ecosystem that aligns with both national and international standards.

A key objective of the workshop is to reinforce integrity and compliance within the maritime training and certification framework. The initiative emphasizes zero tolerance toward malpractice and corruption by promoting digital governance, real-time oversight, and data-driven accountability. This approach aims to ensure that maritime education and certification systems operate with complete transparency, thereby safeguarding the credibility of India's seafarers and training institutions.

The workshop also aims to establish a joint institutional framework between DGS and the Government of Andhra Pradesh. This structured coordination mechanism will facilitate joint planning, monitoring, and implementation of maritime training and skilling initiatives. Through this collaboration, both agencies can align their efforts toward strengthening the maritime workforce and ensuring standardized governance across state and national levels.

Another critical focus area is career promotion and awareness. The workshop seeks to position the Merchant Navy as an aspirational career path, particularly for the youth in coastal districts. By conducting targeted awareness campaigns, counseling sessions, and outreach programs, the initiative intends to motivate young individuals to pursue maritime careers, thereby expanding the pool of skilled professionals from Andhra Pradesh.

In addition, the workshop underscores the need for global skill alignment by aligning state-level training programs with emerging international maritime standards and technologies. This will ensure that seafarers from Andhra Pradesh are equipped with globally relevant competencies, enabling them to compete effectively in the international shipping and logistics markets.

Finally, state-level collaboration forms the foundation of this initiative. The workshop encourages joint efforts between DGS, the Andhra Pradesh Maritime Board, and state skill

development institutions to promote awareness, youth engagement, and integration with national programs such as the Skill India Mission and Maritime India Vision 2030. By fostering this coordinated approach, the workshop aims to transform Andhra Pradesh into a model state for maritime skilling, ethical training, and sustainable employment generation.

6. Coordination between DGS and Andhra Pradesh State

The Directorate General of Shipping (DGS), under the Ministry of Ports, Shipping, and Waterways (MoPSW), is working toward establishing a structured coordination framework with the Government of Andhra Pradesh and the Andhra Pradesh Maritime Board (APMB). The objective of this collaboration is to strengthen maritime training, skilling, and institutional oversight across the state.

This framework aims to align Andhra Pradesh's maritime training infrastructure with national regulatory standards, promote ethical governance, and enhance the employability of seafarers through consistent quality assurance. Through a shared approach between central and state authorities, the collaboration will ensure that policy implementation, compliance monitoring, and training delivery are uniform, transparent, and future-ready.

1. Uniform Standards

One of the central objectives of the DGS–AP coordination framework is to ensure that all Maritime Training Institutes (MTIs) in Andhra Pradesh operate in accordance with nationally approved standards and DGS regulations. By bringing all training institutes under a standardized operational structure, DGS and APMB aim to maintain consistency in education quality, safety practices, and certification integrity. This step is crucial to ensure that seafarers trained in Andhra Pradesh are recognized globally for their competence and reliability.

2. Joint Monitoring

Another major component of this partnership is the development of a joint monitoring mechanism to enhance transparency and accountability. This mechanism will involve: Coordinated inspections of maritime training institutes, Data exchange and performance tracking through digital platforms, Regular review of institute compliance, student enrolment, and certification outcomes. By enabling real-time coordination between DGS and APMB, the system will help in maintaining uniform standards of safety, quality, and integrity in maritime training. This collaborative approach will also help identify gaps, improve responsiveness, and prevent irregularities at the institutional level.

3. Capacity Building and Awareness

The coordination framework between the Directorate General of Shipping (DGS) and the Andhra Pradesh Maritime Board (APMB) places significant emphasis on capacity building and awareness as a key pillar of collaboration. The objective is to ensure that maritime skilling and training initiatives effectively reach coastal youth, local communities, and aspiring seafarers across the state. To achieve this, both agencies are considering a series of joint initiatives such as specialized workshops, seminars, and training programs that disseminate knowledge on emerging technologies, maritime safety regulations, and global industry practices.

Additionally, faculty development programs will be conducted to enhance the teaching capabilities of instructors, ensuring that they remain up to date with the latest advancements in maritime education and shipboard operations. Parallel to this, awareness and outreach campaigns will be launched to motivate young individuals to explore seafaring as an aspirational career path, thereby expanding the local talent pool. Together, these efforts will contribute to building a skilled, informed, and ethically responsible workforce, capable of meeting both national and international maritime standards while fostering continuous improvement in education and training practices.

4. Integrity and Governance

At the core of the DGS–APMB collaboration lies a strong commitment to integrity and transparent governance within the maritime training ecosystem. Both organizations share a vision of creating a corruption-free and accountable system that upholds the credibility and global reputation of India’s seafarers. The framework focuses on preventing fraudulent practices in key processes such as training admissions, examinations, and certification issuance by instituting strict regulatory oversight and digital monitoring mechanisms.

To strengthen transparency, real-time digital oversight systems will be introduced to track institutional performance, compliance, and student progression across all Maritime Training Institutes (MTIs). Moreover, comprehensive accountability frameworks will ensure that every stage from student registration to final certification is verifiable, standardized, and compliant with DGS’s national quality norms. These governance measures are aligned with DGS’s broader goal of enforcing zero tolerance toward malpractice and cultivating a culture of trust, fairness, and professionalism across all maritime training and certification processes in Andhra Pradesh.

7. Integration of ITI Ecosystem with Maritime Training

The integration of the Industrial Training Institute (ITI) ecosystem with maritime training represents a major step toward expanding the maritime talent pipeline and promoting inclusive skill development in coastal regions of Andhra Pradesh. The initiative focuses on creating a structured interface between vocational education and maritime skilling, ensuring that coastal youth gain access to specialized training that can lead to sustainable and globally recognized career opportunities in the maritime sector.

The first aspect of this integration involves the introduction of maritime-focused modules within ITIs. By incorporating subjects such as basic seamanship, marine safety, welding, and electrical maintenance, students can develop foundational maritime competencies while pursuing their regular vocational education. This approach not only broadens their career prospects but also makes maritime skilling more accessible at the community level, particularly in the state’s coastal districts.

Equally important is the creation of career pathways that allow students to seamlessly transition from general vocational programs to DGS-approved maritime courses. Structured linkages between ITI curricula and maritime training institutes will enable students to move from entry-level technical trades to specialized roles in seafaring, port operations, and logistics. This pathway-based model will enhance employability by providing clear and progressive routes into maritime professions.

The framework also highlights the need for faculty development and standardization. Dedicated orientation and capacity-building programs for ITI instructors will ensure that teaching practices, course materials, and assessment methods align with DGS’s quality assurance and competency standards. This alignment will maintain uniform training quality and prepare students to meet both national and international maritime skill requirements.

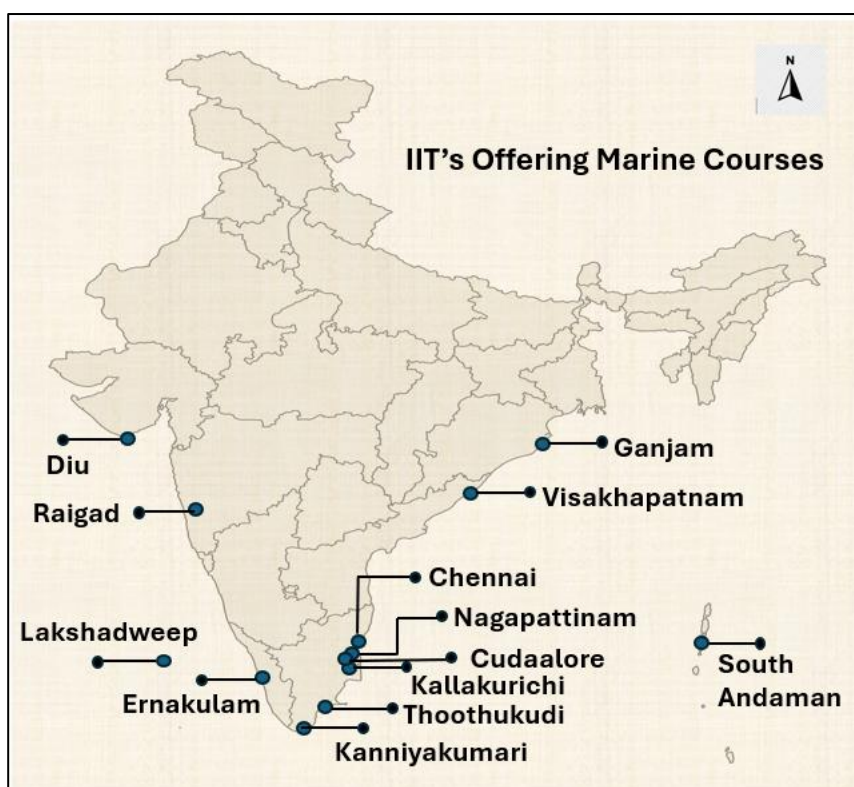


Fig: IIT's offering Marine Courses

The integration of the ITI ecosystem with maritime training aims to introduce maritime-focused modules in ITIs, create clear career pathways into seafaring and port-related roles, and align teaching standards with DGS guidelines. Through coordination between DGS, AP Maritime Board, and APSSDC, the initiative enhances faculty capacity, ensures curriculum alignment, and enables coastal youth to access industry-relevant maritime careers.

To ensure effective governance, state–central coordination will play a key role. Collaboration between the Andhra Pradesh State Skill Development Corporation (APSSDC), the Andhra Pradesh Maritime Board (APMB), and the Directorate General of Shipping (DGS) will help harmonize curriculum design, certification standards, and policy execution. This joint framework will facilitate consistent training outcomes and ensure that the maritime skilling ecosystem operates under a unified national standard.

Ultimately, the outcome and impact of this initiative will be far-reaching. By integrating ITIs into the maritime training ecosystem, coastal youth will gain access to affordable and industry-relevant skill development programs. This will improve local employability, foster entrepreneurship in maritime trades, and significantly enhance India's contribution to the global seafarer pool. The initiative represents a powerful example of how state-level vocational systems can align with national maritime goals to drive inclusive growth and sustainable employment.

Sr. No.	District Name	Name	Name Of Course	Duration	Entry Qualification	NSQF LEVEL	Seating Capacity	Enrolment (2024-25)
1.	SOUTH ANDAMANS, Andaman And Nicobar Islands	Government Industrial Training Institute	Marine Engine Fitter (NSQF)	1 Year	10 th Passed	3.5	20	20
			Marine Fitter (NSQF)	2 Years	10 th Passed	4	40	20
			Vessel Navigator (NSQF)	2 Years	10 th Passed	4	40	20
2.	VISAKHAPATNAM, Andhra Pradesh		Marine Fitter (NSQF)	2 Years	10 th Passed	4	20	20

		Central Institute of Fisheries Nautical Engg. Training Unit	Vessel Navigator (NSQF)	2 Years	10 th Passed	4	20	20
3.	ERNAKULAM, Kerala	Central Institute of Fisheries Nautical and Engineering Training	Marine Fitter (NSQF)	2 Years	10 th Passed	4	20	20
			Vessel Navigator (NSQF)	2 Years	10 th Passed	4	20	20
4.	LAKSHADWEEP DISTRICT, Lakshadweep	Dr B R Ambedkar ITI	Marine Engine Fitter (NSQF)	1 Year	10 th Passed	3.5	40	40
5.	RAIGAD, Maharashtra	Anjumane Waseeul Taleem Edu.Trust Raigad	Marine Fitter (NSQF)	2 Years	10 th Passed	4	20	20
6.	GANJAM, Odisha	Govt Industrial Training Institute, Berhampur	Marine Engine Fitter (NSQF)	1 Year	10 th Passed	3.5	60	20
7.	CHENNAI, Tamil Nadu	Central Institute Of Fisheries Nautical & Engineering Training Institute	Marine Fitter (NSQF)	2 Years	10 th Passed	4	20	20
			Vessel Navigator (NSQF)	2 Years	10 th Passed	4	20	20
8.	CUDDALORE, Tamil Nadu	Government Industrial Training Institute, Cuddalore	Marine Engine Fitter (NSQF)	1 Year	10 th Passed	3.5	40	40
9.	KALLAKURICHI, Tamil Nadu	Government Industrial Training Institute, Sankarapuram	Marine Engine Fitter (NSQF)	1 Year	10 th Passed	3.5	40	38
10.	KANNIYAKUMARI, Tamil Nadu	Government Industrial Training Institute, Nagercoil	Marine Engine Fitter (NSQF)	1 Year	10 th Passed	3.5	40	37
11.	NAGAPATTINAM, Tamil Nadu	Government Industrial Training Institute, Nagapattinam	Marine Engine Fitter (NSQF)	1 Year	10 th Passed	3.5	40	21
12.	THOOTHUKKUDI, Tamil Nadu	Government Industrial Training Institute, Thoothukudi	Marine Engine Fitter (NSQF)	1 Year	10 th Passed	3.5	40	25
13.	THOOTHUKKUDI, Tamil Nadu	Govt. ITI, VEPPALODAI	Marine Engine Fitter (NSQF)	1 Year	10 th Passed	3.5	40	28
14.	DIU, The Dadra And Nagar Haveli And Daman And Diu	Govt Industrial Training Institute, Ghoghala	Marine Engine Fitter (NSQF)	1 Year	10 th Passed	3.5	20	18

8. Pathways to Join the Merchant Navy

India offers multiple entry routes into the Merchant Navy, depending on a candidate's academic qualification, aptitude, and area of interest. These pathways are regulated and approved by the Directorate General of Shipping (DGS) to ensure global standards of competency and safety.

1. After 10th Standard – GP Rating Route

- Course: General Purpose (GP) Rating Course – 6 months
- Eligibility: Minimum 10th pass with 40% aggregate marks and 40% in English. Age 17.5–25 years.
- Training Focus: Basic seamanship, firefighting, first aid, survival techniques, and engine room safety.
- Career Path:
 - Starts as an Ordinary Seaman (Deck) or Wiper (Engine) on board.

- Gains sea-time experience and can appear for Certificate of Competency (CoC) exams to become an Able Seaman, Bosun, and later Officer, through DGS-approved progression pathways.

2. After 12th (Science Stream) – Officer Cadet Route

A. Deck Cadet (Navigating Officer Pathway)

- Course Options:
 - B.Sc. in Nautical Science (3 years, IMU/DGS approved)
 - Diploma in Nautical Science (DNS) leading to B.Sc. (Applied Nautical Science)
- Eligibility: 10+2 with PCM (Physics, Chemistry, Math) – minimum 60% aggregate and 50% in English.
- Career Path:
 - Starts as Deck Cadet, progresses to Third Officer, Second Officer, Chief Officer, and ultimately Master (Captain) after clearing DGS/IMO competency exams.

B. Engine Cadet (Marine Engineering Pathway)

- Course Options:
 - B.Tech in Marine Engineering (4 years, IMU/DGS approved)
 - Graduate Marine Engineering (GME) – 1-year pre-sea course for Mechanical Engineers.
- Eligibility: 10+2 with PCM, 60% aggregate or a degree in Mechanical/Marine Engineering.
- Career Path:
 - Starts as Junior Engineer (JE), advances to Fourth Engineer, Third Engineer, Second Engineer, and finally Chief Engineer after qualifying DGS/IMO competency exams.

3. After Diploma – Lateral Entry Route

- For Deck Side: Diploma holders (Nautical or Marine streams) can apply for DNS or B.Sc. Nautical Science through entrance exams like IMU-CET.
- For Engine Side: Diploma in Mechanical/Marine/Shipbuilding Engineering holders may join Second Year of Marine Engineering (Lateral Entry) in DGS-approved institutes.
- Provides a fast-track route for technically skilled students into shipboard careers.

4. After Degree – Specialized Technical Roles

A. Electro-Technical Officer (ETO)

- Course: 4 months Pre-Sea ETO Course (DGS approved)

- Eligibility: B.E./B.Tech. in Electrical, Electronics, Instrumentation, or equivalent disciplines.
- Career Path:
 - Joins ship as Trainee ETO, responsible for automation, power systems, and electrical maintenance.
 - Progresses to Senior ETO or Chief Electrical Engineer on board.

B. Graduate Marine Engineer (GME)

- Course: 1-year Pre-Sea GME Course (for Mechanical or Naval Architecture graduates).
- Career Path:
 - Joins as Trainee Marine Engineer, progresses through ranks to Chief Engineer with sea-time experience and competency exams.

5. Medical & Regulatory Requirements

- All candidates must undergo a medical fitness test as per DGS and STCW 2010 standards, certified by DGS-approved medical practitioners.
- Must possess an INDOS Number and Continuous Discharge Certificate (CDC) issued by DGS before sailing.

Education Level	Entry Route	Initial Position	Progression
10th	GP Rating	Ordinary Seaman / Wiper	Bosun / Officer
12th (PCM)	Deck Cadet / Engine Cadet	Deck/Engine Cadet	Master / Chief Engineer
Diploma	Lateral Entry (Deck/Engine)	Cadet / Junior Engineer	Officer / Engineer
B.E./B.Tech	ETO / GME	Trainee ETO / Engineer	Senior ETO / Chief Engineer

- Andhra Pradesh can integrate maritime career awareness in coastal schools and ITIs.
- Establish DGS-approved pre-sea training centers to enable local youth to enter these pathways.
- Promote the Merchant Navy as an aspirational and globally employable career contributing to India's maritime growth.

9. Basic Courses for Entry into the Merchant Navy

Before joining a ship, every seafarer irrespective of department or rank must complete five mandatory Basic Safety Courses prescribed under the Standards of Training, Certification and Watchkeeping (STCW) Convention, 1978 as amended in 2010.

These courses are recognized globally and regulated in India by the Directorate General of Shipping (DGS) through approved Maritime Training Institutes (MTIs). Their purpose is to ensure that every person working at sea possesses the basic skills, safety awareness, and emergency response competence required for shipboard life.

List of the Five Mandatory STCW Basic Courses

Sr. No.	Course Name	Typical Duration	Training Focus	Purpose / Outcome
1	Personal Survival Techniques (PST)	3 Days	- Survival at sea, personal life-saving appliances. - Donning life jackets, launching life rafts. - Actions in case of ship abandonment, rescue signals.	Enables seafarers to survive at sea in emergencies, handle life-saving appliances, and respond during distress situations.
2	Fire Prevention and Fire Fighting (FPFF)	5 Days	- Fire chemistry and causes. - Prevention methods, fixed and portable firefighting systems. - Practical firefighting drills in simulated conditions.	Trains seafarers to prevent, control, and extinguish onboard fires safely and effectively.
3	Elementary First Aid (EFA)	3 Days	- CPR, bleeding control, burns, fractures, shock management. - Use of first aid kits and onboard medical procedures.	Equips trainees to provide immediate medical care during onboard medical emergencies.
4	Personal Safety and Social Responsibilities (PSSR)	3 Days	- Safe working practices, teamwork, communication, pollution prevention, social conduct onboard.	Builds awareness of safe behavior, discipline, teamwork, and human relations aboard ship.
5	Security Training for Seafarers with Designated Security Duties (STSDSD)	2 Days	- ISPS Code awareness, threat identification, ship security duties, emergency response.	Prepares seafarers to recognize and respond to security threats and comply with ISPS Code requirements.

Reference: DGS Circular 12 /20

Title: Implementation of e-Governance and Standardization of Maritime Training Courses, Basic Safety and GP Rating Courses.

Key Provisions:

- Standardizes Basic STCW Safety Courses and GP Rating Course structure across all DGS-approved Maritime Training Institutes (MTIs).
- Mandates digital registration, attendance, and assessment through the DGS e-Governance portal to prevent malpractice.

- Ensures uniform curriculum, practical training standards, and certification format nationwide.
- Requires candidates to obtain an INDOS Number before course enrollment.
- Completion of these courses is compulsory for the issue of the Continuous Discharge Certificate (CDC) and eligibility to serve on ships.

Importance of Basic Courses

- These courses are the foundation for every seafarer's professional competency.
- They ensure that all individuals joining ships are trained in:
 - Emergency preparedness and response
 - Survival, safety, and first aid
 - Fire prevention and firefighting
 - Workplace discipline and social conduct
 - Ship security awareness and compliance

Training & Certification Process

- Conducted only in DGS-approved Maritime Training Institutes (MTIs) listed on the DGS website.
- Trainees must attend all sessions and pass both theory and practical assessments.
- Upon successful completion, the MTI uploads data to the DGS e-Governance portal, and a Course Completion Certificate is generated digitally.
- The candidate's details are linked to their INDOS Number — the unique identification for all Indian seafarers.

Typical Course Duration Summary

Course	Duration
Personal Survival Techniques (PST)	3 Days
Fire Prevention & Fire Fighting (FPFF)	5 Days
Elementary First Aid (EFA)	3 Days
Personal Safety & Social Responsibilities (PSSR)	3 Days
Security Training for Seafarers with Designated Security Duties (STSDSD)	2 Days
Total Duration (Full Set)	16 Days

Outcome for Seafarers

- The trainee becomes eligible for employment on merchant vessels.
- Can apply for INDOS and CDC through DGS.
- Gains the fundamental safety and survival competence required under international maritime law.

10. Skill Development and Training for Safe Operations

Safety is the cornerstone of all maritime operations. In the complex and high-risk environment of ships, well-trained and safety-conscious seafarers form the first line of defence against accidents, operational failures, and environmental hazards.

The Directorate General of Shipping (DGS) emphasizes skill-based maritime training that fosters a strong safety culture, technical proficiency, and human reliability ensuring that Indian seafarers continue to meet global standards of competence and integrity.

Importance of Safety Culture

The maritime profession demands adherence to the highest levels of safety awareness, discipline, and teamwork. Safety culture is not limited to compliance; it represents a mindset where every seafarer values safety as a shared responsibility. A strong safety culture helps in,

- Prevent accidents and human errors.
- Ensure operational reliability and efficiency.
- Protect human life, marine environment, and ship assets.
- Promote confidence among shipowners and international employers regarding Indian seafarers.

Components of a Competent Seafarer

A competent seafarer is defined by a balanced combination of qualification, practical experience, and verified skill. Six essential components form the framework of maritime competence:



- **Qualification:** Academic and professional eligibility as per DGS and STCW norms.
- **Training:** Structured pre-sea and post-sea education that builds operational readiness.
- **Examination:** Objective assessment and oral/written tests for evaluating applied knowledge.
- **Sea Service:** Hands-on experience on board vessels, essential for real-world learning.
- **Certification:** Official recognition of competence issued by DGS under global standards.
- **Medical Fitness:** Physical and mental fitness ensuring ability to perform safely at sea.

Together, these elements create a reliable, skilled, and safety-conscious maritime professional.

Continuous Skill Upgradation

Competence in the maritime sector is dynamic — it requires constant renewal and adaptation. To maintain operational readiness and safety, DGS mandates a continuous cycle of refresher, revalidation, and advanced training programs.

Regular Refresher and Revalidation

- Conducted as per **STCW Convention and DGS regulations**, typically every five years.
- Ensures all seafarers remain current with updated safety standards and procedures.

Advanced Specialized Training

- Includes Advanced Fire Fighting, Proficiency in Survival Craft & Rescue Boats (PSC&RB), and Tanker Familiarization Courses.
- Prepares seafarers for advanced responsibilities and vessel-specific operations.

Competency-Based and Simulation Training

- Focuses on practical decision-making and situational awareness using simulators and digital assessment systems.
- Builds real-time operational skills beyond theoretical learning.

Adaptation to Emerging Technologies

- Expands knowledge in alternate fuels (LNG, Methanol, Hydrogen), automation, and cyber safety.
- Keeps Indian seafarers future-ready as the maritime industry transitions to greener and smarter technologies.

Such initiatives would enhance both employability and the reputation of Indian seafarers in the global market.

Core Seafarer Skill Areas for Safe Operations

A. Personal Safety & Emergency Response

- Training in Personal Survival Techniques (PST), including survival at sea, distress signals, and use of life-saving appliances.
- Awareness of emergency evacuation procedures, muster duties, and use of safety gear.

B. Fire Safety

- Training through Fire Prevention and Fire Fighting (FPFF) modules to manage onboard fire risks.
- Practical exposure to fire drills, firefighting equipment handling, and use of breathing apparatus.

C. First Aid and Health Preparedness

- Basic and advanced First Aid training (EFA) to handle medical emergencies.
- Focus on CPR, burns, fractures, shock management, and infection prevention onboard.

D. Safe Working Practices

- Personal Safety and Social Responsibilities (PSSR) course to inculcate discipline, hygiene, teamwork, and social responsibility.
- Familiarization with safe use of machinery, tools, and protective equipment (PPEs).

E. Security and Environmental Safety

- Training on shipboard security duties (STSDSD) and awareness of the ISPS Code.
- Emphasis on pollution prevention, MARPOL compliance, and sustainable operations.

Continuous Skill Upgradation

Maritime safety is an evolving field; skills must be updated regularly to match new technologies and regulations. DGS mandates Refresher and Revalidation Courses at specific intervals for key certifications such as:

- STCW Basic Courses.
- Advanced Fire Fighting and Proficiency in Survival Craft (PSC&RB).
- Tanker Familiarization and Ship Security courses.

Continuous training ensures:

- Updated knowledge of international conventions (SOLAS, MARPOL, STCW).
- Readiness for emergency response under modern shipboard systems.
- Maintenance of valid certification for global employability.

Emerging Training Trends

- Integration of simulation-based learning, virtual reality (VR), and smart assessment systems in safety training.
- Adoption of competency-based training (CBT) to measure skill proficiency rather than theory alone.
- Inclusion of new safety modules on alternate fuels (LNG, Methanol, Hydrogen), automation, and cyber safety.
- Collaboration between DGS, Indian Maritime University (IMU), and MTIs to standardize advanced training content.

Role of Andhra Pradesh

Andhra Pradesh, being a prominent coastal state, can serve as a regional hub for safety and skill training by:

- Encouraging DGS-approved training centres in Andhra Pradesh.
- Integrating maritime safety modules in ITIs and skill universities.
- Promoting state-supported refresher programs and seafarer awareness drives.

11. Emerging Areas in Maritime Skilling

The global maritime industry is undergoing rapid transformation driven by technological innovation, decarbonization, and digitalization. To stay globally competitive and compliant with international regulations, seafarers must acquire new skillsets that go beyond traditional seafaring competencies.

The Directorate General of Shipping (DGS) is prioritizing the integration of these emerging domains into the Indian maritime training ecosystem to ensure the development of a future-ready and sustainable workforce.

Technology-Driven Training

a) Simulator-Based Learning

- Modern training institutes are equipped with full-mission ship simulators, engine room simulators, and cargo handling simulators.
- These simulate real-time operational scenarios such as:
 - Navigation in congested waters.
 - Engine breakdown handling.
 - Emergency decision-making.
- Simulators allow risk-free experiential learning, enhance situational awareness, and improve response under stress.

b) Digital Competency

- As ship operations become more digital, seafarers need to be trained in:
 - Electronic chart display and information systems (ECDIS).
 - Voyage planning software.
 - Shipboard management systems (SMMS).
- Training now includes digital literacy, data handling, and understanding of automated alert and control systems.

Skilling for Green and Alternate Fuels

The International Maritime Organization (IMO) has set targets to reduce greenhouse gas emissions from ships by at least 50% by 2050. This transition is pushing the industry toward low- and zero-emission fuels, requiring new operational competencies.

a) LNG (Liquefied Natural Gas)

- Growing number of vessels are now LNG-fueled.
- Requires specialized training in:
 - LNG bunkering safety.
 - Cryogenic handling.
 - Vapour pressure management.
- STCW now includes LNG tanker familiarization and advanced training modules.

b) Methanol and Ammonia

- These alternative fuels are gaining ground as low-emission propulsion options.
- Operators and engineers must understand:
 - Fuel handling protocols.
 - Corrosive and toxic properties.
 - Emergency measures and risk mitigation.

c) Hydrogen

- Still in pilot stage but expected to scale in future.
- Training includes awareness of:
 - Hydrogen storage and containment systems.
 - Flammability risk.
 - Specialized firefighting and ventilation systems.

The Need for Curriculum Modernization

- Maritime Training Institutes (MTIs) are being encouraged to:
 - Upgrade simulation labs and digital training infrastructure.
 - Include modules on green shipping, automation, and cybersecurity.
 - Partner with industry and classification societies for curriculum innovation.
- DGS, IMU, and global bodies like IMO are collaborating to standardize emerging skill modules within existing STCW and non-STCW courses.

The maritime workforce of tomorrow must be digitally fluent, environmentally aware, and technically agile. Investing in emerging skilling areas today will secure India's position as a global supplier of next-generation seafarers and align with international climate and technology goals.

12. Transparency and Zero Tolerance for Fraud

Directorate General of Shipping's (DGS) commitment to maintaining transparency, accountability, and integrity within the maritime training and certification ecosystem. It reinforces the message of "Zero Tolerance for Fraud" in all processes from admission in Maritime Training Institutes (MTIs) to certification and placement of seafarers. The initiative ensures that every grievance or irregularity is addressed promptly, transparently, and through a structured redressal mechanism.

Framework for Issue Resolution

The top section presents a step-by-step mechanism for handling complaints, queries, or reports of fraudulent activities within the maritime training system.

Step	Description
Raising Issue	Any candidate, seafarer, or stakeholder can report concerns through Call, SMS, or WhatsApp directly to the official DGS helpline.

Helpline Support	A dedicated helpline (09:00 AM – 06:00 PM) operates to provide immediate assistance and register issues.
Escalation Mechanism	Unresolved or critical cases are escalated to appropriate officials for investigation and resolution under DGS protocols.
Follow-up and Guidance	Continuous follow-up communication ensures the complainant receives correct information and procedural guidance.
Analysis & Correction	Each issue is reviewed for root cause analysis, corrective action, and prevention of recurrence — reinforcing transparency.

This structured approach reflects a responsive and citizen-centric governance model aimed at improving trust and efficiency in maritime administration.

Promoting Awareness through Social Media

The lower section showcases efforts to increase awareness among seafarers and the public through official social media campaigns led by DGS and the Directorate General of Maritime Administration.

These visuals emphasize:

- Authenticity in training: Promoting enrollment only in DGS-approved institutes.
- Public outreach: Informing youth about minimum eligibility criteria and legitimate pathways to join the Merchant Navy.
- Event participation: Showcasing DGS’s role in national maritime initiatives such as the Maritime India Conference & Expo and Sagarmala.
- Leadership communication: Highlighting guidance from DGS officials in building a transparent training ecosystem.
- Official helpline promotion: Ensuring trainees and parents know how to verify information or report fraud directly.

Social media platforms are being effectively used to educate, warn, and empower candidates, discouraging the use of unapproved agents or unauthorized training centres.

This initiative embodies the “Transparent Governance, Safe Training” approach of the Directorate General of Shipping.

It ensures:

- Every seafarer or trainee has direct access to official communication channels.
- Fraudulent activities are identified, investigated, and eliminated swiftly.
- Awareness is spread widely through digital media and institutional outreach.
- The integrity of India’s maritime training system remains trusted and globally respected.

The Directorate General of Shipping’s focus on transparency, vigilance, and public awareness protects aspiring seafarers from misinformation and fraudulent practices. Through structured grievance redressal, continuous monitoring, and proactive communication, DGS upholds its mission to build a credible, ethical, and compliant maritime training ecosystem for India.

13. Expected Outcomes and Way Forward

Expected Outcomes of the Workshop

The Directorate General of Shipping (DGS), in collaboration with the Government of Andhra Pradesh, envisions this workshop as a platform to establish a shared roadmap for maritime skilling, training quality, and institutional integrity in the state. The discussions and stakeholder inputs are expected to result in actionable outcomes that strengthen both governance and employability in the maritime sector.

Roadmap for Maritime Skilling in Andhra Pradesh

- The workshop aims to define a state-specific maritime skilling strategy, aligning Andhra Pradesh's initiatives with national frameworks such as the Maritime India Vision 2030 and the Blue Economy Policy.
- It will identify priority areas for skill development including port operations, shipbuilding, marine engineering, and seafaring to create a pipeline of trained professionals from the state.
- Special emphasis will be given to the integration of ITIs and state skilling institutions with DGS-approved maritime training, ensuring career pathways for coastal youth.

Framework for a Transparent and Corruption-Free Training Ecosystem

- The workshop seeks to reinforce zero tolerance for fraudulent practices in training, certification, and placement.
- A coordination framework between DGS and the Andhra Pradesh Maritime Board (APMB) will be proposed for:
 - Regular inspection and digital monitoring of Maritime Training Institutes (MTIs).
 - Transparent communication through helplines, grievance redressal mechanisms, and awareness campaigns.
 - State-level oversight to ensure strict compliance with DGS regulations and ethical standards.
- This will ensure that the training ecosystem remains credible, transparent, and globally trusted.

Enhanced Compliance and Employability

- Institutes in Andhra Pradesh will be encouraged to achieve higher levels of compliance through digital integration, quality management systems, and adherence to DGS circulars.
- Collaboration with industry partners and international employers will enhance exposure and ensure training relevance to evolving global maritime standards.
- The outcome will be better employability of trainees, making Andhra Pradesh a recognized source of competent, ethical, and job-ready seafarers.

Conclusion and Way Forward

A. Strengthening DGS–State Collaboration

The workshop underlines the need for continued partnership between DGS and the Andhra Pradesh Maritime Board (APMB) in implementing the recommendations derived from the discussions. A joint working mechanism will be explored for:

- Planning and monitoring maritime skilling initiatives.
- Aligning state policies with DGS’s national regulatory framework.
- Facilitating data sharing, joint audits, and digital training oversight.

This partnership will ensure coordinated and transparent development of maritime human resources in the state.

B. Human Element and Ethical Training

- The session reaffirms the importance of the human element in maritime safety and operations, as emphasized by IMO and DGS.
- Effective training must not only develop technical competence but also nurture ethical values, discipline, and a safety-first mindset.
- The goal is to build seafarers who are technically proficient, responsible, and globally respected.

C. Technology Integration and Future Readiness

- The way forward involves incorporating emerging technologies such as simulation-based learning, digital competency, automation, and green fuel operations into maritime skilling programs.
- The state can collaborate with DGS to establish centres of excellence in maritime innovation and safety training, ensuring readiness for new regulatory and technological demands.

D. Long-Term Vision

The workshop is not a one-time event but a step toward establishing Andhra Pradesh as a model coastal state for maritime skilling, safety, and ethical governance. With DGS’s technical leadership and the state’s institutional support, this collaboration will contribute significantly to India’s mission of building a competent, transparent, and globally employable seafaring workforce.



Coastal State Workshop- Andhra Pradesh

Pillar 4- Maritime Crewing and Employment Opportunities

Overview of the Maritime Industry in Andhra Pradesh

Andhra Pradesh, with its 1,053 km coastline, stands as one of India's most strategically located maritime states. Its major and non-major ports — including Visakhapatnam, Gangavaram, Krishnapatnam, and Kakinada — act as vital economic gateways, driving cargo movement, ship repair, and offshore logistics.

With a strong maritime tradition and an enabling ecosystem, a growing number of youths from Andhra Pradesh are pursuing promising careers as seafarers, contributing to India's global reputation as a leading supplier of skilled maritime professionals. The state has already produced 39,399 seafarers as of June 2024. As the state continues to strengthen its maritime footprint, it becomes crucial to further enhance the image of seafaring as a safe, respected, and rewarding profession.

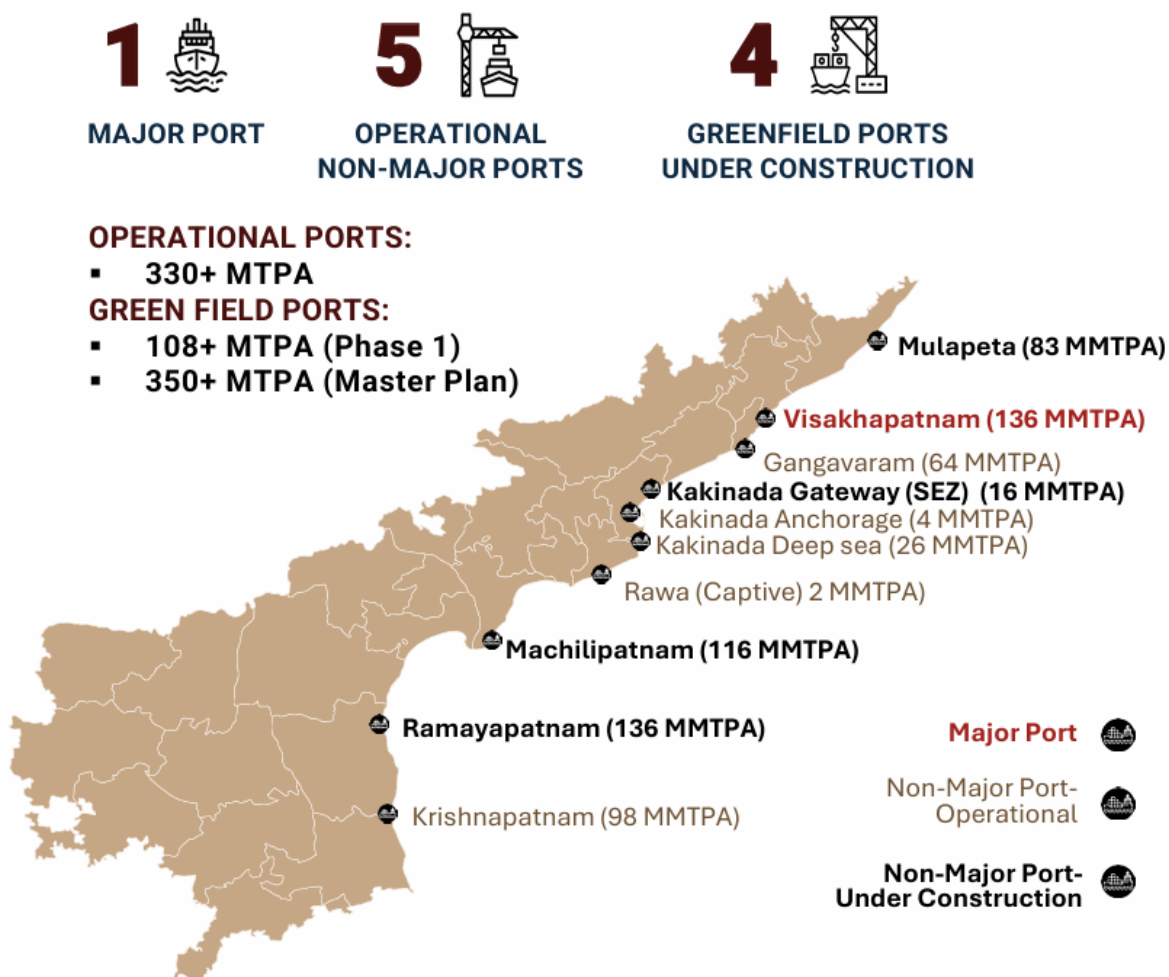
By promoting ethical recruitment practices, regulating crewing agencies, and prioritizing seafarer welfare, Andhra Pradesh can ensure transparency, fairness, and long-term career satisfaction in the sector. In addition, initiatives to promote mental well-being, inclusivity, and family support systems can help address the challenges of life at sea. Through these efforts, the state can set a benchmark in building a vibrant, secure, and aspirational maritime workforce that supports both regional prosperity and national growth.

12.1. What Andhra Pradesh Offers

12.1.1. Ports in Andhra Pradesh

Andhra Pradesh is emerging as a major maritime hub on India's east coast. The state hosts one major port Visakhapatnam, one of the country's largest and several non-major ports such as Gangavaram, Krishnapatnam, Kakinada, and Ramayapatnam, which together handle a diverse range of bulk, liquid, and container cargo. With a combined capacity exceeding 350 million tonnes per annum, these ports form the backbone of Andhra Pradesh's economy, driving trade, logistics, ship repair, and offshore operations.

New greenfield ports at Ramayapatnam, Bhavanapadu, and Machilipatnam, along with industrial corridors and inland waterways integration, are set to further strengthen the state's maritime infrastructure. Supported by the Andhra Pradesh Maritime Board's vision of **“a port every 50 km”**, the state is positioning itself as a gateway for global trade and blue economy growth on India's eastern seaboard.



Category	Key Ports	Description
Major Port	Visakhapatnam Port	One of India's largest and most diversified ports; handles bulk, liquid, and container cargo; also a ship repair and cruise tourism hub.
Non-Major Private Ports	Gangavaram, Krishnapatnam, Kakinada Deep Water, Kakinada Anchorage	High-capacity ports with world-class facilities for cargo handling and logistics integration.
Upcoming Greenfield Ports	Ramayapatnam, Machilipatnam, Kakinada Gateway, Mulapeta	Under development to expand state maritime capacity.

12.1.2.MMDs in Andhra Pradesh

MMD Visakhapatnam

The **Mercantile Marine Department (MMD), Visakhapatnam**, functions under the **Directorate General of Shipping (DGS)**, Ministry of Ports, Shipping and Waterways. It serves as the **primary maritime regulatory office for India's eastern coast**, covering northern coastal Andhra Pradesh and parts of Odisha.

MMD Visakhapatnam oversees **ship surveys and inspections**, ensuring compliance with international maritime conventions such as **SOLAS, MARPOL, and Load Line**. It is also responsible for **seafarer examinations and certification (CoC and CoP)**, **registration of vessels**, and **investigation of marine accidents**. The department plays a pivotal role in monitoring **Maritime Training Institutes (MTIs)** within its jurisdiction to ensure adherence to DGS safety and competency standards.

Administratively, the office operates under the supervision of the **Principal Officer, MMD Chennai**, to implement DGS policies on ship and personnel safety. Led by a **Surveyor-in-Charge** and supported by a technical and administrative team, MMD Visakhapatnam acts as a **key interface between seafarers, training institutes, and shipowners**, maintaining regulatory integrity and operational safety across the region's maritime ecosystem.

MMD Kakinada

The **Mercantile Marine Department (MMD), Kakinada**, is proposed to become functional soon, with its **office building and infrastructure already completed**. Once operational, it will serve as a **regional extension of MMD Visakhapatnam**, decentralizing maritime administration and enhancing accessibility for seafarers, ship operators, and training institutes in the southern coastal belt of Andhra Pradesh. MMD Kakinada will conduct **vessel surveys and inspections**, assist in **seafarer certification and document verification**, and support **licensing and monitoring of RPSL companies** and MTIs. It will also strengthen coordination with **port authorities at Kakinada, Krishnapatnam, and other non-major ports**, improving on-ground vigilance, compliance, and service delivery for the growing maritime workforce in the state.

12.1.3. Maritime Training Institutes (MTIs) in Andhra Pradesh

There are four (4) DG Shipping approved MTIs in Andhra Pradesh. They are as follows:

- Behara Institute of Maritime Training, Vizianagaram
- BIMT, Visakhapatnam
- Praveenya Institute of Marine Engineering & Maritime Studies (PRIME), Visakhapatnam
- Vizag HIMT, Visakhapatnam

12.1.4. RPSL Companies spread across Andhra Pradesh

With Andhra Pradesh contributing nearly 6% of India's total seafarers and experiencing rapid port-led industrial growth, there exists a strong potential to expand the network of RPSL (Recruitment and Placement Services License) companies in the state.

However, according to the Directorate General of Shipping (DGS) database, Andhra Pradesh currently has only 2 valid RPSL companies, while 1 is blocked, 4 are suspended, and 1 license has expired.

This limited presence highlights the urgent need for enhanced awareness, compliance facilitation, and local capacity building to encourage ethical and transparent recruitment practices. Regular monitoring and awareness campaigns are essential to ensure aspiring seafarers engage only with licensed and verified operators, thereby safeguarding them from fraudulent and unsafe placements.

According to the Directorate General of Shipping Database-

Valid RPSL Companies in Andhra Pradesh

- Srisai Oilfield Equipments & Marine Services Private Limited
- Seasworth Marine Private Limited

Few Invalid RPSL Companies in Andhra Pradesh-

- Oscar Maritime And Offshore Pvt. Ltd.
- Vision Maritime Private Limited
- Galilee Sea Services Private Limited
- V and G Marine Services LLP

12.1.5. Maritime Events in the state

Andhra Pradesh has conducted several maritime events. Some of the recent events are as follows:

1. International Fleet Review (IFR) 2026, MILAN 2026 Conclave (Preparatory), and Indian Ocean Naval Symposium (IONS) Conclave of Chiefs



Location: Visakhapatnam

Date: Scheduled for February 15 to 25, 2026

About: These mega maritime events will showcase India's naval capabilities and foster international maritime cooperation. Preparatory activities include infrastructure upgrades and security enhancements, with high-profile guests including the President of India expected to attend. MILAN 2026 will invite participation from over 137 countries, focusing on camaraderie, cooperation, and collaboration.

2. CII PORTS & LOGISTICS CONFERENCE 2025

Organised By: Confederation of Indian Industry

Location: Visakhapatnam

Date: October 2025

Focus: Aimed on building a skilled local workforce in logistics and maritime services. It focused on Building Visakhapatnam - The East Coast Logistics Capital of India

3. Road-show & Workshop – PORTCON 2025

Location: Visakhapatnam Port Authority, Visakhapatnam, Andhra Pradesh

Date: September 2025

Focus: Aimed at port modernization, operational efficiencies, and stakeholder engagement to boost port infrastructure and performance

4. East Coast Maritime & Logistics Summit 2025



Location: Visakhapatnam

Date: 2-3 September 2025

Focus: This summit saw the Andhra Pradesh government outline its vision of becoming a global logistics hub by leveraging the 1,053 km coastline

5. Vizag Skill Sail 2025 – Skill Development Conclave

Location: Visakhapatnam, Andhra Pradesh

Date: 22 August 2025

Focus: Aimed at maritime talent development and green-port innovation in the state's maritime cluster.

6. Second BIMSTEC Ports Conclave



Location: Visakhapatnam, Andhra Pradesh
Date: 14-15 July 2025
Focus: Regional maritime cooperation, cruise tourism and HR development across Bay of Bengal states.

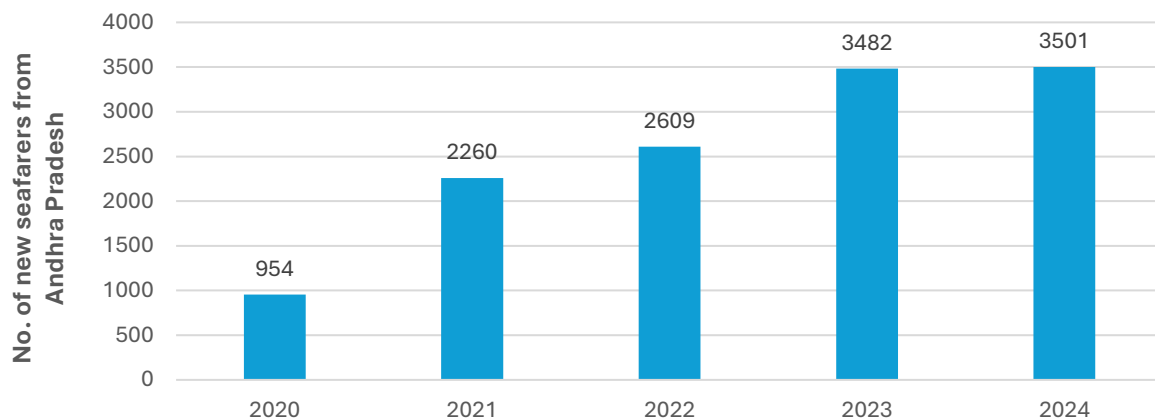
7. Stakeholder Consultation on Andhra Pradesh's Maritime, Logistics & Infrastructure Development

Location: Vijayawada, Andhra Pradesh
Date: 04 March 2025
Focus: Gathering government, industry, and logistics stakeholders to discuss maritime infrastructure and service expansion in AP.

Potentials opportunities for Seafarers

12.1.6. Seafaring Ecosystem in Andhra Pradesh

As of June 2024, Andhra Pradesh ranks sixth among Indian states in seafarer supply, contributing around 5.9% of India's total seafaring workforce. The state's maritime talent pool has shown steady growth at a rate of 38.41%, reaching a cumulative strength of 39,399 seafarers.

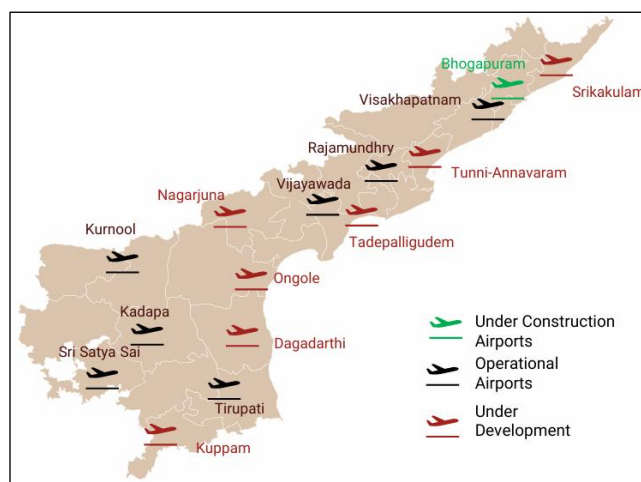


As the contribution of seafarers from the state grows, there could be a rise in the requirement of MTIs. Also, number of institutes alone would not be the deciding factor, as the MTIs would have to be equipped with the latest technology, competent faculty and necessary facilities to impart training to produce future-ready seafarers.

12.1.7. Employment Potential

Accessibility and Connectivity

- a. Andhra Pradesh has 7 operational airports, 1 under construction, and 7 more under development, providing excellent air connectivity for crew travel, logistics, and international deployment.
- b. The Visakhapatnam International Airport ensure quick access to major maritime hubs.
- c. Improved road and rail connectivity through three major industrial corridors namely Visakhapatnam-Chennai Industrial Corridor (VCIC), Chennai-Bengaluru Industrial Corridor (CBIC) and Hyderabad-Bengaluru Industrial Corridor (HBIC) further enhance logistics efficiency.



2. Centres of Maritime Growth

- a. Visakhapatnam serves as the primary maritime employment and training hub, with multiple MTIs, port operations, and ship-repair facilities.
- b. Priority sectors identified include:
 - i. Ports and Maritime Services (operations, logistics, bunkering)
 - ii. Fisheries & Aquaculture (coastal and deep-sea fishing, cold-chain logistics)

- iii. Tourism and Cruise Operations (home-porting potential)
 - iv. Construction & Port-linked Industrial Development
3. Imparting skill and education through MTIs
- a. Impart education to local students: Andhra Pradesh, with its long coastline and maritime potential, can emerge as a key centre for seafarer education and training. Maritime Training Institutes (MTIs) should focus on providing accessible, high-quality education to local youth, particularly from coastal and port-adjacent communities. Initiatives such as career awareness drives, financial assistance, and preparatory training can encourage local participation. Collaboration between MTIs, port authorities, and maritime employers will help align training with real industry needs, enabling youth to seamlessly transition into maritime careers.
 - b. Attract students from other states: To strengthen its position as a maritime education hub, Andhra Pradesh can promote its MTIs as institutions of national repute offering advanced facilities, competent faculty, and globally recognized certifications. By establishing partnerships with schools, universities, and maritime bodies across India, these institutes can attract students from other states, creating a diverse learning environment. Such cross-regional enrolment will enhance the visibility of Andhra Pradesh as a centre of maritime excellence and contribute to the local economy.
 - c. Adopt latest curriculum with advanced technology, future ready workforce: MTIs in the state must continually upgrade their curriculum to include next-generation technologies and international best practices. Simulation-based learning, AI-enabled vessel operation, engine automation, and digital fleet management should form part of the training modules. Integrating sustainability, green shipping, and decarbonization competencies will ensure that graduates are globally competitive and future-ready. Partnerships with leading shipping companies, classification societies, and international academies can help align training outcomes with global workforce demands. Additionally, it is essential that RPSL (Recruitment and Placement Services License) companies and shipping lines establish a presence in Andhra Pradesh. This will ensure that graduates not only receive quality education but also have access to relevant, high-paying, and safe employment opportunities. The co-location of RPSL agencies and shipping firms with MTIs can create a seamless pipeline from training to placement, reducing migration of talent and enhancing the state's reputation as a reliable seafarer supply hub.
4. Alternate career pathways

As seafarers from Andhra Pradesh complete their on-sea careers, it is vital to create structured pathways for their reintegration into the state's onshore maritime and allied sectors. Their vast experience, global exposure, and technical acumen represent a valuable human resource that can directly contribute to the growth of Andhra Pradesh's maritime economy.

To enable this, the state should develop policies and institutional mechanisms that facilitate shore-based employment and entrepreneurship opportunities within Andhra Pradesh. Returning seafarers can play a pivotal role across the following areas:

- a. **Port and Terminal Management:** With several operational and upcoming ports in the state—Visakhapatnam, Krishnapatnam, Kakinada, and others—experienced seafarers can contribute in operations, cargo handling, safety management, and vessel traffic coordination roles.
- b. **Maritime Education and Training:** Former seafarers can serve as instructors, trainers, and mentors at Maritime Training Institutes (MTIs), helping shape the next generation of seafarers with practical, sea-based knowledge.
- c. **Ship Management and Crewing Services:** Encouraging RPSL-licensed companies and shipping lines to establish offices in Andhra Pradesh will open up managerial and technical positions in crew management, ship operations, safety auditing, and compliance.
- d. **Marine Surveying and Classification:** Retired officers can find roles in ship survey, marine inspection, and statutory certification processes, leveraging their hands-on operational expertise.
- e. **Logistics, Supply Chain, and Port-based Industries:** Seafarers with navigational and engineering backgrounds can transition into leadership roles in coastal shipping, logistics parks, and multimodal transport hubs being developed along Andhra's coastline.
- f. **Maritime Entrepreneurship:** The state can promote entrepreneurship among retired seafarers through incubation and financial support for startups in ship repair, marine equipment services, green shipping technologies, and coastal tourism.

By facilitating these alternate career pathways within the state, Andhra Pradesh can retain skilled maritime professionals, reduce outmigration, and strengthen its reputation as a comprehensive maritime ecosystem — from training to deployment to post-sea career reintegration. Such an ecosystem will ensure that the knowledge and experience gained at sea continue to benefit the state's ports, industries, and communities long after seafarers return home.

12.1.8. Current Landscape of Seafarer Welfare in Andhra Pradesh and Insights from Other State

Currently, Andhra Pradesh does not have a dedicated state-specific welfare or insurance scheme for seafarers. Seafarers from Andhra Pradesh are primarily covered under **national-level initiatives** managed by the **Directorate General of Shipping (DGS)** and the **Seafarers' Welfare Fund Society (SWFS)**, which provide benefits like financial assistance, medical aid, scholarships, and death compensation.

However, with its expanding maritime infrastructure, major ports at Visakhapatnam, Krishnapatnam, Gangavaram, and Kakinada, the state has strong potential to introduce tailored welfare and employment schemes for its growing seafaring community. It creates an opportunity for Andhra Pradesh to **develop and implement a dedicated welfare and insurance scheme for seafarers**, aligned with national frameworks and state maritime strategy.

Case Study: Goa Welfare / Pension Scheme for Seafarers, 2023

- A state government initiative by the Home Department, Government of Goa, designed to provide financial security to retired seamen.
- Eligible Beneficiaries:
 - Must be an Indian citizen and a bona fide resident of Goa (by birth or parentage).
 - Retired or medically invalidated seafarer, aged 60 years or above.
 - Minimum 10 years (120 months) of sea service; up to 6-month break allowed.
 - Widows of deceased seafarers eligible if Goan residents for 15+ years and annual income below ₹1.2 lakh.
- Financial Assistance: A monthly gross pension of ₹2,500/- directly through Direct Benefit Transfer (DBT)
- Aim: To help retired seafarers and, on compassionate grounds, the widows of deceased seamen, maintain a decent standard of living during their retirement.

On 25 June 2025, Dr. Pramod Sawant, Chief Minister of Goa, declared that the Seafarers Pension Scheme will be made permanent for all Goan seafarers at the Seafarers Day celebration organized by the Goan Seamen Association of India (GSAI) in Margao.

He stated “We recognize the sacrifices and contributions of our Goan seafarers. This scheme is a token of our gratitude and a step towards ensuring their financial security.”

12.2. Conclusion

In conclusion, Andhra Pradesh is clearly positioned as a strategically vital maritime state, leveraging its 1,053 km coastline and major port infrastructure, including Visakhapatnam and Krishnapatnam, which serve as vital economic gateways. With a growing talent pool that ranks sixth nationally, contributing approximately 5.9% of India’s total seafaring workforce (39,399 seafarers as of June 2024), the state possesses immense human capital potential. However, fully realizing these potential hinges on urgently addressing governance challenges, particularly the prevalence of fraudulent recruitment, unregistered crewing agents, and exploitation of aspiring seafarers. The state must aggressively expand its ethical recruitment network, given the current presence of only 2 valid RPSL companies against several invalid ones, while strengthening regulatory oversight through the existing MMD Visakhapatnam and operationalizing the proposed MMD Kakinada.

The state may also help and develop a conducive environment for on-shore employment opportunities for retired seafarers. Finally, by establishing a dedicated state-specific welfare and insurance scheme an area currently lacking and adopting successful models such as the

comprehensive Goa Welfare/Pension Scheme, Andhra Pradesh can ensure seafarers are supported throughout their careers. This holistic approach will not only safeguard the welfare of its community but also cement India's global reputation as a reliable and ethical supplier of trained maritime professionals.



Coastal State Workshop- Andhra Pradesh

Pillar 5- De-carbonization, Sustainability and Environment Protection

Comprehensive Background Note on Coastal State Workshop Pillar 5
Focus State : Andhra Pradesh

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I. Background

12.3. I.1. Introduction

The maritime sector forms the backbone of global trade, handling nearly **80 percent of global merchandise by volume and 70 percent by value**, making it one of the most critical enablers of the world economy. Its scale and connectivity also mean that its environmental footprint is significant, particularly in terms of **greenhouse gas emissions, waste generation and impacts on coastal ecosystems**.

In recognition of these challenges, the **International Maritime Organization (IMO)** adopted in 2023 its **Revised Strategy on Reduction of GHG Emissions from Ships**, targeting **Net Zero emissions by 2050**. This global goal necessitates systemic decarbonisation, enhanced energy efficiency and adoption of cleaner fuels across the shipping and port ecosystem.

India, as a major maritime nation, has aligned itself with this agenda through the **Maritime India Vision 2030 (MIV 2030)**, the **Maritime Amrit Kaal Vision 2047 (MAKV 2047)** and the forthcoming **National Green Shipping Policy (NGSP)**, all of which establish structured pathways for green port operations, low-carbon shipping and digitalised environmental

governance.

The **Harit Sagar – Green Port Guidelines (2023)** further institutionalise environmental accountability by mandating a **30 percent reduction in carbon intensity per tonne of cargo handled by 2030 and 70 percent by 2047**, achieved through clean energy, efficient waste systems and monitoring via defined **Environmental Performance Indicators (EPIs)**.

The **Directorate General of Shipping (DGS)**, as India's national maritime authority, is implementing these priorities through conventions such as **MARPOL**, digital platforms like the **Swachh Sagar Portal** and initiatives on **green-fuel readiness, environmental auditing and marine-ecosystem management**.

12.4. I.2. Waste Management and Disposal (at Ports and Along the Coast)

Waste management forms a fundamental component of port environmental performance. Ports generate multiple waste streams like **oily residues, bilge water, sewage, garbage, plastics, hazardous waste and e-waste**, all of which, if mishandled, can cause severe marine pollution and ecological damage.

In addition, the growing concern of **Lost, Abandoned and Discarded Fishing Gear (LADFG)**, or “ghost gear,” has emerged as a critical issue along India's coastline. Such gear contributes substantially to marine debris, entangling fish, marine mammals and turtles and damaging benthic habitats. The **IMO - FAO GloLitter Partnership** encourages port authorities and coastal states to recover, register and recycle LADFG through port reception systems, a practice that can be adopted within India's Swachh Sagar framework.

Major ports have implemented structured waste systems with **segregation, storage and certified disposal** through authorised vendors. The **Swachh Sagar Portal** digitally records the type, volume and disposal pathway of ship-generated waste, ensuring traceability and accountability. Some ports, such as **JNPA** and **Cochin**, have also introduced real-time waste tracking, vendor-performance evaluation and automated waste receipts.

However, **non-major and private ports** still lag behind in establishing certified reception and treatment facilities. Smaller fishing harbours and coastal jetties frequently rely on informal or manual disposal, leading to unmonitored dumping of waste and fishing gear in near-shore waters. Integrating these smaller facilities into **digital waste-management networks**, supported by **cluster-based collection and disposal systems**, will ensure environmental uniformity across India's 11098 km coastline.

Extending port waste-management frameworks to **coastal settlements, shipyards and fisheries landing sites** is equally vital. Collaboration with local municipal bodies, fisheries departments and SPCBs can help extend the circular economy to cover **ship waste, plastics, used oil and recovered LADFG**, thus enabling comprehensive coastal cleanliness and ecosystem protection.

12.5. I.3. MARPOL Annexes and Environmental Compliance

The **International Convention for the Prevention of Pollution from Ships (MARPOL)**, implemented in India through DGS, remains the global cornerstone for marine environmental protection. It comprises six key Annexes governing:

- **Annex I:** Oil pollution prevention,
- **Annex II:** Noxious liquid substances,
- **Annex III:** Harmful substances in packaged form,
- **Annex IV:** Sewage from ships,
- **Annex V:** Garbage from ships and

- **Annex VI:** Air pollution and GHG emissions.

India enforces MARPOL through **Port State Control (PSC)** inspections of foreign vessels and **Flag State Inspections (FSI)** of Indian ships. DGS periodically issues circulars specifying compliance procedures and reporting protocols. Major ports such as **JNPA, VOC and Deendayal** maintain established inspection teams and vendor networks. However, non-major ports face persistent gaps, shortage of trained personnel, lack of integrated digital reporting and dependence on third-party handlers. Improved coordination between DGS regional offices, SPCBs and State Maritime Boards will strengthen uniform enforcement nationwide.

12.6. I.4. Port Reception Facilities (PRFs)

PRFs are crucial to ensure that ship-generated waste is safely received and treated onshore. They form the operational link between **MARPOL Annex I–V obligations** and port-level environmental management.

India's major ports under MoPSW maintain PRFs for oily waste, sewage and garbage serviced by certified contractors, with data integrated into Swachh Sagar for transparency. Non-major ports generally operate with partial or non-functional facilities due to low waste volumes and investment constraints. Many handle only oily sludge and garbage, lacking systems for sewage, plastics, hazardous waste and fishing-gear recovery.

The **Harit Sagar Guidelines (2023)** mandate all ports to establish or share certified PRFs for all waste categories and conduct annual independent environmental audits. For coastal states like Andhra Pradesh, developing **shared or cluster-based PRFs** can achieve cost efficiency and compliance uniformity while enabling monitoring through joint digital dashboards.

12.7. I.5. Shore Power (Onshore Power Supply – OPS)

Shore Power enables vessels to connect to the port's electrical grid while berthing, allowing auxiliary engines to be shut down. This eliminates in-port emissions of CO₂, NO_x, SO_x and particulate matter, significantly improving local air quality and reducing noise levels. Globally, ports such as **Rotterdam, Los Angeles and Singapore** have adopted OPS as a key decarbonisation measure, with major cruise and cargo operators now preferring OPS-enabled ports for their sustainability credentials.

In India, Shore Power, often referred to as **Shore Power Supply (SPS)** is being gradually implemented in line with the **Harit Sagar – Green Port Guidelines (2023)**, which outline a phased deployment plan:

- **Phase I (by 2025):** For tugs, pilot boats and small crafts.
- **Phase II (by 2030):** For coastal and feeder vessels.
- **Phase III (beyond 2030):** For international and cruise ships.

Implementation in Key Indian Ports:

- **Kamarajar Port (Ennore):** 500 kW SPS operational at 400 V, 50–60 Hz, installed at Coal Berths 1 and 2.
- **VO Chidambaranar Port (Tuticorin):** 305 kW SPS operational at 400 V, 60 Hz, serving VOC Berths 2 and 3.
- **Jawaharlal Nehru Port Authority (Mumbai):** SPS currently used for tugs; expansion planned for all terminals (45 MVA capacity, estimated investment ≈ INR 600 crore).

- **Cochin, Kandla and Paradip Ports:** Feasibility studies in progress for large-vessel OPS integrated with renewable energy sources.

For **Andhra Pradesh**, the state's strong renewable-energy base, comprising extensive **solar** and **wind** resources, creates a highly favourable context for future OPS integration. Feasibility assessments under the Harit Sagar Phase I programme may identify ports such as **Krishnapatnam, Kakinada and Gangavaram** as early candidates for OPS implementation. The adoption of OPS across Andhra Pradesh's ports would:

- Reduce greenhouse-gas and local pollutant emissions in densely populated coastal areas.
- Enhance port sustainability ratings under the upcoming **Green Port Index (GPI)**.
- Support **cruise and passenger-vessel operations**, as modern cruise liners increasingly require shore-power facilities for hoteling loads.

Integration of OPS with the **state renewable grid (APTRANSCO)** would further ensure that power supplied to berthed vessels is derived from clean sources, reinforcing both India's and Andhra Pradesh's green-growth and tourism objectives.

12.8. I.6. Green Shipping and Green Fuels

The transition to **low- and zero-carbon fuels** such as LNG, biofuels, methanol, ammonia and hydrogen is central to decarbonising shipping. The forthcoming **National Green Shipping Policy (NGSP)** will establish a framework for green-fuel certification, bunkering standards and vessel incentives, while the **National Green Hydrogen Mission (NGHM)** promotes port-based hydrogen and ammonia production.

Pilot LNG and biofuel bunkering projects are active at **VOC and Kandla**, with **JNPA** preparing multi-fuel infrastructure. The **Green Tug Transition Programme (GTTP)** targets deployment of 50 hybrid or green tugs by 2030. In Andhra Pradesh, renewable-energy corridors and industrial clusters around **Kakinada and Krishnapatnam** enable development of biofuel, methanol and green-ammonia supply chains. The **AM Green 2 MTPA green-ammonia plant** at Kakinada (scaling to 5 MTPA) and its MoU with the **Port of Rotterdam** highlight the state's emerging role as a future export hub for clean marine fuels.

12.9. I.7. Environmental and Port Impact Assessment (EIA)

EIA is a statutory requirement for all port development and expansion under the **EIA Notification 2006** and **Coastal Regulation Zone (CRZ) Notification 2019**. It assesses impacts on air, water, sediment, marine ecology, fisheries and biodiversity through baseline surveys and modelling.

Institutions such as **NIOT, NCSCM, CMFRI and CESS** conduct hydrodynamic and shoreline-change analyses and cumulative impact studies. Modern EIAs also incorporate **fishing-route mapping, nursery areas and species distribution zones** to avoid ecological conflicts. Integrating EIA outputs into digital platforms such as **Swachh Sagar** and the forthcoming **Green Port Index (GPI)** will allow real-time compliance monitoring. In Andhra Pradesh, where ports like **Ramayapatnam, Kakinada and Machilipatnam** are expanding, combining EIA studies with marine spatial planning and sensitivity mapping is key to balancing growth and ecological preservation.

12.10. I.8. Marine Ecology, Biodiversity and Conservation

India's coastal waters harbour rich ecosystems, **mangroves, seagrass beds, mudflats, estuaries and coral remnants** that support fisheries, store blue carbon and protect shorelines. The **Coringa Wildlife Sanctuary** in Andhra Pradesh is one of the largest mangrove forests in the country, hosting over 120 bird species and 200 plant varieties.

Ecological mapping by **NCSCM and CMFRI** has identified key sensitive zones including olive-ridley turtle nesting beaches near Nizampatnam, pelagic fish breeding grounds between Machilipatnam and Yanam and migratory-bird wetlands around Kakinada and Coringa. These require ecological buffers and integration within port master plans under **Andhra Pradesh Maritime Board (APMB)**.

Adopting the “**Working with Nature**” approach, as advocated by PIANC, promotes nature-based design for dredging, sediment management and coastal restoration. Marine biodiversity corridors, species conservation programmes and community-based monitoring should form long-term pillars of state maritime environment strategies.

I.9. Ecosystem-Based Management (EBM)

Ecosystem-Based Management (EBM) provides a holistic framework for balancing economic development with the long-term health and productivity of coastal and marine ecosystems. Unlike traditional sectoral management, which treats port operations, fisheries and conservation as separate domains, EBM integrates them within a single ecological and spatial context.

Key elements of EBM include:

- **Integrated Planning:** Considering the cumulative impact of shipping, dredging, fisheries and coastal industry on interconnected habitats.
- **Spatial Mapping:** Using marine spatial planning tools to designate compatible activity zones and ecological buffer areas.
- **Adaptive Management:** Using continuous monitoring data from EIA studies, biodiversity baselines and digital dashboards to adjust decisions as environmental conditions evolve.
- **Stakeholder Collaboration:** Engaging coastal communities, fishers and industry partners in decision-making to ensure equitable and sustainable outcomes.

In India, EBM principles are reflected in national programmes such as the Integrated Coastal Zone Management (ICZM) initiative, Harit Sagar Guidelines (2023) and the draft Blue Economy Policy Framework. For Andhra Pradesh, EBM can guide the integration of port development with the protection of mangroves, estuaries and fishing grounds—creating a balanced approach that supports both ecological resilience and blue-economy growth.

12.11. I.10. Regulatory and Governance Framework

Environmental governance in India's maritime domain operates through a coordinated multi-tier system:

- **MoPSW:** Policy direction and oversight under Harit Sagar Guidelines and the proposed **National Port Sustainability Code (NPSC)**.
- **DGS:** Implementation of IMO conventions (MARPOL, Ballast Water, Ship Recycling) and operation of digital systems like **Swachh Sagar Portal**.
- **MoEFCC:** EIA and CRZ clearances, biodiversity protection and national environmental approvals.

- **State Maritime Boards / SPCBs:** Implementation, monitoring and coordination for non-major ports.

Enhanced digital integration between **DGS, MoPSW and SPCBs**, particularly linking **APPCB's online monitoring systems** with DGS dashboards will enable unified oversight and transparent reporting across coastal states.

II. Present State in India

India's maritime system is transitioning toward sustainability, with all ports now operating within a structured framework of environmental accountability. Major ports under the **Ministry of Ports, Shipping and Waterways (MoPSW)** and non-major ports under **State Maritime Boards** have adopted systematic mechanisms for waste management, MARPOL compliance, environmental monitoring and green-port certification. Coastal states such as **Andhra Pradesh**, with one of the longest shorelines on the east coast and multiple operational ports, reflect this uniform national progress coupled with expanding opportunities for green infrastructure integration.

12.12. II.1. Waste Management and Disposal

India has achieved measurable progress through **digital waste tracking, certified vendor systems and regular audits**.

All ports are now mandated to operate under the **Swachh Sagar Portal** of the **Directorate General of Shipping (DGS)**, which facilitates real-time recording of ship-generated waste, waste-type classification and traceable disposal through authorised handlers. The system has replaced legacy manual processes, ensuring transparency and accountability.

Major and non-major ports alike are covered under periodic audits in line with the **Harit Sagar – Green Port Guidelines (2023)**. Each port maintains arrangements for waste collection, segregation, storage and final disposal through authorised vendors, integrated with **State Pollution Control Boards (SPCBs)** and **Urban Local Bodies (ULBs)** for final treatment.

Growing attention is also directed toward **Lost, Abandoned or Discarded Fishing Gear (LADFG)**, which contributes to marine litter and coastal entanglement risks. Recovery, registration and recycling of LADFG are being mainstreamed through the Swachh Sagar framework and linked community clean-up initiatives in fishing harbours.

In **Andhra Pradesh**, all operational ports under **APMB**—including **Krishnapatnam, Gangavaram and Kakinada**—maintain functional waste-management systems audited under Swachh Sagar. Smaller jetties and fishing harbours are gradually adopting cluster-based collection and disposal models, supported by APMB and APPCB coordination.

12.13. II.2. MARPOL Annex Compliance

India, as a contracting state to all six **MARPOL Annexes**, ensures uniform compliance through the **Merchant Shipping Act, 1958** and DGS circulars. Port State Control (PSC) and **Flag State Inspections (FSI)** verify adherence to standards covering oil pollution prevention, control of noxious liquids, sewage management, garbage segregation and air-emission norms.

All ports, major and non-major, are covered under the national inspection and reporting systems (**SIRS and Swachh Sagar**). Compliance performance remains strong, supported by periodic audits, trained surveyors and certified reception networks.

In **Andhra Pradesh**, MARPOL provisions are implemented effectively under DGS oversight:

- **Krishnapatnam** and **Kakinada** record consistent PSC/FSI performance with satisfactory Annex I and V compliance.
- **Gangavaram** and other ports are progressively expanding to full annex coverage.
- Coordination between **APPCB** and DGS ensures integration of inspection outcomes and waste-handling data, reinforcing transparency and regulatory traceability.

12.14. II.3. Port Reception Facilities (PRFs)

All ports in India are now mandated to maintain certified **Port Reception Facilities (PRFs)** under **MARPOL Annex I–V** and **Harit Sagar Guidelines**. These facilities provide the critical interface for safe reception and disposal of ship-generated waste—oily residues, bilge water, sewage, garbage, plastics and chemical residues.

Every port, including non-major and private ones, operates under DGS-approved or shared PRF arrangements and undergoes annual audits. The Swachh Sagar Portal ensures end-to-end digital traceability of waste receipts, treatment and disposal documentation.

In **Andhra Pradesh**:

- **Krishnapatnam, Gangavaram and Kakinada** maintain operational PRFs with authorised handlers for all primary waste categories.
- **Ramayapatnam**, under development, is incorporating modular PRF systems suited to medium traffic levels.

Shared and cluster-based PRFs are also being encouraged by **APMB** for efficiency and uniform coverage across smaller ports.

12.15. II.4. Shore Power (Onshore Power Supply – OPS)

OPS allows berthed vessels to draw electricity from the port grid, cutting emissions and improving local air quality. India's early pilots, **Kamarajar (Ennore)**, **VOC Tuticorin** and **JNPA Mumbai**, demonstrate feasibility for port crafts, tugs and terminal equipment. Feasibility studies at **Cochin** and **Kandla** are assessing large-vessel integration.

The **Harit Sagar Guidelines** prescribe phased implementation up to 2030, covering tugs, coastal vessels and cruise ships.

In **Andhra Pradesh**, feasibility assessments under Phase I are planned for **Krishnapatnam, Kakinada, Gangavaram and Ramayapatnam**. The state's strong renewable-energy base positions it to supply clean OPS power, including for cruise and passenger vessels, thus supporting both tourism and the upcoming **Green Port Index (GPI)** benchmarks.

12.16. II.5. Green Fuels and Decarbonisation Readiness

India's shift toward alternative fuels is accelerating through pilot projects and private investments. LNG and biofuel bunkering are operational at select major ports; **JNPA** is developing a multi-fuel hub. The **Green Tug Transition Programme (GTTP)** aims for 50 hybrid or green tugs by 2030.

In **Andhra Pradesh**, the **AM Green Kakinada Project** is emerging as a flagship initiative. The facility, powered by hybrid solar-wind storage systems, will produce up to **1 MTPA of green ammonia** in its first phase, scaling to 5 MTPA by 2030. An MoU with the **Port of Rotterdam** underpins a green-fuel export corridor, positioning AP as a key contributor to India's decarbonisation and clean-fuel diplomacy.

12.17. II.6. Environmental Infrastructure and Monitoring

Environmental infrastructure has strengthened nationally through the **Harit Sagar Guidelines**. All ports now maintain **Environment Cells**, periodic audits and continuous monitoring systems that track air, water, noise and biodiversity indicators.

- **CAAQMS, ETPs/STPs** and smart metering systems are standard across major ports.
- **Greenbelt programmes**, mangrove restoration and biodiversity mapping support carbon-sequestration goals.

In **Andhra Pradesh**:

- **Krishnapatnam** and **Gangavaram** operate internal environment cells, wastewater-recycling systems and extensive green-cover initiatives.
- **Kakinada** and upcoming **Ramayapatnam** are progressively aligning with these standards under **APPCB** guidance.

Integration with the **Swachh Sagar Portal** and the **Green Port Index (GPI)** will enable unified tracking of port sustainability metrics and transparent disclosure of annual performance.

III. Opportunities for Coastal States (with Reference to Andhra Pradesh)

12.18. III.1. Introduction

Coastal states are central to India's maritime and environmental transformation. As the nation advances toward a low-carbon, resource-efficient blue economy, state maritime administrations hold the operational levers of change, from infrastructure development and compliance enforcement to ecosystem stewardship and community engagement. The success of national frameworks such as the **Harit Sagar – Green Port Guidelines (2023)**, the forthcoming **National Green Shipping Policy (NGSP)** and the **Maritime Amrit Kaal Vision 2047 (MAKV 2047)** will ultimately depend on how effectively they are localised and implemented by coastal states.

Among India's maritime states **andhra Pradesh** occupies a position of strategic importance. With **1053 km of coastline**, the third longest in India and six operational or planned ports (**Krishnapatnam, Gangavaram, Kakinada, Machilipatnam, Nizampatnam** and **Ramayapatnam**) the state anchors a vital segment of the **East-Coast Maritime Corridor**. Its diversified cargo profile, renewable-energy capacity, strong industrial hinterland and ecological diversity make it ideal for piloting **green-port, clean-fuel** and **biodiversity-sensitive** maritime initiatives.

While national policies define the direction, the operational execution of waste-management systems, port-reception facilities, on-shore power, green-fuel logistics and marine-ecology safeguards will rest with the state. The **Directorate General of Shipping (DGS)** will continue to provide policy alignment, technical standards and digital integration, while the **Andhra Pradesh Maritime Board (APMB)** will determine, sequence and implement initiatives as it deems fit to the state's priorities.

12.19. III.2. Waste Management and Circular Economy

12.19.1. III.2.1 Cluster-Based PRFs

Andhra Pradesh can strengthen sustainability through **cluster-based Port Reception Facilities (PRFs)** serving multiple smaller ports and fishing harbours. A cluster spanning **Kakinada–Machilipatnam–Nizampatnam** can manage oily waste, sewage, plastics and hazardous residues efficiently. These may be developed via PPP or viability-gap models with support from the **Green Port Fund** or **FSDF**.

12.19.2. III.2.2 Integration with Swachh Sagar Portal

Extending full integration of all APMB ports with the **Swachh Sagar Portal** ensures real-time traceability of ship-generated waste and LADFG recovery, supporting unified audit and compliance visibility for DGS, APMB and APPCB.

12.19.3. III.2.3 Circular-Economy Linkages

Recovered oils, plastics and scrap metal can feed local recycling and re-refining industries around **Krishnapatnam SEZ** and **Kakinada SEZ**, creating circular-economy value chains and green jobs.

12.19.4. III.2.4 Marine-Litter and LADFG Management

Lost or abandoned fishing gear (LADFG) forms a major portion of marine debris. Mapping of high-intensity fishing zones along **Machilipatnam, Nizampatnam and Kakinada** will enable targeted gear-recovery drives and integration with PRF logistics. Establishing **Port–Municipal–Fisheries Coordination Cells** can ensure harmonised litter collection and recycling, strengthening coastal cleanliness under the **Swachh Sagar–Sampoorna Sagaram** framework.

12.20. III.3. Strengthening MARPOL Compliance

12.20.1. III.3.1 State MARPOL Facilitation Cell

APMB may consider forming a **State MARPOL Facilitation Cell** to coordinate between DGS, APPCB and port authorities for inspections, reporting and data collation.

12.20.2. III.3.2 Inspection & Training Capacity

In partnership with **IMU Visakhapatnam**, APMB can conduct short-term certification courses and workshops on MARPOL Annexes I–VI, ballast-water management and spill-response readiness, creating a trained cadre of port environmental officers.

12.20.3. III.3.3 Digital Integration

Integration of APPCB emission and effluent datasets with DGS dashboards will enable real-time compliance visibility, automated analytics and faster corrective responses.

12.21. III.4. Enhancing Port Reception and Waste Infrastructure

All ports in Andhra Pradesh already maintain audited PRFs; opportunities now lie in **upgradation, digital enhancement and clustering**.

12.21.1. III.4.1 Modernisation of Existing PRFs

Ports such as **Krishnapatnam**, **Gangavaram** and **Kakinada** can evolve into full-spectrum multi-waste PRFs covering plastics, recyclables and sewage, with automated digital reporting via Swachh Sagar and third-party audits.

12.21.2. III.4.2 Development of Cluster PRFs

Emerging ports including **Ramayapatnam** may integrate modular PRF designs during construction, avoiding retrofits and enabling compliance from inception.

12.21.3. III.4.3 Coordination

DGS will continue to provide design and certification guidance, while APMB may determine local models and cost-sharing arrangements suitable to regional port clusters.

12.22. III.5. Shore Power (Onshore Power Supply – OPS)

12.22.1. III.5.1 Pilot Implementation

Krishnapatnam and **Kakinada** are ideal Phase I pilots under Harit Sagar (2023). Both have strong electrical backbones and renewable-energy connectivity.

12.22.2. III.5.2 Integration with Renewables

Linking OPS to **APTRANSCO's** renewable grid (solar + wind) will ensure zero-emission electricity for berthed ships, supporting **NGSP** decarbonisation objectives.

12.22.3. III.5.3 Passenger and Cruise Vessels

Extending OPS to cruise and passenger jetties at **Visakhapatnam** and **Kakinada** will cut localised emissions, boost tourism and meet international cruise-line preferences for clean-energy berths.

12.22.4. III.5.4 Investment Models

Ports may adopt PPP arrangements or MoUs with renewable-power producers, supported by green-finance or carbon-credit incentives. DGS will guide technical standards and integration; APMB will oversee local coordination and phasing.

12.23. III.6. Green Fuels and Clean-Energy Hubs

12.23.1. III.6.1 Kakinada – National Green Fuel Hub

The **AM Green Ammonia Project** at Kakinada, producing **2 MTPA by 2027** and scaling to 5 MTPA by 2030, will anchor India's first large-scale **green-ammonia export corridor**. Its MoU with the **Port of Rotterdam** enables a trans-continental supply chain, making Andhra Pradesh a cornerstone of India's clean-fuel diplomacy.

12.23.2. III.6.2 Methanol and Biofuel Bunkering

Krishnapatnam and **Gangavaram** can be developed as **biofuel and methanol bunkering hubs**, supported by nearby renewable clusters. Such facilities will:

- Supply low-carbon fuels to coastal and feeder vessels,
- Support the **Green Tug Transition Programme (GTTP)** and
- Strengthen India's east-coast refuelling corridor for green-ready ships.

12.23.3. III.6.3 Industrial and Logistics Linkages

By integrating refineries, renewable generators and SEZ-based storage terminals (Kakinada SEZ, Krishnapatnam SEZ), APMB can develop a **coastal green-energy corridor** connecting production, bunkering and export.

12.23.4. III.6.4 Policy and Partnership Alignment

DGS and MoPSW will issue unified standards for bunkering safety, certification and digital tracking.

APMB may designate **Kakinada, Krishnapatnam and Gangavaram** as **green-fuel nodes** and pursue partnerships with **Port of Rotterdam, Yara Clean Ammonia, IMO Green Voyage 2050** and similar global programmes.

12.24. III.7. Environmental Management and Biodiversity Protection

12.24.1. III.7.1 Institutionalising Environment Cells

All ports may operate dedicated **Environment Cells** under APMB to implement Harit Sagar requirements and coordinate with APPCB on monitoring and annual performance reporting.

12.24.2. III.7.2 Digital Monitoring

CAAQMS, STPs and ETPs should feed live data into DGS's **Green Port Index (GPI)** and **Swachh Sagar** dashboards, enabling transparent benchmarking.

12.24.3. III.7.3 Biodiversity and Ecological Mapping

AP's coast hosts ecologically sensitive zones:

- **Coringa Wildlife Sanctuary (Kakinada)** – major mangrove and avifauna habitat
- **Nizampatnam and Krishna Estuary** – olive-ridley turtle nesting and fishing routes
- **Machilipatnam–Yanam** – pelagic fish-breeding grounds

Spatial mapping of these zones should guide **port master plans** and **vessel-route designs** to avoid disruption of fishing corridors and breeding areas. Adopting **“Working with Nature”** principles in dredging and reclamation will minimise ecological impact and enhance coastal resilience.

12.24.4. III.7.4 Community Engagement

Initiatives such as **“Sagar Swachhta Saptah”**, school-level awareness drives and joint port–fisher cooperatives can sustain participation in coastal clean-up and mangrove protection.

III.8. Ecosystem-Based Management (EBM) and Marine Spatial Planning (MSP)

Andhra Pradesh can pioneer an ecosystem-based approach to coastal governance that aligns port expansion, fisheries protection and biodiversity conservation under a unified planning framework.

- **Adopt EBM Principles:** Integrate EBM concepts into APMB's port-master-planning process to ensure cumulative environmental and socio-economic factors are considered for each coastal stretch.
- **Marine Spatial Mapping:** Undertake state-level marine spatial planning (MSP) to identify high-productivity fishing zones, migratory corridors and ecologically sensitive areas—ensuring that new ports, dredging routes and shipping lanes avoid critical habitats.

- **Institutional Collaboration:** Establish a coordination mechanism among APMB, APPCB, Fisheries Department and Forest Department to share environmental and oceanographic data for ecosystem-wide decisions.
- **Data Integration:** Use real-time information from EIA studies, the Swachh Sagar Portal and CAAQMS stations to continuously update ecological baselines and inform adaptive management.
- **Community Participation:** Involve local fishing communities and coastal stakeholders in planning exercises to promote co-management and social acceptance of maritime projects.

Applying EBM and MSP principles would position Andhra Pradesh as a model coastal state practising proactive, science-based maritime development consistent with global best practices and India's Blue Economy Vision 2047.

12.25. III.9. Institutional Strengthening and Digital Governance

- **Integrated Environmental Monitoring System (IEMS-AP):** link APMB, DGS, MoPSW and APPCB for unified analytics and compliance dashboards.
- **Capacity Building:** continuous training on MARPOL, OPS and green-fuel operations with IMU Visakhapatnam and maritime institutes.
- **Dedicated Sustainability Divisions:** within APMB to coordinate policy, funding and stakeholder engagement.

12.26. III.10. Financing and Partnerships

- **Green Finance:** utilise Green Port Fund, FSDF and carbon-credit mechanisms for PRFs, OPS and green-fuel projects.
- **Global Partnerships:** collaborate with IMO GreenVoyage 2050, Global Maritime Forum, GIZ, World Bank and bilateral partners for technology and grants.
- **Academia & R&D:** partner with IIT-Tirupati andhra University and IMU Visakhapatnam on green fuels, waste valorisation and low-carbon port design.

12.27. III.11. Renewable Energy and Energy Efficiency for Green Ports (with reference to Andhra Pradesh)

Objective: Reduce grid emissions intensity, stabilise power costs and improve Green Port Index (GPI) performance by scaling on-site and near-site renewables, storage and electrification.

12.27.1. III.11.1 On-site and Near-site Renewable Generation

- **Rooftop & Shade-Top Solar:** Deploy solar PV on warehouses, terminal sheds, parking canopies, administrative blocks and CISF housing.
- **Ground-Mount & Floating Solar:** Utilise non-operational land parcels, dredge-spoil ponds, freshwater reservoirs and stormwater basins for floating/ground PV at **Krishnapatnam, Kakinada, Gangavaram and Ramayapatnam (new).**

- **Hybrid RE Parks (Solar + Wind):** Leverage AP's coastal wind resources and inland solar corridors to create **hybrid supply** for ports via *captive*, *group-captive*, or *open-access* routes.
- **Green Wheeling via APTRANSCO/SLDC:** Enable round-the-clock (RTC) supply through green wheeling/ banking arrangements to match **OPS** loads and cold-chain demand.

12.27.2. III.11.2 Storage, Microgrids and Resilience

- **Battery Energy Storage Systems (BESS):** Install BESS to firm intermittent RE for **OPS windows**, reefer peaks and night operations.
- **Port Microgrids:** Build segmented microgrids for critical loads (VTS, navigation aids, fire pumps, EDI/data centres), enabling black-start capability and cyclone resilience.
- **Demand Response (DR):** Enrol high-load equipment (RTGs, STS cranes, yard chargers) into DR programmes to shave peak tariffs and stabilise OPS supply.

12.27.3. III.11.3 Electrification and Clean Equipment

- **Yard & Terminal Equipment:** Transition to e-RTGs, e-RMGs, electric tractors, forklifts and shore-powered harbour craft; consider **methanol or hybrid tugs** under GTTP where electrification is infeasible.
- **Cold-Ironing Synergy:** Align RE/BESS sizing with **OPS** roll-out so berthed vessels receive verifiably green power (metered and digitally logged for GPI/ESG reporting).
- **Buildings & Utilities:** High-efficiency HVAC, LED retrofits, VFDs and solar hot-water in port townships; smart meters across feeders and major consumers.

12.27.4. III.11.4 Procurement and Commercial Models

- **Capex (Own-Build):** For quick-win rooftops and small BESS at admin/warehouse clusters.
- **OPEX/PPP:** Solar/wind/BESS via RESCO or hybrid PPA with performance-linked tariffs and uptime SLAs.
- **Group-Captive/Open Access:** For multi-port clusters (e.g., **Kakinada–Machilipatnam–Nizampatnam**) to pool demand and unlock RTC green supply at scale.
- **Revenue Stacks:** Renewable Energy Certificates (RECs), carbon credits (for OPS electrification) and potential viability-gap support under green-infrastructure schemes.

12.27.5. III.11.5 Measurement, Verification and Digital Reporting

- **Energy KPIs:** kWh from RE (% of total), kWh supplied to OPS from RE, kg CO₂e avoided per berth-hour, specific energy use per TEU/tonne.
- **Digital Integration:** Live metering to **Swachh Sagar/GPI** dashboards; API hooks for vendor PPAs, BESS dispatch logs and OPS meters for third-party assurance.

12.27.6. III.11.6 Andhra Pradesh – Suggestive Priority Actions

- **Phase I (Krishnapatnam, Kakinada):** 10–20 MWp rooftop/ground PV + 10–30 MWh BESS; align with initial **OPS** berths and e-yard pilots.
- **Phase II (Gangavaram, Ramayapatnam):** Hybrid open-access PPA (solar + wind) sized to yard electrification and reefer growth; floating solar at water bodies.

- **Tourism & Passenger Focus (Visakhapatnam/Kakinada jetties):** Dedicated green feeders + BESS for cruise OPS, with ESG-grade metering for cruise lines.
- **Cluster Play (Kakinada–Machilipatnam–Nizampatnam):** Group-captive hybrid PPA to supply PRFs, fishery cold chains and municipal pumps, improving coastal livelihood resilience.

12.27.7. III.11.7 Suggestive Roles and Governance

- **DGS:** Technical guidance on metering, disclosure and OPS–RE interoperability; alignment with forthcoming NGSP and GPI criteria.
- **APMB:** Site selection, phasing and procurement model as deemed fit; MoUs with APTRANSCO/SLDC and RE developers; convergence with municipal services where efficient.

Outcome: Lower operating costs, reduced emissions intensity, improved air quality in port cities, stronger **GPI** scores and enhanced attractiveness for green-ready cargo lines and cruise operators, positioning **Andhra Pradesh** as a first-mover in **renewable-powered green ports** on the east coast.

12.28. III.12. Training, Capacity Building and Skill Development for Sustainable Maritime Operations

Building technical expertise and institutional capacity is essential for coastal states to sustain long-term progress under the Harit Sagar Guidelines, the upcoming National Green Shipping Policy (NGSP) and other green-port frameworks. For Andhra Pradesh, developing a structured approach to training and awareness would help strengthen compliance, encourage innovation and create employment in emerging green maritime sectors.

12.28.1. III.12.1 Institutional Opportunities

- The Andhra Pradesh Maritime Board (APMB) may explore the creation of a **Maritime Sustainability Training Framework (MSTF–AP)** in collaboration with the **Directorate General of Shipping (DGS)**, the **Ministry of Ports, Shipping and Waterways (MoPSW)** and academic institutions such as **IMU Visakhapatnam andhra University** and **IIT Tirupati**.
- Such a framework could gradually build a pool of skilled professionals capable of managing environmental systems, green-fuel logistics, onshore power and waste-management processes.
- Knowledge partnerships with industry and global agencies may also be encouraged for curriculum development and demonstration-based learning.

12.28.2. III.12.2 Suggested Training Focus Areas

- **Environmental Management:** Port-level environmental monitoring, MARPOL compliance, biodiversity mapping and ecological restoration methods.
- **Waste Management and PRFs:** Segregation, collection, documentation and vendor oversight in line with Swachh Sagar Portal practices; handling of oily waste, plastics and hazardous residues.

- **Pollution Prevention and Response:** Operational readiness for oil-spill management, sewage control and emergency waste containment under IMO and DGS guidelines.
- **Renewable Energy and OPS Systems:** Conceptual and technical familiarisation with hybrid energy systems, battery storage, microgrids and Onshore Power Supply (OPS) operations.
- **Green Fuels and Bunkering:** Safety and certification training for handling LNG, methanol, biofuels and green ammonia, aligning with international bunkering protocols and NGSP guidelines.
- **Circular Economy and Resource Recovery:** Exposure to recycling, resource efficiency and circular-waste business models relevant to port and coastal operations.
- **Digital Environmental Governance:** Orientation on tools such as the **Green Port Index (GPI)**, environmental audit dashboards and integrated digital reporting.

12.28.3. III.12.3 Implementation and Collaboration

- APMB may consider working with **IMU Visakhapatnam** as a knowledge and training partner for short-term courses and simulation-based programmes.
- Local technical institutes and universities can be engaged to offer modular training and research support on specific domains such as marine ecology, renewable integration and waste recycling.
- Periodic capacity-building workshops could be organised jointly with DGS, APPCB and port operators to ensure consistent understanding of standards and practices.

12.28.4. III.12.4 Community and Awareness Initiatives

- Ports may collaborate with educational institutions, fisheries departments and civic organisations to conduct awareness campaigns such as **Sagar Swachhta Saptah** and coastal clean-up drives.
- Engagement of students, self-help groups and coastal communities in activities like **mangrove plantation, marine-litter monitoring** and **blue-carbon projects** can promote inclusive participation and shared ownership of environmental outcomes.

12.28.5. III.12.5 Expected Outcomes

- Enhanced capacity across ports for environmental monitoring, clean-fuel handling and sustainable operations.
- Creation of new employment avenues in renewable energy, waste management and environmental services.
- Strengthened collaboration between industry, academia and regulatory bodies.
- Gradual evolution of Andhra Pradesh as a **regional training and capacity-building hub** for sustainable maritime practices.

IV. Way Forward

12.29. IV.1. Institutional and Policy Alignment

- Align APMB's initiatives with DGS and MoPSW programmes for cohesive development of waste, OPS and green-fuel infrastructure.

- Formalise APMB–APPCB–municipal coordination for unified governance and MARPOL compliance.
- Conduct annual sustainability reviews tracking GPI scores, emissions and digital integration.

12.30. IV.2. Infrastructure and Technology

- Prioritise pilots for **PRFs, OPS and green-fuel bunkering** at **Krishnapatnam, Kakinada and Gangavaram**.
- Adopt renewable-linked OPS models and cluster PRFs to lower carbon intensity and cost.
- Ensure all ports remain integrated with **Swachh Sagar** and **GPI** dashboards.

12.31. IV.3. Capacity Building

- Launch a **Maritime Sustainability Training Framework** with IMU Visakhapatnam and DGS covering MARPOL, OPS and clean-fuel operations.
- Certify and continuously train environment officers for professionalised port-level sustainability management.

12.32. IV.4. Financing and Investment

- Utilise **Green Port Fund, FSDF and carbon finance** to scale green infrastructure.
- Encourage PPP models for OPS, waste and biofuel facilities.
- Pursue international climate-finance and technology grants to expedite rollout.

12.33. IV.5. Community and Environmental Stewardship

- Expand **Sagar Swachhta Saptah**, blue-carbon and mangrove initiatives across sensitive coastal belts.
- Promote CSR/ESG participation in restoration and awareness programmes.
- Maintain harmony between port growth, fishing livelihoods and biodiversity protection through spatial planning.

12.34. IV.6. Digital Integration and Monitoring

- Operationalise the **Integrated Environmental Monitoring System (IEMS-AP)** linking DGS, MoPSW, APMB and APPCB.
- Mandate annual sustainability audits and GPI ranking for all ports to institutionalise continuous improvement.

12.35. IV.7. Conclusion

Andhra Pradesh stands poised to lead India's green-maritime transition. With a long coastline, renewable-energy advantage and emerging clean-fuel ecosystem, the state can evolve into the **eastern seaboard's model of sustainable port governance**. The **Directorate General of Shipping (DGS)** will continue to provide national guidance and digital-platform support, while the **Andhra Pradesh Maritime Board (APMB)** will execute projects, partnerships and innovations as deemed appropriate.

Through coordinated and sustained effort andhra Pradesh can reinforce India's position as a **global maritime power** advancing confidently toward **Net Zero 2050** and a resilient, inclusive **blue economy**.



Coastal State Workshop- Andhra Pradesh

Pillar 6- Coastal Shipping and Opportunities in Inland Navigation

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1. State Profile: Snapshot of Andhra Pradesh's Strategic Initiatives

Andhra Pradesh has emerged as a key player in India's maritime development, leveraging its extensive coastline and strategic location to strengthen coastal shipping, inland navigation, and multimodal connectivity. The state's approach integrates infrastructure development, policy support, and private sector participation to create a future-ready maritime ecosystem.

2. Current Infrastructure

The state boasts a robust maritime network comprising:

- Six operational ports, including Visakhapatnam (a major port), Gangavaram, Kakinada (anchorage and deep sea), Krishnapatnam, and Ravva.
- Four greenfield ports under development: Ramayapatnam, Machilipatnam, Mulapeta, and Kakinada Gateway through public-private partnerships.
- Three declared National Waterways—NW-4, NW-40, and NW-104—covering the Krishna, Godavari, and other river systems.
- Over 900 km of navigable inland waterways being developed to facilitate cargo movement and tourism.
- Comprehensive multimodal connectivity, including 1.6 lakh km of roads, 9,000 km of rail network, and an expanding air network with seven operational airports and a greenfield airport at Bhogapuram.

3. Strategic Initiatives

To enhance maritime efficiency and sustainability, Andhra Pradesh has introduced several forward-looking initiatives:

- Development of RO-RO (Roll-on/Roll-off) and RO-PAX (Roll-on/Passenger) services on the Krishna and Godavari rivers.
- Integration of fishing harbors and coastal cargo terminals to promote short-sea shipping and strengthen coastal trade.
- Establishment of AP Logistics Infrastructure Corporation (AP Link) to unify logistics entities and ensure seamless last-mile connectivity.
- Positioning inland waterways as a green logistics spine, reducing carbon emissions and lowering transportation costs.

4. Opportunities

The state offers significant growth prospects in the maritime sector:

- Modal shift from road to water-based transport for bulk and container cargo, reducing congestion and costs.
- Linking inland industrial zones to ports via waterways and freight corridors to improve supply chain efficiency.
- Development of cruise and temple tourism circuits along rivers to boost marine tourism.

- Private sector participation in building terminals, jetties, and cargo handling infrastructure.

5. Policy & Incentives

Andhra Pradesh has implemented investor-friendly policies to accelerate maritime development:

- 100% SGST reimbursement for 10 years.
- Capital investment support for infrastructure projects.
- Stamp duty exemption for eligible investments. These incentives aim to attract private investment and foster innovation in shipbuilding, marine manufacturing, and sustainable shipping practices.

6. State Profile: Maritime and Trade Profile

Andhra Pradesh is undertaking an ambitious expansion of its maritime infrastructure to strengthen its position as a leading trade and logistics hub on India's eastern coast. The state's development blueprint focuses on creating world-class port facilities, boosting cargo handling capacity, and unlocking the potential of the Blue Economy through strategic investments and policy reforms.

The state is currently developing four major greenfield ports—**Mulapeta (Bhavanapadu) in Srikakulam, Ramayapatnam in Nellore, Machilipatnam in Krishna, and the Kakinada SEZ Port**. These projects represent a significant leap toward modernizing Andhra Pradesh's maritime ecosystem. Budgetary allocations for FY 2025–26 underscore this commitment, with ₹100 crore earmarked for land acquisition at Mulapeta, ₹50 crore for Kakinada SEZ, ₹150 crore for Machilipatnam, and ₹100 crore for the first phase of Ramayapatnam. Construction progress is noteworthy: Ramayapatnam Port is already **52.91% complete**, with a target completion date of December 2025, while Mulapeta has achieved **27.69% progress**, aiming for completion by April 2026. The combined investment for these projects is estimated **at ₹17,600–18,000 crore**, signaling a transformative phase for the state's maritime economy.

The investment potential is equally impressive, projected at **₹16,000 crore by 2030**, scaling up to **US \$20 billion by 2035**, and reaching **₹18,000 crore by 2047**. Employment generation is a key outcome, with more than **75,000 jobs expected by 2030 and over 100,000 jobs by 2047**, creating opportunities across port operations, logistics, and ancillary industries.

Strategic targets have been clearly defined. By 2030, Andhra Pradesh aims to achieve a **cargo handling capacity of 145 million tonnes per annum (MTPA)** through the development of new greenfield ports. A longer-term vision seeks to capture **20% of India's total cargo handled by ports by 2047**, while expanding the state's share in the national shipbuilding and repair sector to **25% under the Andhra Pradesh Maritime Policy 2024 (APMP-2024)**. To support this, a **large shipbuilding and repair cluster** is planned at **Dugarajapatnam in Nellore district**, spanning over 2,000 acres and including core shipyard units and ancillary industries. This cluster is expected to attract investments of approximately ₹26,000 crore and generate direct employment for 5,000 individuals and indirect employment for 30,000 more.

In addition to port development, the state is prioritizing inland waterways and coastal shipping. The goal is to increase cargo movement via waterways from the current **8 million tonnes to 14**

million tonnes, reducing dependence on road transport and promoting sustainable logistics. Furthermore, Andhra Pradesh is working toward an **infrastructure density target of one port or fishing harbor every 50 kilometers of coastline**, ensuring equitable access and regional development.

The **Andhra Pradesh Maritime Board (APMB)** serves as the nodal agency for these initiatives, providing streamlined governance and investor facilitation to accelerate project execution and policy implementation.

7. Coastal Cargo:

a) Interventions to Boost Coastal Cargo through Berth Development

Andhra Pradesh is prioritizing the development of coastal berths as a critical intervention to unlock the full potential of coastal shipping. This strategy aims to augment cargo handling capacity by approximately **34 million tonnes**, significantly reducing logistics costs and promoting sustainable transportation.

The state has identified key coastal berths at major ports such as JNPT (Mumbai), Chennai, Cochin/Kollam, and NMPT (Old Mangalore), which are already planned or under implementation. These berths are designed to handle diverse cargo categories, including cement, steel, tiles, and food grains. For instance, the coastal berth at JNPT is expected to manage nearly 10 million metric tonnes per annum (MMTPA) of cement and steel, with an estimated project cost of ₹1.7 billion. Similarly, Chennai's berth will cater to 2 MMTPA of steel, while Cochin/Kollam is projected to handle 8 MMTPA of tiles and cement, and Old Mangalore will accommodate 3 MMTPA of cement and food grains. These projects are at various stages of readiness, with some already under implementation and others in advanced planning phases.

Beyond these existing plans, the state is exploring the development of new coastal berths at strategic locations, including the Gulf of Khambhat, Machilipatnam, Palghar, and Kori Creek. These sites have been identified for their potential to serve as high-capacity cargo hubs, supporting commodities such as cement, fertilizer, and salt. The proposed projects are currently at the concept stage, with an estimated investment size ranging between ₹5–10 billion, depending on dredging requirements and location-specific factors.

The development of these coastal berths is not merely an infrastructure upgrade; it represents a transformative step toward creating a cost-efficient, environmentally sustainable logistics network. By shifting cargo movement from road to sea, Andhra Pradesh aims to reduce congestion on highways, lower carbon emissions, and enhance the competitiveness of its maritime trade. This initiative aligns with the broader objectives of the Maritime India Vision 2030, positioning the state as a key driver of coastal shipping growth in India.



b) Connectivity Projects for Seamless Integration

The development of coastal cargo infrastructure in Andhra Pradesh is intrinsically linked to robust connectivity solutions that integrate rail, road, and inland waterways with sea-side facilities. Recognizing this, the state has outlined a series of critical connectivity projects aimed at ensuring efficient cargo movement and reducing logistical bottlenecks.

A key priority is the dedicated rail connectivity to Machilipatnam Port from Pedana Station, which is being developed by private stakeholders. This project, estimated at a cost of ₹0.4 billion, is currently in the stage of preparing a Detailed Project Report (DPR) and is categorized as a medium-term initiative. Similarly, plans for rail connectivity to Hazira Port and the last-mile approach road for Palghar coastal berth are under conceptualization, reflecting the state's commitment to long-term infrastructure planning.

In addition to rail and road projects, inland waterways are being positioned as a strategic enabler for multimodal logistics. The development of National Waterway-4 (NW-4), which spans from Vijayawada to Galagali on the Krishna River and connects Kakinada, Vijayawada, Muktyala, and Thada, is a major undertaking by the Inland Waterways Authority of India (IWAI). With an estimated cost of ₹70.02 billion, this project is already under implementation and is expected to significantly enhance the transportation of cement to ports such as Kakinada and Krishnapatnam.

Further, the phased development of National Waterway-5 (NW-5) is aimed at facilitating the movement of coal and other bulk cargo to East Coast ports. Phase 1, with a projected cost of ₹14.62 billion, is focused on steel and coal transportation and is currently undergoing DPR updates, while Phase 2 remains at the conceptual stage.

These connectivity projects are not standalone efforts; they represent a holistic approach to integrating coastal berths with hinterland infrastructure. By synchronizing rail, road, and waterway development, Andhra Pradesh seeks to create a seamless logistics network that reduces transit times, lowers costs, and promotes sustainable cargo movement. This integrated model aligns with the objectives of the Sagarmala Programme and the Maritime India Vision 2030, reinforcing the state's role as a critical node in India's maritime trade ecosystem.

c) Key Enablers to Support Coastal Shipping and Inland Water Transport (IWT)

To fully realize the potential of coastal shipping and inland waterways, Andhra Pradesh is focusing on a series of operational and policy interventions designed to create a level playing field for all modes of transport and optimize multimodal logistics. These measures aim to reduce costs, improve efficiency, and promote sustainable cargo movement across the state's maritime network.

One of the primary enablers is the promotion of multimodal movement, which involves streamlining operational and policy frameworks to ensure equitable treatment of coastal and inland water transport compared to rail and road. Currently, freight subsidies are linked to rail distance, creating a disincentive for coastal and IWT modes. Addressing this imbalance, along with resolving delays in subsidy reimbursements and revising the higher GST rate of 12% on multimodal movement, is critical for encouraging modal shift. Additionally, aligning supply schedules and demand patterns for coastal districts will enable the planning of scheduled services through containerized coastal movement. These efforts are expected to increase coastal cargo share from the current 0.5% to 7%, while inland water transport for eastern and northeastern regions could rise to approximately 2%, driving overall modal optimization.

Another significant intervention is the standardization and containerization of fertilizers, which can reduce transportation costs by 20–25% compared to traditional bagged or jumbo bag methods. Policy recommendations are being formulated to promote containerized movement and implement the concept of “Bulk-in-Bulk-out” loading, where fertilizers are pumped directly into containers. This approach will minimize congestion at ports and plants, improve turnaround times for ships and rakes, and reduce costs associated with port charges and warehousing.

Connectivity remains a cornerstone of these initiatives. Road and rail connectivity to ports is essential for reducing logistics and handling costs, which currently inflate overall transportation expenses. In addition to ongoing Sagarmala projects, 60 new road connectivity projects and 61 rail connectivity projects have been identified through consultations with key stakeholders, including the Ministry of Railways, Ministry of Road Transport and Highways, State Maritime Boards, and Port Authorities. A Comprehensive Port Connectivity Plan, prepared by DPIIT, will serve as the guiding framework for these developments, ensuring seamless integration between coastal berths, inland waterways, and hinterland infrastructure.

Collectively, these interventions represent a strategic shift toward building a cost-efficient, environmentally sustainable, and technologically advanced maritime logistics ecosystem. By addressing policy gaps, improving connectivity, and promoting containerization, Andhra Pradesh is laying the foundation for a robust coastal shipping and IWT network that aligns with national priorities under the Maritime India Vision 2030.

d) Key Enablers to Support Green Shipping

Andhra Pradesh is committed to advancing green shipping practices as part of its broader maritime sustainability agenda. The state recognizes that shifting cargo movement from road and rail to sea is a critical step toward reducing emissions and lowering logistics costs. This transition not only enhances environmental performance but also improves operational efficiency across the maritime value chain.

A major thrust of the green shipping strategy involves transitioning vessels to green fuels and installing Energy Saving Devices (ESDs). These measures require substantial funding support, and the state is actively exploring financial mechanisms to facilitate adoption. Complementing this, policy incentives are being introduced to encourage cargo movement on vessels that meet stringent green compliance standards, ensuring alignment with global environmental norms.

To accelerate the adoption of sustainable technologies, Andhra Pradesh is promoting 90% long-tenure loans for Hybrid Tugs at major ports. These tugs play a vital role in port operations and their conversion to hybrid systems will significantly reduce emissions. Additionally, the regular provision of green shore power at ports is being prioritized to enable vessels to operate sustainably while docked, minimizing reliance on fossil fuels.

Institutional frameworks are also being strengthened to drive demand and foster collaboration. The Coastal & Inland Cargo Facilitation Center (CCFC), under the Inland Waterways Authority of India (IWAI), will spearhead outreach initiatives and coordinate efforts among public sector undertakings, trade bodies, private players, and rail-road ministries. Similarly, the Center for Marine Economy & Connectivity, in partnership with the Indian Ports Association (IPA) and Research and Information System for Developing Countries (RIS), will harmonize coastal shipping agreements with BIMSTEC nations, boosting regional waterways movement and cross-border trade.

Further, the establishment of the National Center for Excellence for Green Ports & Shipping, in collaboration with TERI, marks a significant milestone in India's green maritime journey. This center will focus on developing hydrogen hubs and green coastal vessels, positioning Andhra Pradesh as a leader in sustainable shipping innovation.

Collectively, these initiatives underscore the state's commitment to environmental stewardship while enhancing maritime competitiveness. By integrating green technologies, financial incentives, and institutional support, Andhra Pradesh is paving the way for a cleaner, more efficient, and globally aligned maritime ecosystem.

8. Coastal Shipping Act, 2025: Key Provisions and Improvements

The Coastal Shipping Act, 2025 represents a landmark reform aimed at modernizing India's coastal shipping framework and fostering self-reliance in the maritime sector. This legislation introduces several progressive measures designed to simplify compliance, enhance operational efficiency, and promote sustainable growth.

One of the most significant provisions is simplified licensing, which removes the requirement for Indian-flagged vessels to obtain a general trading license for coastal operations. This change reduces regulatory burdens and encourages greater domestic participation in coastal trade. Complementing this, the Act broadens the definition of coastal trade beyond the traditional carriage of goods and passengers to include services such as exploration, research, and other commercial activities, excluding fishing. This expanded scope opens new avenues for innovation and investment in maritime services.

The Act also emphasizes integration of coastal and inland waterways, creating a seamless multimodal transport network that minimizes transshipment needs and improves overall efficiency. This integration is expected to significantly reduce logistics costs and enhance connectivity between ports and hinterland regions.

To support better decision-making and transparency, the Act mandates the creation of a national database for coastal shipping. This centralized platform will provide real-time information on licenses, routes, and operational metrics, enabling stakeholders to plan and optimize coastal trade effectively.

Strategic planning is another cornerstone of the Act. It calls for the biennial preparation of a National Coastal and Inland Shipping Strategic Plan, which will focus on route optimization, traffic forecasting, and sustainable growth initiatives. Additionally, the Act strengthens environmental compliance by introducing revised penalties and stricter environmental standards, ensuring that coastal shipping aligns with global sustainability norms.

Importantly, the Act promotes the use of Indian-built vessels, reinforcing the domestic shipbuilding and repair industry and advancing India's goal of maritime self-reliance. By

combining regulatory simplification, technological integration, and sustainability measures, the Coastal Shipping Act, 2025 sets the stage for a transformative shift in India's coastal shipping landscape.

9. National Database for Coastal Shipping: The Vision

The creation of a National Database for Coastal Shipping represents a transformative step toward digitizing and streamlining India's coastal trade ecosystem. This initiative aims to address existing inefficiencies, reduce costs, and enable seamless integration of multimodal logistics through advanced digital solutions.

a) Current State

At present, coastal shipping operations are hindered by segregated, paper-based processes, with documents circulating across multiple portals, leading to delays and inconsistencies. Access to critical information such as vessel details, licenses, and service providers is limited, creating operational bottlenecks. Outdated regulations further compound these challenges, as they fail to reflect the realities of modern logistics and digital workflows. Additionally, the absence of standardized formats for documentation results in fragmented processes and lack of interoperability.

b) Interventions

To overcome these limitations, the proposed database will digitize the flow of information in coastal trade, enabling real-time clearance, licensing, and reporting. By reducing logistics costs and the cost of capital, this initiative will make coastal shipping more competitive and efficient. Aligning laws and regulations with digital practices is a key priority, supported by the development of Digital Standard Operating Procedures (SOPs) to ensure uniformity and compliance across stakeholders.

c) The Desired State

The ultimate goal is to create a fully automated system that integrates digital clearance, trading, reporting, and KYC processes. This will lead to a widened logistics ecosystem, offering a national and global one-stop-shop service that connects coastal trade with broader supply chains. A robust legal framework will mandate the exclusive use of electronic documentation, ensuring transparency and accountability. Furthermore, interoperability across systems will enable seamless data exchange between different technology platforms and government initiatives, fostering efficiency and reducing redundancies.

By bridging the gap between traditional practices and digital innovation, the National Database for Coastal Shipping will serve as a cornerstone for India's maritime modernization. It will not only enhance operational efficiency but also support strategic planning, policy formulation, and sustainable growth in alignment with the Maritime India Vision 2030.

10. National Database for Coastal Shipping: Current Digital Initiatives in the Indian Maritime System

India's maritime sector is undergoing a significant digital transformation, and coastal trade is emerging as the missing link in this modernization journey. Several initiatives have been launched to integrate technology into port operations, streamline processes, and enhance efficiency, sustainability, and regional connectivity.

The Digitalization Push is at the forefront of this effort, focusing on modernizing ports, optimizing cargo handling, reducing congestion, and enabling paperless trade. This initiative aims to create a seamless digital ecosystem that minimizes manual interventions and accelerates operational workflows.

A key enabler of this transformation is the SAGAR SETU Platform, a unified digital system that connects over 80 ports and 40 stakeholders, facilitating EXIM operations and improving ease of doing business. This platform serves as a centralized hub for trade-related processes, ensuring transparency and efficiency across the maritime value chain.

The establishment of the Digital Centre of Excellence (DCoE) under the Ministry of Ports, Shipping & Waterways (MoPS&W) in partnership with CDAC marks another milestone. The DCoE is driving innovation through advanced technologies such as Artificial Intelligence (AI), Internet of Things (IoT), and blockchain, aligning with the objectives of Maritime India Vision 2030 and Amrit Kaal Vision 2047.

Performance monitoring and transparency are being strengthened through the DRISHTI Framework, which introduces KPI-based evaluation across ports. This system ensures accountability and fosters continuous improvement in operational standards.

To optimize costs and promote uniformity, the Standardized Scale of Rates (SOR) has been implemented, harmonizing port tariffs and enabling digital integration for cost efficiency. Complementing these efforts are Green Initiatives, such as the “Gateway to Green” report, which positions Paradip, JNPA, and DPA as global hubs for green hydrogen, targeting a production capacity of 5 million tonnes by 2030.

The Sagarmala Programme continues to play a pivotal role in port modernization, connectivity enhancement, and the adoption of technologies like blockchain and IoT for improved efficiency and transparency. Additionally, the Innovation Ecosystem, driven by the Sagarmala Startup & Innovation Initiative (S2I2), is fostering maritime technology startups and MSMEs, promoting indigenous solutions and global competitiveness.

Collaboration remains a cornerstone of these initiatives, with partnerships between academia, research institutions, and private sector players aimed at accelerating innovation and building a resilient maritime technology ecosystem.

Collectively, these digital initiatives are transforming India’s maritime sector into a technology-driven, sustainable, and globally competitive industry. By integrating coastal trade into this digital framework, India is unlocking new opportunities for efficiency, environmental stewardship, and regional connectivity.

11. National Database for Coastal Shipping: Proposed Setup under the Coastal Shipping Act, 2025

The proposed setup for the National Database for Coastal Shipping is designed to create a centralized, transparent, and efficient system for managing coastal trade operations. This framework, mandated under the Coastal Shipping Act, 2025, integrates strategic planning, stakeholder engagement, and digital infrastructure to streamline processes and enhance decision-making.

At the apex of this structure is the Ministry of Ports, Shipping and Waterways, which provides oversight and publishes the strategic plan. The Strategic Plan Preparation Committee, comprising representatives from DG Shipping, IWAI, Port Authorities, and Maritime Boards, is responsible for drafting the strategic plan. This plan will outline route assessments, operational improvements, and policy recommendations aimed at optimizing coastal shipping and inland waterway integration.

Once finalized, the strategic plan will be made publicly accessible through a government web portal, ensuring transparency and stakeholder participation. The system will also incorporate continuous data feeds from industry experts, seafarer and shipowner representatives, and other stakeholders, enabling real-time updates and informed decision-making.

At the operational level, the National Database for Coastal Shipping will feature multiple modules, including:

- License Module for managing permits and compliance.
- Route and Voyage Database to track vessel movements and service schedules.
- Reporting Engine for performance monitoring and analytics.
- Application Tracker to streamline approvals and licensing processes.
- Route/Service Registry for maintaining standardized service information.
- Administrative Management Tools to ensure smooth functioning and governance.

This integrated system aims to deliver a one-stop digital platform that supports automation, interoperability, and transparency across the coastal shipping ecosystem. By consolidating data and processes, the proposed setup will reduce administrative delays, improve operational efficiency, and foster sustainable growth in line with the objectives of the Maritime India Vision 2030.

12. National Database for Coastal Shipping: Stakeholder Identification and Data Collection

The initiative focuses on creating a comprehensive National Database for Coastal Shipping, aimed at improving data integration and stakeholder collaboration within the maritime ecosystem. The line of action involves systematic identification of stakeholders and robust data collection strategies to support national objectives.

Key Activities

1. Review of Existing Data Sources and Systems

A thorough examination of current maritime and coastal shipping data repositories and systems is undertaken to understand existing capabilities and gaps.

2. Stakeholder Identification

All relevant stakeholders within the maritime ecosystem and coastal trade network are identified and listed to ensure inclusive participation in the database framework.

3. Assessment of Data Availability and Readiness

The initiative evaluates the accessibility and quality of existing data, preparing strategic options for data collection and synthesis to enhance decision-making.

4. Evaluation of Data Usage Across Ecosystem

Usage patterns and requirements of stakeholders are analyzed to ensure the database meets operational and strategic needs.

5. Baseline Data Collection Framework Finalization

A standardized framework for data collection is finalized, aligning with the National Coastal Shipping Database and other national digital initiatives for interoperability.

13. Maritime Ecosystem Stakeholders

The project encompasses a wide range of stakeholders critical to coastal shipping operations, including:

- Government Authorities: Inland Waterways Authority of India, Major Port Authorities (12 ports), State Maritime Boards, Ministry of Ports, Shipping & Waterways, Ministry of Commerce, Ministry of Road Transport & Highways (MoRTH), and Ministry of Electronics & IT (MeitY).
- Industry Participants: Ship Owners, Seafarers, Shipping Corporation of India, CHAs/Freight Forwarders.
- Infrastructure and Logistics: DMICDC, NICDC, Indian Railways, GSTN.
- Regulatory and Customs: Customs Department.

Integration and Collaboration

The initiative explores opportunities for Memorandums of Understanding (MoUs) and integration with platforms such as NLP-Marine and ULIP, ensuring seamless inclusion of major stakeholders and promoting data-driven maritime operations.

As part of Phase I of the National Database for Coastal Shipping, a structured plan has been developed to integrate critical data points that will enhance transparency and operational efficiency in coastal trade. The database will capture information on applications received for licenses under Section 4 of the Coastal Shipping Bill, along with details of licenses granted under the same section and the terms and conditions associated with these licenses. It will also include comprehensive records of routes, voyages, and services operating within India's coasting trade. Additionally, the system will document requirements for applicants seeking licenses under Section 4, as well as information on expired and revoked licenses under Section 5 of the Bill. Reports submitted to the Director-General under Section 6 will form an essential part of the dataset, ensuring regulatory compliance and oversight. To maintain flexibility and adaptability, the database will also accommodate any other information deemed necessary by the Director-General, thereby creating a robust and dynamic framework for coastal shipping governance.

14. Tentative Functional Architecture of the Database

The tentative functional architecture of the National Database for Coastal Shipping has been designed to provide a comprehensive and integrated platform for managing coastal shipping operations. The system will feature multiple portals, including a web portal, mobile application, and back-office portal, each serving distinct functions to ensure seamless user experience and administrative control. The web and mobile portals will offer business information services such as license management and route and voyage details, along with digital publications like MOPSW reporting and performance reports. Common services will include data security and compliance, user authentication, document management, and API gateways, ensuring interoperability and adherence to MeitY and other compliance standards. Business application services will provide e-services for operational licenses, ship tracking, and route planning, as well as extended services for foreign and Indian licenses.

The back-office portal will support administrative functions such as audit trails and configuration management, while also handling workflow control, content management, database management, and compliance reporting. Identity and access management will cover authentication for vessel owners and seafarers. Additionally, DG Shipping will have a dedicated reporting and tracking module, featuring an internal website for asset and license management, and an administrative dashboard for licenses, inspections, enforcement, and compliance reports. The architecture also integrates with multiple external interfaces, including

E-Samudra, port authorities, maritime boards, real craft portals, and movement data systems for road and rail, ensuring a fully connected ecosystem. This layered architecture is designed to deliver efficiency, transparency, and regulatory compliance across the coastal shipping sector.

15. Interventions Sought from the State Government

To enable seamless integration with the National Database for Coastal Shipping (NDCS), stakeholders are expected to undertake several key actions. First, a nodal officer and technical contact must be nominated to coordinate and manage the integration process effectively. Where necessary, stakeholders should enter into a data-sharing agreement or Memorandum of Understanding (MoU) with the Directorate General (DG) Shipping to formalize collaboration. Compliance with licensing and voyage processes, as outlined in the Coastal Shipping Act, 2025, is essential to ensure regulatory alignment. Additionally, stakeholders must provide access to a complete inventory of vessel, license, and voyage data, which will serve as the foundation for accurate and comprehensive reporting. Finally, access to existing systems and necessary APIs should be granted to facilitate smooth technical integration and interoperability within the NDCS framework.