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India Emerges as World's Leading Ship Recycling Nation in 2025, Advancing Circular Economy and Sustainable Maritime Development

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Recent Developments:

India Becomes Global Leader in Ship Recycling:

- According to the latest UNCTAD estimates, India became the world's leading ship recycling nation in 2025, with its global share increasing from 30.1% in 2024 to 35.4% in 2025
- India recycled 2.99 million gross tons (GT) of ships in 2025, compared with 1.86 million GT in 2024, representing an increase of nearly 60%
- India achieved the Maritime India Vision 2030 target of becoming the world's leading ship recycling nation five years ahead of schedule
- The growth reflects improvements in regulatory compliance, yard infrastructure, environmental management, worker safety and international market access

Alang-Sosiya Strengthens India's Position:

- The Alang-Sosiya Ship Recycling Yard in Gujarat accounts for about 98% of India's ship recycling activity and remains the backbone of the national ship recycling industry
- Alang-Sosiya currently has 128 operational plots with a recycling capacity of approximately 4.5 million LDT per annum
- Since its establishment in 1982-83, Alang has recycled more than 8,900 ships, aggregating over 71 million LDT
- The yard supports approximately 15,000 direct workers and more than 1.5 lakh people indirectly through ancillary industries and related services

International Compliance Gains Momentum:

- The Hong Kong International Convention for the Safe and Environmentally Sound Recycling of Ships entered into force on 26 June 2025, establishing mandatory international requirements for safe and environmentally sound ship recycling
- India's domestic regulatory framework has been aligned with the Convention through the Recycling of Ships Act, 2019, the Recycling of Ships Rules, 2021, and the Recycling of Ships Regulations, 2026
- The Recycling of Ships Regulations, 2026 were notified on 2 January 2026 under the Recycling of Ships Act, 2019 and apply to ship recycling facilities operating in India and Indian-registered ships within the scope specified

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by the Regulations

- India and the European Union are also working towards greater regulatory cooperation and the inclusion of eligible Indian yards under the EU Ship Recycling Regulation framework

Ship Recycling: Concept and Significance:

What Is Ship Recycling?

- Ship recycling is the systematic dismantling of an end-of-life vessel to recover reusable materials such as steel, machinery, equipment and other components
- Ship recycling converts obsolete vessels into secondary raw materials and therefore contributes to the circular economy
- Responsible recycling also requires the safe identification, removal, treatment and disposal of hazardous materials present on ships
- Hazardous substances may include asbestos, heavy metals, hydrocarbons and ozone-depleting substances, creating occupational and environmental risks if they are poorly managed

Why Is Ship Recycling Important for India?

- Ship recycling supports resource security by recovering large quantities of steel and other materials without requiring equivalent quantities of virgin resource extraction
- The industry generates employment, industrial activity and ancillary economic opportunities in coastal regions
- Recycling ships reduces the environmental burden associated with extracting and processing new raw materials and therefore supports resource efficiency and circularity
- A globally competitive recycling industry can strengthen India's position in the maritime value chain

India's Ship Recycling Ecosystem:

Alang-Sosiya Ship Recycling Cluster:

- The Alang-Sosiya cluster in Gujarat is India's principal ship recycling hub and accounts for approximately 98% of national ship recycling activity
- The cluster combines ship recycling yards, steel re-rolling mills, waste-management facilities, transport networks and other ancillary services
- Alang has therefore developed from a ship-breaking location into an increasingly integrated ship recycling ecosystem
- The cluster promotes the recovery and reuse of steel and other materials, supporting circular economy objectives and reducing resource consumption

Steel Recovery and Resource Efficiency:

- Ship recycling enables substantial recovery of steel and other reusable materials, reducing dependence on fresh extraction of natural resources
- Recovered steel can enter downstream manufacturing through steel re-rolling and allied industrial activities

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- This creates a link between maritime infrastructure, secondary raw materials and manufacturing, strengthening industrial resource efficiency

Worker Safety and Welfare:

- Modernisation of recycling yards has increasingly incorporated engineered plots, impermeable surfaces, drainage systems, mechanised handling, hazardous-waste storage and structured safety systems
- Worker welfare measures include occupational safety training, healthcare facilities, emergency preparedness and improved working conditions
- Such measures are particularly important because ship recycling can expose workers to toxic substances, heavy machinery, fire hazards and structural risks

Regulatory and Institutional Framework:

Recycling of Ships Act, 2019:

- The Recycling of Ships Act, 2019 provides the principal statutory framework for regulating ship recycling in India
- The Act establishes requirements relating to authorisation, certification, inspection, hazardous-material management and enforcement
- The Directorate General of Shipping functions as the National Authority for implementing the regulatory framework

Recycling of Ships Rules, 2021:

- The Recycling of Ships Rules, 2021 operationalise the statutory framework by prescribing requirements for ship recycling facilities, ship recycling plans, hazardous materials, worker safety, training and reporting
- The Rules provide an implementation framework for translating the objectives of the 2019 Act into operational requirements

Recycling of Ships Regulations, 2026:

- The Recycling of Ships Regulations, 2026 provide more detailed requirements for the operation of ship recycling facilities and strengthen environmental, occupational-safety and compliance standards
- The Regulations strengthen India's domestic implementation of internationally recognised standards under the Hong Kong Convention

Hong Kong Convention:

About the Convention:

- The Hong Kong International Convention for the Safe and Environmentally Sound Recycling of Ships, 2009 was adopted under the framework of the International Maritime Organization (IMO)
- The Convention was adopted on 15 May 2009 and entered into force on 26 June 2025
- Its principal objective is to ensure that ships are recycled without creating unnecessary risks to human health, worker safety or the environment

- The Convention addresses the entire recycling chain through requirements concerning ship design, construction, operation, preparation, recycling facilities, authorisation, certification, inspection and reporting

Conditions for Entry into Force:

- The Convention required at least 15 States, representing at least 40% of world merchant shipping by gross tonnage, along with sufficient ship recycling capacity before entering into force
- These conditions were fulfilled in June 2023, allowing the Convention to enter into force 24 months later on 26 June 2025

Importance for India:

- The Convention creates a more uniform global regulatory environment for ship recycling and can improve the competitiveness of compliant Indian yards
- Compliance helps Indian facilities gain access to international markets and improves their prospects for recognition under regulatory regimes such as that of the European Union
- India's compliance is particularly significant because India is one of the world's major ship recycling countries

Inventory of Hazardous Materials:

Purpose of IHM:

- The Inventory of Hazardous Materials (IHM) identifies hazardous substances present on a ship before the vessel reaches the recycling stage
- It improves traceability, transparency and risk management throughout the ship's operational and recycling lifecycle
- IHM is particularly important for substances such as asbestos, heavy metals, hydrocarbons and ozone-depleting substances, which can harm workers and ecosystems if improperly handled
- Proper identification enables recycling facilities to prepare vessel-specific procedures for safe removal, storage, treatment and disposal

Ship Recycling and Circular Economy:

Contribution to Circular Economy:

- Ship recycling converts an end-of-life vessel into a source of secondary raw materials, thereby reducing waste and improving resource productivity
- Recovery of steel and other materials reduces the requirement for virgin raw materials and can lower the environmental footprint of industrial production
- The industry demonstrates how waste management, manufacturing and maritime infrastructure can be integrated within a circular economic model

Resource Security:

- India's large-scale ship recycling capacity provides a domestic source of recovered steel and other materials
- Greater use of secondary materials can reduce pressure on natural resources and strengthen industrial resilience

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- Ship recycling can therefore contribute simultaneously to resource security, employment, industrial development and environmental sustainability

Policy Measures Supporting the Sector:

Maritime India Vision 2030:

- Maritime India Vision 2030 identified ship recycling as an important component of India's maritime development strategy
- India has already achieved the target of becoming the world's leading ship recycling nation, five years ahead of the original 2030 timeline
- Future priorities include increasing capacity, improving global compliance and strengthening India's position as a safe and environmentally sustainable ship recycling hub

Ship-Breaking Credit Note Scheme:

- The Ship-Breaking Credit Note Scheme under the Ship Building Financial Assistance Scheme 2.0 seeks to connect ship recycling with domestic shipbuilding
- The scheme provides a credit note equivalent to 40% of the recycled vessel's scrap value, subject to the applicable conditions
- The credit note can be used towards the purchase of a new vessel built in India, with its utilisation capped at 5% of the value of the new Indian-built vessel
- The policy creates a linkage between ship recycling and shipbuilding, encouraging a more integrated domestic maritime industrial ecosystem

Yard Modernisation:

- Government support has encouraged Indian recycling yards to upgrade infrastructure, environmental management systems and occupational-safety arrangements
- Modernisation has supported compliance with the Hong Kong Convention and improved the prospects of Indian yards in international markets
- Periodic and unannounced inspections are also used to strengthen environmental compliance, worker safety and operational transparency

India–European Union Cooperation:

EU Recognition:

- India is working with the European Union to facilitate the recognition of eligible Indian ship recycling facilities under the EU Ship Recycling Regulation
- More than 30 Indian ship recycling yards had applied for EU recognition by July 2026, while several facilities were undergoing compliance and approval processes
- EU recognition is strategically important because it can improve access to vessels subject to European regulatory requirements and strengthen India's position in the global recycling market

Significance:

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- EU recognition can create incentives for Indian yards to maintain higher environmental, labour and safety standards
- Greater regulatory interoperability can improve India's integration with global maritime supply chains
- International recognition can also help shift India's ship recycling industry from a traditional ship-breaking model towards responsible ship recycling

Ex-INS Viraat: Case Study:

Background:

- INS Viraat was one of the world's longest-serving aircraft carriers and served the Royal Navy for 27 years and the Indian Navy for 30 years
- The vessel was decommissioned in March 2017 and subsequently reached Alang, Gujarat, in September 2020 for dismantling and recycling
- Its recycling demonstrated India's capacity to handle the dismantling of a large and technically complex vessel

Significance:

- The recycling of Ex-INS Viraat demonstrated the potential for material recovery, employment generation and industrial activity through responsible ship recycling
- The case also highlighted the importance of applying improved occupational-safety and environmental-management practices to large-scale vessel dismantling

Challenges:

Occupational Safety:

- Ship recycling involves risks from hazardous materials, heavy machinery, confined spaces, fires, explosions and unstable structures
- Sustaining international leadership therefore requires continuous investment in worker training, personal protective equipment, emergency preparedness and healthcare

Hazardous Waste Management:

- End-of-life ships may contain asbestos, heavy metals, hydrocarbons and other hazardous substances
- Improper handling can contaminate soil, groundwater and coastal ecosystems and expose workers to serious health risks
- Effective recycling therefore requires scientific segregation, storage, treatment and disposal of hazardous waste

Environmental Concerns:

- Poorly managed ship recycling can cause marine pollution, air pollution, soil contamination and hazardous-waste accumulation
- Environmental compliance must therefore extend beyond individual yards to include the entire waste-management and downstream recycling chain

Global Competition:

- India competes with major ship recycling countries such as Bangladesh, Pakistan and Türkiye
- Maintaining leadership will require continued investment in technology, infrastructure, safety, environmental performance and international certification

Regional Concentration:

- The overwhelming concentration of ship recycling activity at Alang-Sosiya creates both an industrial advantage and a regional concentration risk
- Developing additional compliant recycling capacity can improve geographical diversification, resilience and national capacity

Significance for India:

Economic Significance:

- Ship recycling generates employment, industrial output, recovered raw materials and ancillary economic activity
- The industry strengthens coastal economies and supports businesses involved in steel processing, logistics, waste management, machinery and services

Environmental Significance:

- Responsible recycling supports the circular economy by recovering materials from obsolete ships
- It can reduce demand for virgin resources and contribute to resource efficiency and lower industrial environmental pressures

Maritime Significance:

- A strong ship recycling sector complements India's ambitions to develop a comprehensive maritime industrial ecosystem
- Linking ship recycling with shipbuilding can create a more integrated domestic ship lifecycle economy

Strategic Significance:

- Internationally compliant recycling facilities can enhance India's position in the global maritime economy
- Leadership in sustainable ship recycling strengthens India's broader image as a proponent of responsible and environmentally sustainable maritime development

Way Forward:

Strengthen Green Ship Recycling:

- India should promote mechanised dismantling, cleaner technologies, scientific waste treatment and resource-efficient processes to reduce environmental and occupational risks
- Greater adoption of digital monitoring can improve traceability, compliance and transparency

Improve Worker Protection:

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- Continuous investment in occupational safety training, protective equipment, emergency response, healthcare and social-security measures is essential
- Worker safety should remain a core performance indicator alongside recycling volume and economic output

Expand International Recognition:

- India should accelerate efforts to obtain EU recognition for eligible recycling facilities while maintaining compliance with the Hong Kong Convention
- International certification can increase access to higher-value recycling markets and reinforce India's reputation for responsible recycling

Diversify Recycling Capacity:

- Additional compliant recycling clusters can be developed beyond Alang-Sosiya while ensuring adequate environmental infrastructure, skilled labour and regulatory capacity
- Diversification can reduce regional concentration and expand employment opportunities across India's coastline

Integrate Shipbuilding and Ship Recycling:

- Policy should create a stronger ship lifecycle ecosystem, connecting ship design, construction, operation, maintenance, decommissioning and recycling
- The Ship-Breaking Credit Note mechanism can help create demand for Indian-built vessels while encouraging compliant recycling

UPSC Relevance:

GS Paper I – Indian Geography and Industry:

- Alang-Sosiya, Gujarat, as a major maritime industrial cluster
- Coastal industrialisation, resource recovery and the spatial concentration of maritime activities
- Relationship between ship recycling, steel production, employment and coastal economic development

GS Paper II – International Relations:

- Hong Kong Convention, IMO and international environmental governance
- India–EU cooperation on sustainable ship recycling
- India's role in shaping global norms for environmentally responsible maritime activity

GS Paper III – Economy and Environment:

- Circular economy, resource efficiency, secondary raw materials and sustainable industrialisation
- Maritime sector development under Maritime India Vision 2030
- Occupational safety, hazardous-waste management and environmental regulation

Essay:

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- “A circular economy converts end-of-life products into new economic opportunities without compromising environmental sustainability.”
- “India’s maritime strength requires not only building ships but also managing their entire lifecycle responsibly.”

Value Addition for UPSC:

Key Concept – Ship Recycling and Circular Economy:

- Ship Recycling ? Material Recovery ? Secondary Raw Materials ? Reduced Virgin Extraction ? Resource Efficiency ? Circular Economy

Key Concept – Hong Kong Convention:

- The Hong Kong Convention follows a cradle-to-grave approach, covering relevant environmental and safety aspects throughout the ship lifecycle and establishing responsibilities for shipowners, shipyards, recycling facilities and authorities

Important Facts for Prelims:

- India’s global ship recycling share in 2025: 35.4%
- India’s ship recycling volume in 2025: 2.99 million GT
- India’s ship recycling volume in 2024: 1.86 million GT
- Alang-Sosiya share of India's ship recycling activity: approximately 98%
- Operational plots at Alang-Sosiya: 128
- Current Alang-Sosiya recycling capacity: approximately 4.5 million LDT per annum
- Hong Kong Convention adopted: 2009
- Hong Kong Convention entered into force: 26 June 2025
- Indian statutory framework: Recycling of Ships Act, 2019
- Operational rules: Recycling of Ships Rules, 2021
- Latest regulations: Recycling of Ships Regulations, 2026
- Main Indian recycling hub: Alang-Sosiya, Gujarat
- International organisation responsible for the Hong Kong Convention: International Maritime Organization (IMO)
- Core environmental principle: Safe and environmentally sound recycling of ships
- Major hazardous materials: Asbestos, heavy metals, hydrocarbons and ozone-depleting substances

One-Line UPSC Takeaway:

- India’s emergence as the world’s leading ship recycling nation reflects the convergence of maritime industrial policy, circular economy, international environmental compliance, resource security and sustainable development

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