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Navigating India's Evolving EHS Regulatory Landscape:

Key EHS Updates Every Manufacturer Must Know

A Sparrow RMS Strategic Playbook

Foreword: From Compliance Burden to Competitive Advantage in the New Industrial Age

For decades, Environment, Health, and Safety (EHS) compliance in India was often viewed as an administrative necessity a framework of licenses, registers, and inspections to be managed. Today, this perception is not just outdated; it is dangerous. The Indian manufacturing landscape is at the nexus of three powerful, converging forces that have elevated EHS from a back-office function to a central driver of business resilience and competitive advantage.

First is the intensification of regulatory scrutiny. India's legal framework is undergoing its most significant transformation in decades. New, stringent, and data-driven laws like the Occupational Safety, Health and Working Conditions (OSH) Code, 2020, are replacing legacy acts. Sector-specific rules on greenhouse gas emissions, water pollution, and chemical management are being enforced with unprecedented rigour, backed by a powerful National Green Tribunal (NGT). Second is the rise of investor and market demands. Global investors, supply chain partners, and entire markets now operate on the principles of Environmental, Social, and Governance (ESG). Access to capital and, increasingly, access to global markets—such as the EU, with its Carbon Border Adjustment Mechanism (CBAM) —is now contingent on proving sustainable and safe operations.

Third is the heightened awareness of stakeholders. A modern workforce actively seeks safer and healthier work environments, directly impacting talent retention. Consumers are more discerning, demanding supply chain sustainability and ethical sourcing, making EHS integrity a critical component of brand reputation. Navigating this new, high-stakes environment requires more than a checklist. It demands strategic foresight to anticipate change and integrated digital systems to manage risk in real-time. This playbook is the definitive guide to mastering this new landscape. It is built on **Sparrow RMS's** unique, dual-pronged approach: the strategic expertise of our Core Consulting practice (Section 1) and the powerful execution of our Technology Gambit (Section 2).

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We are engineering "the bridge between complex logic and tangible outcomes," delivering the integrated solutions that build resilience and create lasting value at the core of India's manufacturing digitalization.

SECTION 1: THE EHS REGULATORY LANDSCAPE & STRATEGIC CONSULTING

This section details the complex web of regulations—the "what" and "why." It is designed to demonstrate deep domain expertise and the strategic advisory services that provide the foundation for any successful compliance program.

Part 1.1: The Foundations of Indian EHS Compliance

The Three Pillars: The Bedrock of Environmental Law

Understanding India's EHS landscape begins with three foundational "umbrella" acts that grant the government its power to regulate.

- The Environment (Protection) Act, 1986 (EPA): Enacted after the Bhopal tragedy, this is India's single most powerful "umbrella legislation". It grants the Central Government sweeping powers to "take all such measures as it deems necessary" to protect the environment. For manufacturers, its key provisions include:
  - Power to Set Standards: The EPA empowers the Central Government to set national standards for emissions and discharges from industries.
  - Regulation of Hazardous Substances: It provides the legal basis for controlling hazardous substances, which led to subsequent rules like the MSIHC Rules.
  - Severe Penalties: The Act includes stringent penalties for non-compliance, including fines and imprisonment, with provisions that can hold corporate officers and heads of departments personally liable.
- The Water (Prevention and Control of Pollution) Act, 1974: This Act established the core regulatory architecture of the Central Pollution Control Board (CPCB) and the State Pollution Control Boards (SPCBs). Its primary function is to control and prevent water pollution by regulating industrial discharges. Key provisions include:
  - Prohibition on Pollution: It prohibits the disposal of polluting matter into streams, wells, or on land.
  - Consent to Establish/Operate: It mandates that no industry can establish or operate without first obtaining "Consent" (Consent to Establish - CTE, and Consent to Operate - CTO) from their respective SPCB.

- The Air (Prevention and Control of Pollution) Act, 1981: Following the Water Act, this legislation empowers the CPCB and SPCBs to regulate and control air pollution. Its key provisions include:
    - Consent to Operate: Like the Water Act, it mandates that industries obtain SPCB "Consent" to operate within designated "air pollution control areas".
    - Stricter Standards: It gives SPCBs the authority to set emission standards for their state that are stricter than the national standards, often based on local environmental conditions.

The Enforcement Hierarchy: Navigating the Key Agencies

- Ministry of Environment, Forest and Climate Change (MoEF&CC): The apex body responsible for all policy formulation, issuing legal notifications (like the EPA rules), and managing India's international environmental commitments.

- Central Pollution Control Board (CPCB): The national technical and coordinating body. The CPCB sets the national standards for air, water, and noise; develops waste management guidelines; and coordinates the activities of the state boards.

- State Pollution Control Boards (SPCBs): For manufacturers, this is the most critical on-ground enforcement agency. The SPCBs are responsible for issuing and renewing the all-important CTE and CTO, conducting inspections, collecting monitoring data, and enforcing penalties.

- National Green Tribunal (NGT): Established in 2010, the NGT is a powerful, specialized judicial body that has fundamentally accelerated EHS enforcement. It has the power to hear environmental cases and has become known for levying massive "Environmental Compensation" (EC) penalties and mandating stricter norms, such as Zero Liquid Discharge (ZLD) in polluted areas.

EMERGING UPDATE (2024-2025): A New Era for Project Approvals

A landmark change in late 2024 has fundamentally altered the project approval process for all new manufacturing plants.

- **The Change:** On November 12, 2024, the MoEF&CC issued notifications G.S.R. 702(E) and G.S.R. 703(E) under the Air and Water Acts.

- **The Impact:** These notifications create two new pathways:

  - **EC-CTE Integration:** For all new projects and expansions that require a prior Environmental Clearance (EC) under the EIA Notification 2006, a separate Consent to Establish (CTE) from the SPCB is no longer required.

  - **"White Category" Exemption:** Non-polluting White Category industries are now exempt from both CTE and Consent to Operate (CTO), requiring only a one-time intimation to the SPCB.

While this is being promoted as a reduction of compliance burden, the reality is more complex. The official Standard Operating Procedure (SOP) clarifies that the SPCB must still be consulted during the EC process and the CTE fee must still be paid.

This does not eliminate scrutiny; it front-loads it. The Environmental Clearance application has now become the single, high-stakes gateway for project approval. All technical details, pollution control designs, water balance diagrams, and SPCB-specific concerns must be flawlessly addressed at the initial EC stage. Previously, a minor query on the CTE application might delay a project by weeks. Today, a query on the integrated EC application can delay the entire project by many months, making Right First Time a non-negotiable business objective.

This change massively increases the value of expert, upfront consulting. Manufacturers can no longer treat EC and CTE as separate, sequential hurdles. They must present a single, holistic, and technically robust case to both central and state authorities from day one.

CASE IN POINT: How **Sparrow's Consulting** Ensures "Right First Time" Approval

Client: A leading automotive component manufacturer planning a new greenfield plant in Maharashtra.

Challenge: The new EC-CTE integration rule promised faster setup but created massive uncertainty. The client's project team was unsure how to address SPCB-level technical queries within the central EC application.

Sparrow Solution: Sparrow's EHS consulting team was engaged at the project design phase. We developed an integrated application package that pre-emptively addressed all anticipated SPCB concerns regarding water balance, ETP design, and air dispersion modeling for their paint shop. By simulating the new "integrated" EC review, we ensured all data was present and technically sound before submission.

Outcome: The client received their "integrated" EC in a single pass with no "Request for Further Information" (RFI), saving them an estimated three months of project delays and associated costs.

Part 1.2: The New Era of Worker Safety: From The Factories Act to the OSH Code

For over 70 years, the Factories Act, 1948, has been the foundational law governing the health, safety, and welfare of workers in manufacturing. Until the OSH Code is fully implemented by all states, manufacturers remain bound by its detailed provisions.

Key Chapters for Compliance:

- Health (Sec. 11-20): This chapter forms the basis of industrial hygiene, with mandates for Cleanliness, Disposal of Wastes and Effluents, Ventilation and Temperature, Control of Dust and Fumes, Lighting, and provision of wholesome Drinking Water.

- Safety (Sec. 21-41): This is the heart of operational safety, containing critical provisions for the Fencing of Machinery, Work on or Near Machinery in Motion, Hoists and Lifts, Lifting Tackles, Pressure Plants, Protection of Eyes, and Precautions in Case of Fire.

- Provisions Relating to Hazardous Processes (Chapter IV-A): This special chapter places specific, non-delegable responsibilities on the "Occupier" for any factory handling hazardous processes.

- Welfare (Sec. 42-50): This chapter mandates facilities such as washing areas, First Aid appliances, Canteens, and Crèches (where applicable).

Non-compliance carries severe penalties, including imprisonment and fines, with the "Occupier" of the factory held primarily responsible.The Great Consolidation: The Occupational Safety, Health and Working Conditions (OSH) Code, 2020

The OSH Code is the single most significant legislative change to worker safety in India's history. While passed by Parliament in 2020, its full, on-the-ground enforcement is imminent, awaiting finalization of state-level rules. This Code subsumes 13 legacy laws—including the Factories Act, the Contract Labour Act, and the Boilers Act—into a single, modern framework.This is not a simple "cut and paste" of old laws. It introduces new concepts and responsibilities for all employers.

Key Changes & New Duties for Manufacturers:

- Single Registration: The Code provides for a single, electronic registration for each establishment, replacing the need for multiple registrations under various old acts.

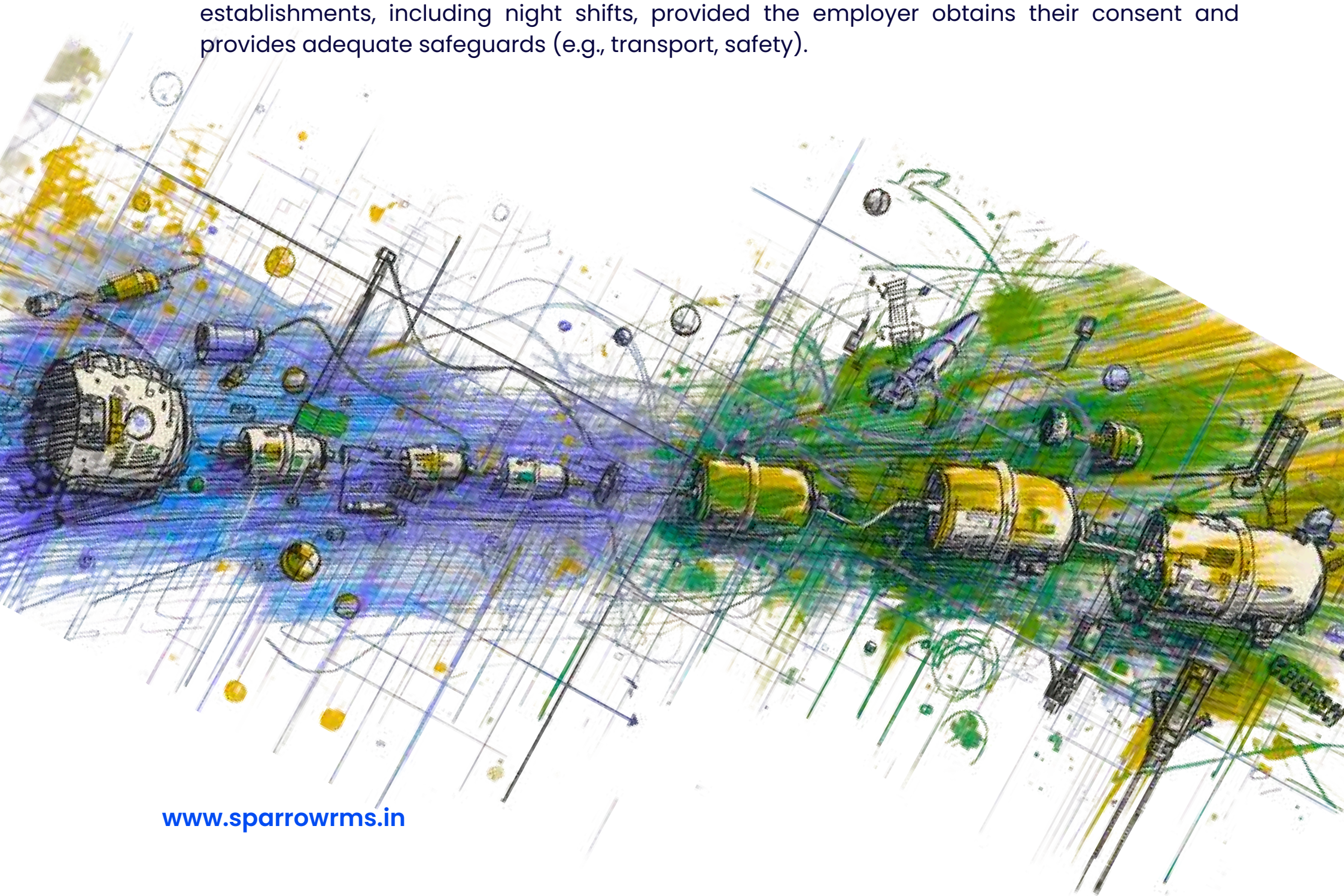
- Clearer Employer Duties: The Code explicitly mandates that every employer must provide a workplace that is free from hazards. This includes conducting risk assessments, providing all necessary Personal Protective Equipment (PPE), and offering free annual health check-ups to specified employees.

- Safety Committees & Safety Officers: The Code mandates the establishment of a Safety Committee in specified establishments, giving workers a formal, legal role in safety management.

- Inspector-cum-Facilitator: The role of the Inspector is officially changed to Inspector-cum-Facilitator, signaling a government intent to move towards advisory-led compliance, though enforcement powers remain.

- Stricter Penalties: While the approach is facilitative, the penalties for non-compliance, repeat offenses, or accidents causing death or serious injury are significantly harsher than under the old Acts.

- Women in Night Shifts: The Code empowers the employment of women in all roles and establishments, including night shifts, provided the employer obtains their consent and provides adequate safeguards (e.g., transport, safety).

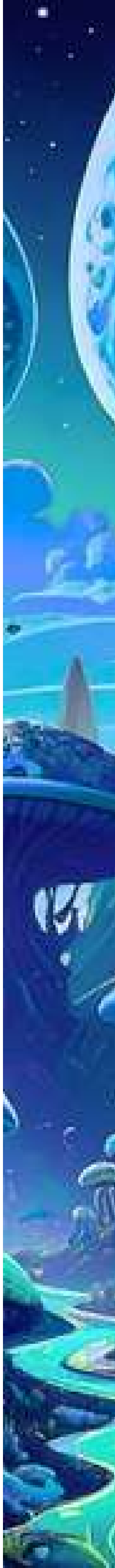


The OSH Code marks a fundamental shift from a prescriptive, inspection-based regime (the Factories Act) to a preventive, Safety Management System (SMS)-based approach. The old framework was about passing an inspection. The new Code is about proving you have a functional, documented, and continuously improving system for managing risk.

Soft best practices from the old era like conducting risk assessments, holding safety committee meetings, and documenting training are now hard, explicit legal requirements under the OSH Code. This creates a significant new documentation, training, and management burden that most manufacturers are not prepared for.

Valuable Table: Factories Act, 1948 vs. OSH Code, 2020: Key Changes for Manufacturers

Provision	The Factories Act, 1948	The OSH Code, 2020
Applicability	10+ workers (with power), 20+ workers (without power)	10+ workers (factories & hazardous ops), 20+ workers (other establishments)
Registration	Separate registration for Factory License, Contract Labour, etc.	Single electronic registration for the establishment
Welfare Officer	Threshold of 500 workers	Threshold lowered to 250 workers (or as prescribed)
Canteen Facility	Threshold of 250 workers	Threshold lowered to 100 workers (or as prescribed)
Crèche Facility	Threshold of 30 women workers	Threshold of 50 workers (gender-neutral)
Health Check-ups	Mandated for workers in hazardous processes	Mandated annually for specified employees (potentially all), free of cost
Safety Committee	Mandated for hazardous industries or 250+ workers	Mandated for specified establishments, with equal worker/employer representation
Women in Night Shifts	Restricted/prohibited, required special state government permission	Permitted for all work types, subject to worker consent and adequate safeguards



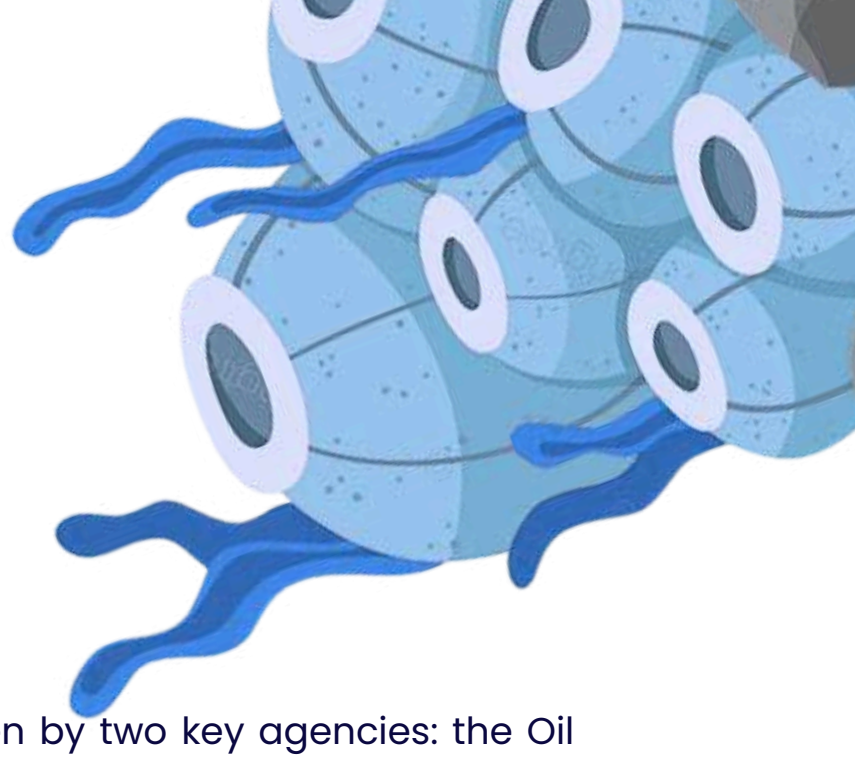
CASE IN POINT: Sparrow's OSH Code Gap Assessment and Implementation Consulting

- **Client:** A multi-state FMCG manufacturer with five large-scale production plants.

- **Challenge:** The client was operating compliantly under the 1948 Factories Act , but their leadership was unsure of their compliance gaps relative to the impending OSH Code. They lacked a clear transition plan.

- **Sparrow Solution:** Sparrow's EHS consulting team conducted a comprehensive OSH Code Gap Assessment across all five plants. Our audit found that their existing Safety Committees were informal and non-compliant with the new Code's strict composition rules. We also identified a complete lack of documented risk assessments for non-hazardous operations, which is now a legal mandate.

- **Outcome:** Sparrow delivered a time-bound, prioritized roadmap for each plant, including redrafting their corporate EHS policy, establishing a charter for new, compliant Safety Committees, and a digital template and training program for conducting and recording risk assessments, laying the complete groundwork for their OSH transition.



Part 1.3: Sector-Specific Deep Dive: High-Hazard Industries

Oil & Gas: Managing Volatility with Rigour

Compliance in the O&G sector is non-negotiable and is driven by two key agencies: the Oil Industry Safety Directorate (OISD) for technical standards and the Petroleum and Explosives Safety Organisation (PESO) for licensing.

- **The OISD Framework:** OISD standards are developed by the industry and are mandatory for all O&G operators. They represent the sector's collected wisdom on managing high-hazard processes.

1. **Deconstructing OISD-STD-105 (Work Permit System):** This is the single most critical standard for daily operational safety. It is a formal safety management system, not just a form. Key requirements include:
    - **Permit Types:** Segregation of work by hazard, using specific permits for Hot Work (welding, grinding), Cold Work (blinding, flange tightening), Confined Space Entry, and Electrical Isolation.
    - **Mandatory Procedures:** The permit process must be linked to a Job Safety Analysis (JSA), control of hazardous energy (LOTO), and a Toolbox Talk before work begins.
    - **Roles & Responsibilities:** It defines clear, accountable roles for the Permit Issuer (asset owner), Permit Receiver (performer), and the area-in-charge.

1. **Deconstructing OISD-STD-116 & 117 (Fire Protection):**
    - **OISD-STD-116 (Refineries & Processing Plants):** This standard is built on the rigorous philosophy of being able to fight two major fires simultaneously. Key mandates include detailed specifications for Fire Water Systems (storage, pumps, distribution) , Fixed Water Spray and Foam Systems, and a critical requirement for automatic rim seal fire extinguishing systems for floating roof tanks storing Class A products. It also mandates advanced hydrocarbon (HC) gas detectors and flame/heat detectors in critical areas.
    - **OISD-STD-117 (Depots & Terminals):** This standard applies similar, robust principles to depots, terminals, and pipeline installations, covering fire water, foam, mobile equipment, and alarm systems.

- **PESO Compliance:** While OISD governs how you operate, PESO governs your license to exist. PESO is the statutory authority for licensing the storage, transport, and handling of explosives, petroleum, and compressed gases. Key mandates for manufacturers include obtaining specific licenses for:

    1. Petroleum Storage (based on flash-point Class A, B, C).
    2. Transport of hazardous substances.
    3. Approval and certification of pressure vessels and storage tanks.

EMERGING UPDATE: OISD Standard Consolidation (2024)

In June 2024, OISD initiated a significant and subtle regulatory shift. It withdrew multiple, decades-old standards related to specific equipment, including OISD-STD-119 (Pumps), OISD-STD-120 (Compressors), OISD-STD-125 (Mechanical Seals), and OISD-STD-127 (Diesel Engines).This is not deregulation. These standards were merged into new, holistic standards, most notably OISD-STD-240: Asset Integrity Management of rotary equipment.This consolidation signals a major evolution in regulatory philosophy. OISD is moving away from fragmented, equipment-specific checklists ("Is the pump guard in place?") towards a comprehensive, system-level management approach ("Do you have a risk-based Asset Integrity Management program for your entire rotating equipment system?"). This makes compliance simpler on paper (fewer standards to track) but far more complex in practice. It demands an integrated, risk-based program that connects maintenance, operations, and process safety—a perfect use case for a digital twin.

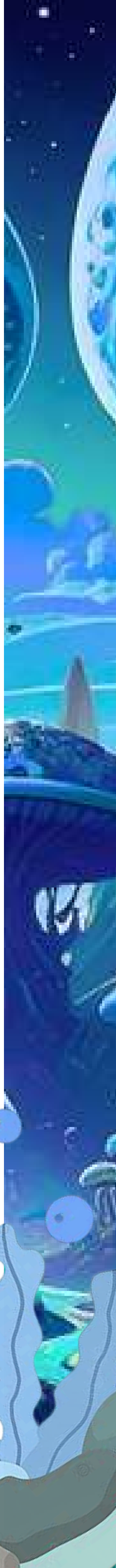
CASE IN POINT: **Sparrow's PSM & OISD Compliance Consulting** **for O&G**

Client: An upstream O&G client with multiple production installations.

Challenge: The client was cited by OISD during a safety audit for "gaps in their ERDMP" and poor adherence to the work permit system, consistent with common industry findings.Sparrow Solution: Sparrow's Process Safety Management (PSM) consultantsconducted a full audit against OISD-STD-105 (PTW), OISD-STD-116 (Fire), and the new OISD-STD-240 (Asset Integrity). We found their paper-based PTW system was completely siloed from their CMMS (maintenance) system, making it impossible to comply with the intent of the new Asset Integrity standard. Our team redesigned their entire safety workflow, provided a roadmap to implement a full 14-element PSM framework , and developed a unified "Asset Integrity" dashboard concept, directly addressing the new OISD-240 standard.B. Chemical: Proactive Management of Hazardous Substances

The chemical industry is governed by a framework designed to prevent major accidents, with legal responsibility placed squarely on the "Occupier" of the facility.

- MSIHC Rules, 1989 (Manufacture, Storage and Import of Hazardous Chemicals): Enacted under the EPA , these rules are the foundational law for chemical safety. They apply to any facility storing or handling hazardous chemicals above a specified threshold quantity (e.g., 10 tonnes for Chlorine).
- The "Occupier's" Critical Duties: The MSIHC Rules place specific, non-delegable legal duties on the "Occupier" (the person in ultimate control of the facility).



Valuable Table: Key Obligations of an 'Occupier' under MSIHC Rules, 1989

Obligation	Description
Hazard Identification	Identify all Major Accident Hazards (MAH) and implement preventive steps.
Safety Report	Prepare a comprehensive Safety Report detailing all hazards, controls, and emergency plans.
Submission of Report	Submit the Safety Report to the authorities at least 90 days before commencing activity.
Safety Audit	Conduct an independent safety audit annually and submit the report to the authorities.
On-Site Emergency Plan	Prepare, maintain, and regularly update a detailed On-Site Emergency Plan.
Public Information	Proactively inform the public and individuals in the vicinity of the MAH hazards and the corresponding safety measures.
Worker Training	Provide all workers with specific information, training, and safety equipment related to the hazards.

Process Safety Management (PSM): A critical insight for this sector is that, unlike the US (OSHA PSM) , India has no single comprehensive PSM regulation. Instead, PSM principles are embedded within the MSIHC Rules and the Factories Act. A robust PSM program, built on the 14 global elements (e.g., **Process Hazard Analysis (PHA)**, Process Safety Information (PSI), Management of Change (MOC), **Pre-Startup Safety Review (PSSR))** , is the only viable way to meet MSIHC obligations. Sparrow understands the specific Indian challenges in implementing PSM, including a historically reactive safety culture, poor quality of PSI documentation, and weak Mechanical Integrity (MI) programs.

EMERGING UPDATE (India REACH): The Chemicals (Management and Safety) Rules (CMSR)

This is the next major regulatory hurdle for the entire chemical industry. The CMSR, currently in its fifth draft , is India's version of the EU's REACH regulation.The Paradigm Shift: The CMSR will shift India's chemical controls from regulating users to regulating originators (manufacturers and importers).

Key Obligations for Manufacturers & Importers:

- **Notification:** All existing and new substances manufactured or imported in quantities >1 Tonne Per Annum (TPA) must be "notified" (i.e., listed) with the new Chemical Regulatory Division.
- **Registration:** A list of "Priority Substances" (Schedule II, containing ~750 chemicals) will require formal Registration for quantities >1 TPA. This is a far more complex process, requiring the submission of a full Technical Dossier, Chemical Safety Report, and exposure scenarios, similar to EU REACH.
- **Authorised Representative (AR):** Foreign manufacturers must appoint an India-based Authorised Representative (AR) to manage their Notification and Registration processes.

This regulation is not just an EHS compliance task; it is a supply chain data bomb. It will create an unprecedented need for supply chain transparency. A manufacturer importing a "proprietary" chemical mixture will be non-compliant unless its foreign supplier reveals the full chemical composition (including percentages) to their Indian AR. This will trigger a massive data collection, management, and strategic sourcing crisis for which most of the industry is unprepared.

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CASE IN POINT: Sparrow's PSM & "India REACH-Ready" Consulting

- **Client:** A specialty chemical plant in Gujarat.

- **Challenge:** The client was cited by the SPCB for an inadequate Safety Report that failed to meet MSIHC Rule 10 requirements. They were also unaware of their future obligations under the draft CMSR.

- **Sparrow Solution:** Sparrow's PSM consultants were engaged. We conducted a full **Quantitative Risk Assessment (QRA)** to model hazard scenarios. We then compiled the required Process Safety Information (PSI) and delivered a new, data-backed, compliant Safety Report. As a strategic value-add, our team also conducted a "CMSR-Ready" gap analysis. We cross-referenced their 1,200-chemical inventory against the draft CMSR Schedule II , identifying 42 substances that will require immediate Registration and flagging 15 critical imported raw materials that will require complex supplier engagement via an Authorised Representative (AR).C. Pharmaceuticals: Beyond Compliance to Product Stewardship

- The pharmaceutical industry, a cornerstone of India's economy, is under intense scrutiny from the CPCB and NGT for its environmental impact , specifically water pollution from Active Pharmaceutical Ingredient (API) residues.The Core Challenge: APIs and Antimicrobial Resistance (AMR): The CPCB's focus is driven by a major public health crisis. API (especially antibiotic) residues discharged in wastewater create drug-resistant "superbugs," fueling Antimicrobial Resistance (AMR). CPCB has recognized this threat and issued specific guidelines for monitoring API residues.

- **CPCB's Strict Mandates:** The MoEF&CC 2021 standards and CPCB guidelines are exacting:

1. **The ZLD Mandate:** The industry is being aggressively pushed to "reduce, recycle, and reuse... to the maximum extent or Zero Liquid Discharge (ZLD)". Discharge of treated effluent into streams or rivers is explicitly discouraged.
2. **The OCEMS Mandate:** This is the digital enforcement mechanism. Plants are required to install Online Continuous Monitoring Systems (OCEMS) for key parameters: pH, BOD, COD, TSS, and Flow. This data must be streamed 24/7 directly to CPCB and SPCB servers.
3. **Visual Surveillance:** CPCB also mandates Pan-Tilt-Zoom (PTZ) cameras with integrated flowmeters at all final discharge points (for ZLD or CETP), with the live feed also streamed to their servers.

- **Complex Waste Management:** The sector faces two unique waste streams:
  1. **Hazardous Waste:** ETP sludge and manufacturing residues are classified as Hazardous Waste and must be managed as per the HW Rules.
  2. **Drug Disposal:** New CDSCO guidelines establish a "reverse logistics" pathway, making manufacturers ultimately responsible for the safe disposal of expired or unused drugs returned from the supply chain.

Valuable Table: CPCB Compliance Mandates for Pharmaceutical Industry

Mandate	Key Requirement
Discharge Policy	Zero Liquid Discharge (ZLD) or maximum recycle/reuse. No discharge to surface water bodies.
API Residues	Must monitor and control Active Pharmaceutical Ingredient (API) residues as per CPCB guidelines.
Online Monitoring	Mandatory OCEMS for pH, BOD, COD, TSS, and Flow, with 24/7 data streaming to SPCB/CPCB.
Online Surveillance	Mandatory PTZ Camera with flowmeter at discharge points for data streaming to SPCB/CPCB.
Effluent for Domestic Use	Use of treated ETP effluent for domestic purposes is strictly prohibited (due to API residue risk).
ETP Sludge	Sludge and process residues are classified as Hazardous Waste and must be managed accordingly.

CASE IN POINT: Sparrow's PSM & "India REACH-Ready" Consulting

- **CASE IN POINT:** Sparrow’s Consulting for ZLD & OCEMS Compliance.
- **Client:** A large bulk drug (API) manufacturer in Hyderabad.
- **Challenge:** The client was facing imminent closure notices from the SPCB due to inconsistent ETP performance and detectable API residues in their final discharge, violating CPCB norms. Sparrow Solution: Sparrow's EHS consulting team conducted a full water balance audit and ETP adequacy assessment. We identified the specific high-COD/TDS wastewater streams that were "poisoning" the biological ETP. We provided a turnkey consulting roadmap to segregate these streams for thermal destruction and upgrade the remaining ETP to a fully ZLD-compliant system. Crucially, our roadmap included the detailed technical specifications for the mandatory OCEMSand PTZ camera systems required to stream data directly to the SPCB portal, ensuring 100% transparency and regulatory trust.

Part 1.4: Sector-Specific Deep Dive: Manufacturing & Infrastructure

Cement: Leading the Decarbonization Mandate

The cement industry, one of the "hard-to-abate" sectors, is now at the forefront of India's new, market-based environmental policies.

EMERGING UPDATE (2025): The GHG Emission Intensity Target Rules

- The Change: This is the most significant new regulation for the sector. The Greenhouse Gases Emission Intensity Target Rules, 2025, were notified on October 8, 2025.

- The Mandate: The rules set legally binding GHG emission reduction targets for 282 industrial units, 186 of which are in the cement sector.

- The Target: Facilities must reduce their emission intensity (GHG emissions per tonne of product) from a 2023-24 baseline. The target for the cement sector is up to a 3.4% reduction over the 2025-26 to 2026-27 compliance period.

- This regulation is enforced via India's new Domestic Carbon Market, established under the Energy Conservation (Amendment) Act."Earn or Buy": Plants that emit below their target will earn tradable carbon credits.

- "Buy or Pay": Plants that exceed their target must buy credits to cover the deficit or pay a penalty.

- The Penalty: The penalty is severe and designed to be punitive: twice the average credit price for the compliance cycle, as determined by the Bureau of Energy Efficiency (BEE) and enforced by the CPCB.

This new domestic liability, combined with international pressures like the EU Carbon Border Adjustment Mechanism (CBAM) , has fundamentally changed the business equation. GHG management is no longer an ESG or sustainability "nice-to-have." It is a fundamental economic survival issue for the cement industry. Accurate, auditable, and real-time GHG accounting is now as critical as financial accounting.

- The Circular Economy Solution (Co-processing): One of the key strategies for the cement sector to meet these new GHG targets is by increasing its use of Alternative Fuels and Raw Materials (AFR) through the co-processing of hazardous waste in cement kilns. CPCB guidelines permit this, but with strict controls:

  - Waste must be stored for less than 90 days.
  - Facilities must have adequate pre-processing and feeding systems.
  - Emissions (especially dioxins, furans, and heavy metals) during co-processing must not exceed the baseline emissions from normal operation.

- **CASE IN POINT:** Sparrow's GHG Accounting & Decarbonization Strategy

- **Client:** A major Indian cement producer with multiple plants. Challenge: The client urgently needed to establish its 2023-24 emissions baseline to comply with the new GHG Rules and create a strategy to meet the 3.4% reduction target.

- **Sparrow Solution:** Sparrow's **GroundESG™** consulting team was engaged. We conducted a full, auditable Scope 1, 2, and 3 GHG inventory, establishing a defensible baseline. Our analysis identified that optimizing their use of AFR through co-processing was the fastest and most economical path to meeting the new reduction target.

- **Outcome:** We provided a multi-year decarbonization strategy to not only comply with the new rules but to generate tradable carbon credits by 2027, turning a new regulatory liability into a potential revenue stream.

Automotive & General Manufacturing

This broad sector faces a wide array of EHS regulations, from foundational environmental compliance to the most significant updates in worker safety.

EMERGING UPDATE (2025): The Boilers Act, 2025

A critical, and often overlooked, update for any facility that operates a boiler is the Boilers Act, 2025.

T**he Change:** Enacted on April 4, 2025, this is a complete repeal and replacement of the archaic Boilers Act, 1923. It is the first major overhaul of boiler safety law in nearly 100 years.

Key Impacts for Manufacturers:

- **Stricter Standards:** The new Act introduces stricter safety standards and audits for manufacturing, owning, and using boilers.
- **Digitization:** It aims to digitize registration and reporting processes, moving away from old-paper based records.
- **Harsher Penalties:** Imposes significant penalties, including up to two years imprisonment and fines of 100,000 INR.
- **New Personnel Rules:** The Boiler Operation Engineers' Rules, 2025 and Boiler Attendants' Rules, 2025create new, stricter certification requirements and supervision responsibilities. Old certifications may become invalid.
- **New Accident Reporting:** The Boiler Accident Inquiry Rules, 2025 mandate that businesses must report any boiler-related accident within 24 hours to the state's chief inspector.

Core Operational Compliance: Beyond the boiler update, this sector must manage:

- **Air & Water Acts:** CPCB and SPCBs have specific standards for effluents, especially from paint shops and surface treatment, and emissions from boilers and DG sets.

- **Waste Management:** Must comply with a raft of rules including Hazardous Waste (for oil-soaked cotton, paint sludge), E-Waste, and Battery Waste Management Rules.

- **Occupational Safety:** The Factories Act and the impending OSH Code are central to managing assembly line, material handling, and maintenance safety.

This combination of new laws creates a clear mandate for verifiable competency. The new Boilers Act demands certified personnel. The OSH Code demands documented training and risk assessments. The era of informal, on-the-jobccompetency is over. Regulators now demand auditable proof of competency, creating an urgent need for centralized, digital Training Management and Competency Mapping systems.

- **CASE IN POINT:** Sparrow's Integrated Compliance Audit for Manufacturers

- **Client:** An auto-ancillary component manufacturer. Challenge: The client was preparing for their bi-annual SPCB consent renewal and was confident in their ETP and stack monitoring data.

- **Sparrow Solution:** Sparrow's consulting team was engaged to conduct a 360-degree **EHS compliance audit**, not just an environmental one. Our team found two critical, non-obvious gaps:

    1. Their boiler operators long-standing certifications were invalid under the new Boilers Act, 2025.
    2. The machine guarding on their 20-year-old press machines was non-compliant with the Factories Act, posing a major financial and legal risk under the OSH Code's new penalty structure.

- **Outcome:** We delivered a prioritized action plan to immediately get all boiler operators re-certified and to a phased plan to upgrade machine safety, preventing both a consent rejection and a potentially catastrophic safety incident.

FMCG & Retail: The Rise of Producer Responsibility

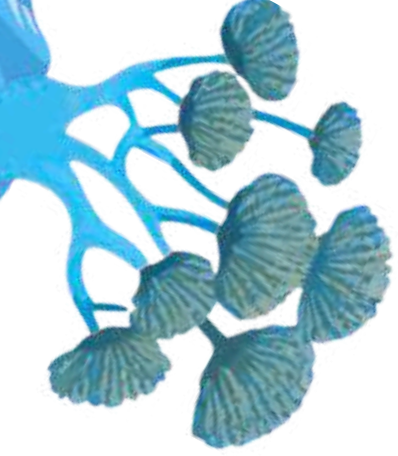
While often seen as "low-impact," the FMCG and retail sectors face two dominant and financially significant compliance challenges. The EPR Mandate: Plastic Waste Management (PWM) Rules:

- **This is the primary environmental issue for the sector.** The PWM Rules framework of Extended Producer Responsibility (EPR) places direct, end-to-end accountability on Producers, Importers, and Brand Owners (PIBOs) for the entire lifecycle of their plastic packaging.

- **The Mechanism:** PIBOs must register on the CPCB's Centralized EPR Portal , declare the tonnage of plastic they place on the market (by category), and then meet annual recycling and reuse targets. They prove compliance by purchasing "EPR certificates" from registered Plastic Waste Processors.

- **Categories & Targets:** The 2024 amendments and subsequent rules define clear targets across five categories: Cat I (Rigid), Cat II (Flexible), Cat III (Multilayered - the most problematic), Cat IV (Compostable), and Cat V (Biodegradable).

- **Penalties:** Failure to meet these targets results in heavy Environmental Compensation (EC) being levied on a "polluter pays principle". This is a direct, hard-dollar cost that will impact packaging costs and margins for major brands.



Legal Metrology Act, 2009:

- This is the second critical compliance area, governing all "pre-packaged commodities".
- **Key Mandates:**

1. **Labeling:** The Legal Metrology (Packaged Commodities) Rules, 2011 mandate 100% accurate declarations on every package: Net weight/volume, MRP, date of manufacture, and manufacturer/importer details.
2. **Verification:** All weighing and measuring instruments used on packaging lines must be periodically verified and stamped by the authorities.

- **CASE IN POINT:** **Sparrow's EPR & Sustainability Data Advisory**
- **Client:** A leading Indian food & beverage company.
- **Challenge:** The company was managing its nationwide EPR compliance on a series of complex, disconnected spreadsheets. They had no visibility into their actual plastic tonnage obligation until the end of the year and were at constant risk of over-paying for EPR certificates or under-complying and facing massive EC penalties.
- **Sparrow Solution:** **Sparrow's sustainability consultants** were engaged. We mapped their entire packaging value chain—from procurement to co-packers—and designed a data architecture to provide monthly visibility on their plastic obligation.
- **Outcome:** This allowed their finance team to strategically purchase EPR certificates when prices were low, rather than a panic-buy at the end of the year. Our advisory turned a compliance headache into a strategic financial function, saving them crores in potential fines and over-payments.

Textile: Navigating the Zero Liquid Discharge (ZLD) Imperative

- The textile industry is one of India's largest employers, but its "wet processing" (dyeing, bleaching) units are also among the most water-intensive and polluting.The Core Challenge: Water Intensity & Pollution: Due to the high pollution load (Color, BOD, COD, and Total Dissolved Solids - TDS) , the sector has been aggressively targeted by the CPCB and NGT.

- **The ZLD Mandate:** In water-stressed regions and critical river basins (like the Ganga), Zero Liquid Discharge (ZLD) is often mandated, not just encouraged. Where ZLD is not mandated, the treated effluent standards are extremely stringent, with a focus on maximizing the reuse of treated wastewater back into the process.

The technical solutions for ZLD, such as Reverse Osmosis (RO) and Multiple Effect Evaporators (MEE), are well-known. However, they are extremely expensive to operate, primarily due to their massive energy consumption.
This creates the ZLD Op-Ex Trap. Many textile units install expensive ZLD systems just to get their SPCB consent (CTE) but then fail to operate them 24/7 due to the high operational cost. This leads to bypasses, non-compliance, and eventual closure notices. The real challenge is not just installing ZLD, but economically sustaining it.

The only way to achieve sustainable ZLD is to first implement aggressive water conservation and effluent segregation at the source, thereby reducing the volume and pollution load (TDS/COD) that needs to be treated by the expensive ZLD system.

- **CASE IN POINT:** Sparrow’s Water Balance & ETP Auditing Expertise

- **Client:** A large textile processing park in a water-stressed zone.Challenge: The park was under a ZLD mandate from the SPCB. Their Common Effluent Treatment Plant (CETP) was oversized, and its MEEwas consuming enormous power, making the park's operational costs unviable for its member units.

- **Sparrow Solution:** Sparrow’s EHS consulting team conducted a detailed water balance and ETP audit for the entire cluster. Our analysis identified that three specific dyeing processes were contributing over 70% of the total TDS load.

- **Outcome:** By recommending a new, segregated drainage system and at-source pre-treatment for this high-TDS stream, we reduced the inlet flow to the central MEE by 40%. This single intervention drastically cut the park's opex, bringing the entire cluster back into sustainable compliance.

SECTION 2: THE TECHNOLOGY GAMBIT: DIGITALIZING EHS & SUSTAINABILITY

The complexity detailed in Section 1—managing OISD standards, transitioning to the OSH Code, tracking MSIHC safety reports, streaming real-time data to the CPCB, and accounting for every gram of carbon—has made manual, paper-based compliance impossible.
This section is the "solution." It details how Sparrow's integrated technology stack is purposefully designed to solve the challenges of the modern regulatory landscape.

Part 2.1: The Foundation: Sparrow IndustryOS™ & Digital Twin

The Problem: The "Spreadsheet & Binder" Risk

The traditional EHS department runs on a dangerous and inefficient combination of paper binders, isolated spreadsheets, and a standalone maintenance system (CMMS). This creates information silos. A safety officer reviewing a work permit has no real-time data from the plant floor (SCADA). A maintenance manager has no visibility into the safety (PTW) or process (MOC) workflows. This data gap is where incidents happen and non-compliance festers.

The Solution: Sparrow IndustryOS™ — India's First Digital Twin Platform

This is Sparrow's "bridge between complex logic and tangible outcomes".8 It is a digital twin-based platform designed for a single purpose: to unify all manufacturing data to solve complex problems.

It works by integrating three data types into a single "pane of glass":

With core capabilities like seamless **IT/OT integration**, **AI/ML integration** , and normalized data structures , the IndustryOS™ creates a living, intelligent model of the entire operation.
This platform moves an organization from reactive EHS to predictive risk management. A traditional EHS system records an incident after it happens. A Digital Twin prevents it.

For example: When an operator tries to issue a Permit to Work (Workflow Data) for a pipeline, the **IndustryOS™** can simultaneously check the real-time gas sensor data (Dynamic Data) for that specific pipeline asset (Static Data). If a gas leak is detected, the system can automatically halt the permit and flag the conflict. This is not just "digitization"; it is intelligent, automated, and predictive risk management in action.Part 2.2: Mapping Sparrow's EHS Software Suite to Your Regulatory Challenges

Built on the IndustryOS™ platform, Sparrow's 50+ EHS Software Suite provides a specific digital tool for every regulatory challenge identified in Section 1.

Valuable Table: Sparrow's EHS Software Suite: Mapping Modules to Regulatory Needs

Regulatory Challenge (from Section 1)	Primary Sector(s) Affected	The Sparrow Tech Solution (Module)	How It Solves the Problem
Complex, high-risk work permits and JSA/LOTO linkage. (OISD-STD-105)	Oil & Gas, Chemical, Cement	**Permit to Work (PTW) Software**	Digitizes and enforces the complete PTW workflow, ensures JSA and LOTO are digitally linked, prevents conflicting permits, and creates a 100% auditable trail for OISD.
Ensuring safe energy isolation during maintenance. (Factories Act / OSH Code)	All Manufacturing	**LOTO Management Software**	Digitizes isolation points on the digital twin, manages lock/key allocation, and ensures group isolation is properly controlled and verified before work starts.
Conducting and tracking hundreds of audits and findings. (MSIHC Safety Audits, OSH Code Audits)	Chemical, All Manufacturing	**Audit Management Software**	Schedules all statutory and internal audits, provides mobile checklists for inspectors, and tracks all findings and Corrective/Preventive Actions (CAPAs) to closure.
Proving 100% compliance with all SPCB/CPCB consents and laws. (All Acts)	All Manufacturing	**Compliance Management Software**	Creates a central, cloud-based legal register of all obligations (consents, laws, etc.). It sends automated reminders for filings and links compliance tasks to operational evidence.
Managing and updating complex risk assessments. (PSM / MSIHC / OSH Code)	Chemical, O&G, Pharma	**PSM Software** **HIRA Software** **JSA Software**	Provides a digital, structured framework for conducting, recording, and updating all PHAs, HIRAs, and JSAs, linking them directly to assets, controls, and MOCs.
Capturing and investigating all incidents and near-misses 24/7. (Factories Act, OSH Code, Boilers Act)	All Manufacturing	**Incident Management Software**	Enables any worker to report an incident or near-miss from a mobile device. Streamlines the investigation, Root Cause Analysis (RCA), and CAPA management.

Ensuring all process changes are safely reviewed. (PSM / MSIHC)	Chemical, O&G, Pharma	**Management of Change (MOC) Software**	Enforces a formal digital workflow for all changes (technical, procedural, or personnel), ensuring all safety, technical, and EHS reviews are completed before implementation.
Tracking contractor safety and workforce competency. (OSH Code, Boilers Act, 2025)	All Manufacturing	**Contractor Management Software** **Training Management Software**	Manages contractor pre-qualification, site-entry compliance, and performance. Maintains a digital training matrix for all employees and contractors, schedules training, and tracks certifications (e.g., for Boiler Engineers).
Real-time visibility of EHS performance for leadership and regulators. (CPCB OCEMS Mandate)	All, esp. Pharma, Cement	**EHS KPI Dashboard**	Provides highly customizable dashboards that pull real-time data from IndustryOS™ (IT/OT) and other EHS modules to visualize compliance status (e.g., CEMS/OCEMS data vs. SPCB limits).

Part 2.3: The Sustainability Imperative: Sparrow GroundESG™

Beyond "traditional EHS," a new class of regulations (GHG Rules, BRSR, EPR) demands massive data collection, management, and reporting. Spreadsheets are not just inefficient; they are a direct financial liability.

The Problem: The Cement sector's new GHG Rules , mandatory BRSR reporting for listed companies , and the FMCG sector's EPR rules have turned sustainability from a "report-once-a-year" activity into a "manage-in-real-time" operational imperative.

The Solution: Sparrow **GroundESG™** Platform

This is Sparrow's dedicated suite for making ESG data "actionable" and "auditable".

For the Cement Sector & GHG Rules :

- **Challenge:** Complying with the GHG Emission Intensity Target Rules, 2025.

- **Sparrow Tech Solution:** The GHG Accounting & Assurance module. This automates the collection of Scope 1, 2, and 3 emissions data, provides real-time dashboards on emission intensity (e.g., tCO2/tonne of cement), and manages the carbon credit portfolio, directly addressing the new law.

For Listed Companies & BRSR:

- **Challenge:** Mandatory, complex Business Responsibility and Sustainability Reporting (BRSR).

- **Sparrow Tech Solution:** The BRSR Reporting Solutions module. This platform simplifies and automates the creation of the complex BRSR, ensuring it is data-backed, auditable, and aligned with GRI/SDG frameworks.

For the FMCG Sector & EPR:

- **Challenge:** Managing complex EPR obligations under the Plastic Waste Management (PWM) Rules.

- **Sparrow Tech Solution:** This is a combined solution. **IndustryOS™** tracks plastic packaging as a raw material in vendor management and production, while **GroundESG™** manages the compliance lifecycle: automatically calculating the EPR obligation, tracking certificate purchases, and auto-generating the annual reports for the CPCB portal.

For All Sectors (Advanced Strategy):

- **Challenge:** Understanding the true environmental impact of a product for global markets (like the EU).

- **Sparrow Tech Solution:** The **Life Cycle Assessment (LCA)** module provides deep, data-driven insights into a product's cradle-to-grave environmental footprint.

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Conclusion: Your Partner for a Resilient and Future-Ready Enterprise

The Indian regulatory landscape is no longer a static map; it is an evolving, dynamic, and data-driven environment.

Success is no longer defined by reacting to inspections. It is defined by anticipating regulatory change, managing operational risk predictively, and proving compliance in real-time to regulators, investors, and customers.

This new reality demands a new kind of partner. Sparrow RMS is uniquely positioned as the only partner that bridges the critical gap between strategy and execution, offering:

- **Strategic Foresight (Consulting):** The deep domain expertise to navigate the "what" and "why" of complex regulations, as detailed in Section 1.
- **Digital Execution (Technology):** The integrated, intelligent platform (**IndustryOS™**, EHS Software Suite, **GroundESG™**) to manage the "how," as detailed in Section 2.

We invite you to contact Sparrow RMS for a comprehensive "Regulatory Resilience Assessment" to begin your journey toward a safer, more sustainable, and future-ready enterprise.

APPENDICES: PRACTICAL COMPLIANCE TOOLS

Appendix A: EHS Compliance Calendar (2025-2026)

This calendar provides a non-exhaustive list of key all-India EHS filing deadlines. Deadlines can vary by state and consent orders.

Regulation	Filing / Return / Action	Frequency	Due Date
Environment			
Environment (Protection) Rules	Form V (Environmental	Annual	30th September
Hazardous Waste (M&T) Rules	Form 4 (Annual Return)	Annual	30th June
Water & Air Acts	Consent to Operate (CTO) Renewal	As per validity	60-90 days before expiry
Waste Management			
E-Waste (Management)	Form 1 (EPR Filing for Producers)	Annual	30th June
Plastic Waste (PWM) Rules	EPR Annual Return (for PIBOs)	Annual	30th June
Battery Waste (BWM) Rules	EPR Filing (Producers/Importer	Annual	30th June
Bio-Medical Waste Rules	Form 4 (Annual Return)	Annual	31st January
Safety			
OSHA (US Standard) / OSH Code	Form 300A (Summary of	Annual	March 2nd
EPCRA (US Standard) / MSIHC	Tier II Hazardous Chemical Inventory	Annual	March 1st
Monitoring			
CPCB	CEMS / CEQMS Data Submission	Real-time	Continuous
MoEF&CC	EC Compliance Report	Half-Yearly	1st June, 1st December

Appendix B: General Manufacturing EHS Audit

Checklist

This checklist, based on the Factories Act, 1948, and OSH Code principles, provides a starting point for internal audits.

- **Statutory & Legal Compliance**

- [ ] Is the Factory License displayed and renewed?
- [ ] Is the Consent to Operate (CTO) from the SPCB valid and displayed?
- [ ] Is the Abstract of the Factories Act displayed?
- [ ] Are all statutory registers (e.g., Form 3A, Form 12) maintained?
- [ ] Is the latest Environmental Statement (Form V) submitted?
- [ ] Is the On-Site Emergency Plan prepared (if applicable)?

- **Health, Hygiene & Welfare**

- [ ] Are workrooms and floors clean and free of obstructions?
- [ ] Is adequate ventilation and temperature control maintained?
- [ ] Is wholesome drinking water provided at suitable locations?
- [ ] Are latrines and urinals clean, sufficient, and segregated?
- [ ] Are first-aid boxes stocked and readily accessible?
- [ ] Is a Canteen provided (if >250 workers)?

- **Occupational Safety**

- [ ] Are all dangerous parts of machinery (gears, belts, flywheels) securely fenced?
- [ ] Are aisles, doorways, and exits clear and free of obstructions?
- [ ] Are floors and stairs in good condition and non-slip?
- [ ] Is appropriate Personal Protective Equipment (PPE) (e.g., eye protection, gloves, helmets) provided and used?
- [ ] Are all hoists, lifts, and lifting tackles inspected and certified?
- [ ] Are all pressure vessels and plants certified by a competent person?

- **Fire Safety**

- Are all exits clearly marked with "EXIT" signs?
- Are emergency lighting systems operational?
- Are fire extinguishers in place, of the correct type, and inspected?
- Are fire alarm pull stations unobstructed?
- Are "NOT AN EXIT" labels on doors that could be confused for exits?

- **Hazardous Waste & Chemical Management**

- Is all electrical wiring properly insulated and in good condition?
- Are all electrical panels unobstructed (3-foot clearance)?
- Is proper grounding and bonding verified?
- Are temporary extension cords prohibited for permanent use?

Appendix C: Checklist for Hazardous Chemical Storage (MSIHC Rules)

This checklist is a critical tool for any facility storing chemicals, especially those approaching MSIHC threshold quantities.

- **Inventory:** Is a complete inventory of all chemicals (with max quantities) maintained and up-to-date?
- **Labeling:** Are all containers, tanks, and vessels clearly and legibly labeled with the chemical name and hazard pictograms?
- **Safety Data Sheets (SDS):** Is a hard or soft copy of the SDS for every chemical readily available to all personnel in the storage and use areas?
- **Segregation:** Are incompatible chemicals (e.g., acids and flammables, oxidizers and combustibles) stored in separate, segregated, and/or bunded areas?

  Storage Conditions: Are chemicals stored away from direct sunlight, heat sources, and operational areas?

- **Storage Conditions:** Are chemicals stored away from direct sunlight, heat sources, and operational areas?
- **Ventilation:** Is the storage area well-ventilated to prevent the buildup of toxic or flammable vapors?
- **Spill Control:** Are spill kits, absorption materials, and containment (bunds) available and adequate for the volume stored?
- **Emergency PPE:** Is specific PPE (e.g., chemical splash goggles, respirators, aprons) and emergency equipment (safety showers, eyewash stations) available, inspected, and accessible within 10 seconds?
- **Security:** Is the storage area secured against unauthorized access?
- **Fire Protection:** Is the appropriate fire protection (e.g., AFFF foam extinguishers for flammables, dry chemical for metal fires) in place and functional?
- **Training:** Have all personnel who handle these chemicals received specific training on their hazards, handling procedures, and emergency response?
- **Emergency Plan:** Is the On-Site Emergency Plan (if required under MSIHC)or a local emergency plan displayed, and are personnel trained on it?

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