

Handling Major Ship-Related Pollution Incidents: Operational Challenges and Lessons from the Mv X-Press Pearl and MSC ELSA 3 Events in Sri Lanka

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Major ship-source pollution incidents involving hazardous and noxious substances (HNS), plastic pellets, and container losses can significantly impact marine ecosystems and coastal communities. Sri Lanka experienced two major maritime pollution incidents in recent years: the MV *X-Press Pearl* incident in 2021 and the MSC *ELSA 3* incident in 2025. This study examines the operational challenges encountered during these incidents and evaluates the adequacy of existing preparedness and response arrangements. Information was obtained from incident reports, operational response records, stakeholder consultations, and relevant international guidance documents. The analysis indicates that Sri Lanka's National Oil Spill Contingency Plan facilitate coordination among responsible agencies but remains primarily designed for conventional oil spill response. Provisions addressing HNS incidents, plastic pellet spills, container-loss events, and salvage operations are inadequately incorporated within the existing framework. Most response agencies possess only Tier 1 response capability, while available response equipment is largely concentrated within ports and coastal areas, limiting the capacity to manage large-scale offshore incidents. During the MV *X-Press Pearl* response, hazardous cargo assessment and several technical components of the operation required international assistance. The incident also highlighted the absence of established arrangements for managing HNS releases and contaminated plastic pellets. The MSC *ELSA 3* incident highlighted additional challenges associated with offshore container tracking, transboundary movement of plastic pellets, and large-scale shoreline cleanup operations. These findings strengthen contingency arrangements to address HNS incidents, salvage operations, offshore response capability, environmental monitoring, and regional cooperation. Enhancing these areas will improve Sri Lanka's preparedness and operational capacity for managing future ship-source pollution incidents.

Keywords: *Hazardous and noxious substances (HNS), Plastic pellets (nurdles), Ship-source pollution, Maritime preparedness, Shoreline cleanup, Pollution response*