

# B GUIDANCE

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## HYDRAULIC HOSE AND PIPE FAILURE IN PORT

A BREACH OF CONTAINMENT OF HYDRAULIC HOSES OR PIPES ONBOARD A SHIP IN A PORT CAN RESULT IN PERSONAL INJURY, DISRUPTION TO OPERATIONS AND ENVIRONMENTAL POLLUTION INCIDENTS.

### UNDERSTANDING THE RISK

THE HYDRAULIC SYSTEM ONBOARD A SHIP GENERALLY CONSISTS OF FIXED PIPING AND FLEXIBLE HOSES THAT CARRY HYDRAULIC OIL UNDER PRESSURE.

These systems, used for equipment such as cranes, mooring winches, cargo pumps, cargo hatch covers, shell doors and vehicle ramps, are mostly operated in port. Any failure of hydraulic pipes or hoses can cause hydraulic oil to escape under pressure, spraying over a large area in a short time.

Hydraulic oil under pressure is a clear risk to personnel should a leak occur. Furthermore, as hydraulic systems are often critical to ships business, their unavailability can also have commercial implications, such as delays and off-hire situations.

However, a very common occurrence is that the leakage results in hydraulic oil spilling overboard, and when this occurs in port it can result in severe fines and costly cleanup operations.

Hydraulic hoses or lines located near to the ships side are particularly risky, as any oil escaping due to hose or line failure will be difficult to contain onboard and will likely result in a rapid spill to sea.

Environmental factors have a negative effect on materials used onboard ships. Exposure to salt water, temperature extremes, and ultraviolet light can contribute to reducing the life of hydraulic piping

and hoses. A frequent cause of hydraulic line failure is thinning of the line due to corrosion, whilst degradation of flexible hoses occurs more rapidly when exposed to environmental factors. In addition, mechanical damage such as from frequent bending/twisting of hoses due to poor installation or design can also reduce the service life, whilst the position of some hoses and pipes may increase their vulnerability to impact damage.

## BEST PRACTICES TO REDUCE RISKS

To reduce the risks of oil spills from hydraulic piping and hoses in exposed locations, the following measures are recommended:

- **A thorough visual inspection of the flexible hydraulic piping and hoses** should be carried out on a regular basis in accordance with the ships Planned Maintenance System (PMS).
- Any indication of rust patches on piping should be tackled immediately with **de-rusting and application of protective paint coating**. Rust patches should not be painted over without maintenance. Spare sections of hydraulic pipes, seals and fixings should be on board for immediate repairs in case of pipeline failure.
- Evidence of abrasion, kinking, or chemical contamination of hoses, or corrosion of hose connections should be **investigated further and action taken as necessary**.
- **A policy for replacing hydraulic hoses onboard**, depending on their location, should be included in a company's safety management system. Hoses located in exterior locations cannot be expected to last as long as hoses protected from environmental conditions. To address this increased risk of failure, some companies are known to replace hydraulic hoses in high-risk locations every 2.5 years and every 5 years for all other hydraulic hoses exposed to weather. This task should be part of the ships PMS, and all replacements should utilise the original equipment manufacturer components and be correctly rated for the intended application. We recommend **maintaining a complete set of spare hoses onboard**. Additionally, the connectors of these hydraulic hoses should preferably be made of stainless steel. **Maintaining a record of hydraulic tank quantities** helps determine the amount of oil spilled, as even small spills can spray over a large area, appearing as significant pollution, and leading to heavy fines if the spilled quantity is unknown.
- Exposed outboard hydraulic piping and flexible hoses should ideally be avoided during the design stage. **Utilising alternative designs, such as electric or pneumatic power sources**, should be considered, as they pose lower pollution risks. We are aware of a project where a shipowner replaced existing hydraulic actuators in an exposed location with pneumatically operated ones. Alternatively, an **all electric system for cranes, hatch covers, ramps, and winches** can be considered if the ship type allows.

Any form of marine pollution damages the environment. A ship can be penalised and may face commercial implications. Identifying potential pollution risks and addressing them through **alternative designs, proactive maintenance and operational best practices** is essential.

## FOR FURTHER INFORMATION

For further information, please do not hesitate to email [lossprevention@tindallriley.com](mailto:lossprevention@tindallriley.com).

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