

# BIBLIOGRAPHY

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# PREVENTING SLIPS, TRIPS AND FALLS THROUGH-LIFE

SAFE CONDUCT OF THE SHIP, CREW HEALTH AND SAFETY, SAFE AND TIMELY DELIVERY OF CARGO, SAFE DOCK WORKING, SAFE SHIPYARD WORKING

## DESIGN

DESIGN OUT HAZARDS THROUGH LIFE, SET ACCESS AND MOVEMENT GOALS



Ship motion; long life coatings (tanks, decks) to reduce slips and need for access; placing sensors and controls outside tanks; eliminating tasks by equipment re-design; reducing frequency by greater reliability; arranging walkways and ladders to simplify traffic flow; locating gangways away from cranes; providing arrangements for barriers, fall arrest gear, stowing loose objects; ladder design, angles, hand rail design; lighting placement.

## BUILD

BUILD STRATEGY, BEST PRACTICE



"Ship design drives process design"

**Avoid access Surfaces**  
**Stairs, ladders, Gangways, railings**  
**Hatch access**  
**Anchor points**  
**Masts**  
**Cable management**

## DOCK WORK

PLATFORMS, RAILS, EDGES, LIGHTS, LADDERS

Stevedoring is the ninth most hazardous occupation in Britain. Falls contribute significantly. [9] Injury accidents on board visiting ships account for the majority of accidents that occur within container ports. 40% of accidents to dockworkers occur onboard ships and the majority of these are related to lashing activities on containerships. The most common cause is the lack of suitable and safe access to lashing work-stations provided by the vessel, resulting in unorthodox and unsafe work practices. [25] Seafarers are expected to carry out lashing operations standing on platforms as small as 20 x 160cm, on average 20m above the quay or water. Injuries resulting from body stressing, falls, slips and trips, being hit by moving objects and hitting objects with a part of the body accounts for 88% of all injuries. Falls, trips, slips incidence 0.63% (total incidents 2.07%) [20].



## USE, MAINTAIN

MARKED EDGES, HOUSEKEEPING, PROCEDURES, TRAINING



Trawler fishing and merchant seafaring are the two most dangerous occupations in Britain. Fatal accident rates in seafaring: 51.6 per 100 000 worker-years, fishing: 103.1 per 100 000 worker-years. Similar patterns are found internationally [13]. General cargo ships account for 20% of world's fleet and 40% of fatalities - beyond the maximum tolerable individual risk for workers if occupation accidents were added [12].

46.2% and 19.8% of the accidents or deaths of seafarers worldwide were caused by slips/ falls and manual materials handling respectively [10] 45% of serious injuries are due to slips, trips and falls [19]. slips, trips and falls accounted for 22% of all personal injuries reported and 23% of illness/injury claims costs [17].

US shipyards ...non-fatal injury rate of 22.0 injuries and illness per 100 vs. general average of 6.1 per 100 for private industries. 20 (16%) of 120 shipyard fatalities ... falls from height. "Slips/twist/not falling" .. 35% of the Navy-wide summary of fall related injuries [from 1] UK shipbuilding and shiprepairing industries have accident incidence rates almost twice that of all manufacturing. Falls from a height account for the largest proportion of fatal accidents. Trips, slips and falls ...37% of major accidents ... most important cause of major injuries in shipyards and boatyards. (27%). Slips, trips and falls on the level accounted for approximately 25% of all major injuries [from 4].