



Naval Safety Center

LESSONS LEARNED



LL 21-08

SHIPBOARD FORKLIFT MISHAPS

Forklifts are indispensable material handling equipment (MHE) for essential load movement onboard ships. From pier-side operations to underway replenishments, forklifts provide efficient material movement that would not be safe or possible using human lift. However, forklift operations can also hold safety risks if the potential for human error is not mitigated. Human risk control must be purposeful to prevent injury and avoid damage to critical shipboard systems and supplies.

In 2020, the Naval Safety Center Knowledge Management (KM) team conducted a shipboard forklift mishap risk assessment, including mishap data analysis and a review of forklift-related doctrine and training. The data collected from 2014-2020 showed four top categories of forklift mishaps (Figure 1). Of note, only six of the 56 forklift mishaps in this time span were reported aboard our hospital, LHA, LPD, and LSD ship classes; CVN and LHD reported the other 50. Given the smaller operational spaces onboard those four ship classes and the high numbers of forklift operations necessary for their missions, the KM analysts consider that mishap underreporting may be affecting the assessment data.

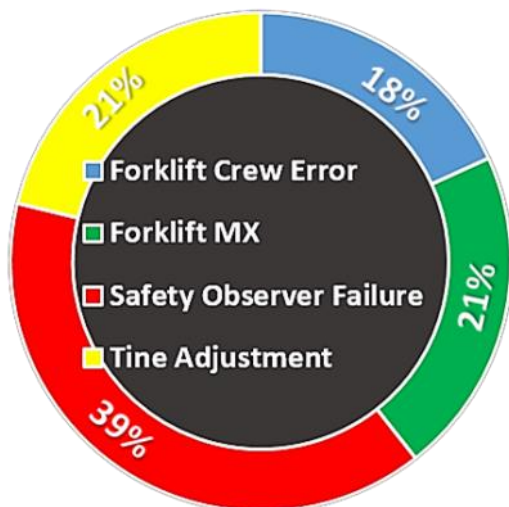


Figure 1

Zeroing in on Risk Data

Within the top four categories, the reported mishaps were caused by the following:

1. **Forklift Crew Error.** These mishaps occurred as a result of either the crew not adhering to the safety calls of their safety observer, or the forklift was operated in a manner that resulted in inadequate clearance for operation, or caused a nearby pallet strike.
2. **Forklift Maintenance.** These mishaps occurred during the performance of forklift maintenance, and resulted in finger cuts, smashed fingers while lifting the battery, a few electrical shocks tightening battery terminals, and cleaning.
3. **Tine Adjustment.** The tines or “forks” of a forklift usually are very heavy and are used to counterbalance the center of gravity of a forklift. As written, all the tine adjustment mishaps may have been preventable. The tines’ weight was a ‘common denominator’ to each injury, with the injuries occurring because one person tried to make tine adjustments alone.
4. **Safety Observer Failure.** These mishaps occurred due to the safety observer’s actions, either being out of position to safely observe the ongoing forklift operations or losing control of the forklift operations by conducting them without the ability to “emergency” stop unsafe actions.

SHIPBOARD FORKLIFT MISHAPS

Performing the Risk Assessment

With an understanding of each mishap, our KM team applied the risk assessment model to analyze the primary procedural guidance* and human error management tools (or risk controls) currently used by the fleet to standardize and define general forklift operations, forklift operator training, and forklift team training. They determined the larger root causes of reported shipboard forklift mishaps, and provided potential solutions for risk design shortfalls.

*Publications reviewed included OPNAVINST 5100.19F, NAVSUP P-538 (6th Edition), NAVEDTRA 43100-6T (Personnel Qualification Standard) Catalog, and LHA/LHD NATOPS Manual (NAVAIR 00-80T-106).

Results

The current risk design (written doctrine and procedures) mitigates 46% of shipboard forklift operational risk, leaving a 54% shortfall in procedural guidance. This shortfall means unmitigated risks must be identified and mitigated separately (*and differently*) by individual commands. The risk assessment team offered several recommendations, which are now under consideration by NAVSUP and OPNAV, to help increase the level of risk mitigation in weight handling doctrine and training. Here is a brief summary of recommended improvements forthcoming to the fleet:

- ◆ Develop a Basic Forklift Operation Safety Training Video to complement existing afloat forklift training that is otherwise “hidden” by being embedded in specific rate manuals
- ◆ Develop a forklift operations team concept (similar to Crew Resource Management)
- ◆ Develop a general forklift tine adjustment procedure to annotate heavy weights associated with tines and the need to secure tines when underway for transport in heavy weather
- ◆ Develop illustrations for all critical maintenance processes versus just text, including a “warning” at the appropriate sequence points in the OPNAVINST 5100.19F and NAVSUP P-538
- ◆ Create a NAVEDTRA for General Forklift Operations to standardize local forklift guidance
- ◆ Develop Safety Observer actions and qualification guidance that organizes all published Safety Observer actions into one section within the OPNAV and NAVSUP publications above
- ◆ Develop a specific General Forklift Operations checklist for different cargo handling missions to better organize work actions (e.g., Pre-Event MHE Pre-Op Checks, Cargo Event Safety Brief, Cargo Staging, Cargo Movement Plan, etc.)

Key Takeaways / Lessons Learned

While positive changes are on the way with improved training material and revised procedural guidance, knowing and addressing the top causes of forklift mishaps and addressing them at your unit will go a long way toward safer operations.

1. **Focus on the top causes of forklift mishaps.** Specifically, when you’re adjusting tines, performing maintenance, or are the safety observer, you should hear Risk Management alarm bells in your head.
2. **Checklists prevent improvising.** Get a head start on doctrine and training by reviewing (*and developing*) unit-level checklists. Ensure you include pre-event MHE pre-op checks, safety brief, cargo staging, cargo movement plan, communications plan for extended operations, and PPE in your risk management.
3. **Effective Safety Observers are most important!** Safety Observers are the top cause of shipboard forklift mishaps, so ensure you have adequate communication methods and that you are covering all blind spots. That action alone can reduce your risk of a mishap by nearly 40 percent!

This product is posted on the NAVSAFECEN CAC-enabled website

<https://intelshare.intelink.gov/sites/nsc/Pages/default.aspx>

For a copy of the full risk assessment — or just to send us feedback — email us at

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