

Best practice: Seafastening on mobile offshore units

Working Together for Safety Recommendation 038E/2017



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Samarbeid for Sikkerhet

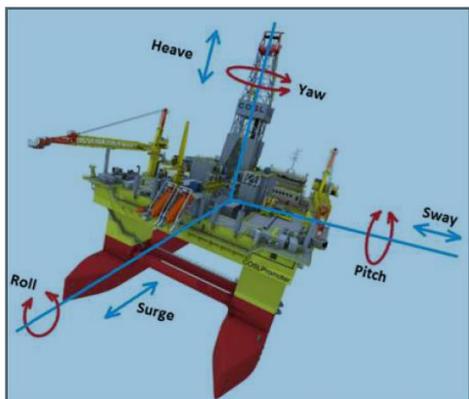
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Introduction

Unsecured equipment and cargo may move due to horizontal forces. These forces may be a result of roll, pitch, wind and horizontal acceleration/retardation in adverse weather conditions. Even on large mobile offshore units, such motion may arise quickly and unexpectedly. This may cause cargo to shift, resulting in damage to equipment and injuries to personnel.



Several undesirable incidents involving injuries caused by shifting cargo on mobile offshore units have been reported. Working Together for Safety has therefore been requested to prepare a best practice recommendation for seafastening on such units. The recommendation builds on measures that have been suggested following accidents, and existing procedures already available at some companies. Applicable regulations, standards and routines from the shipping industry, where good seafastening routines have been developed, are also included in this best practice.

Purpose

The purpose of this recommendation is to:

- Ensure the planning, execution and completion of the seafastening of cargo and movables on board rigs / mobile units
- Reduce the risk of incidents occurring
- Increase knowledge within the area
- Raise awareness of the necessity of possessing the relevant competence

Scope

Working Together for Safety's recommendations apply primarily to Norwegian petroleum activities, but the individual company is also free to use this recommended practice in connection with activities outside the Norwegian Continental Shelf.

Definitions

Mobile offshore unit: A mobile offshore unit is any floating mobile offshore unit, of any hull type, used in connection with activities undertaken by the subsea petroleum industry. Examples include drilling units, accommodation units, floating storage and offloading units (FSOs), floating production storage and offloading units (FPSOs), floating drilling production storage and offloading units (FDPSOs), and well intervention units (ref. the Norwegian Maritime Authority).

Temporary stowage of cargo: Temporary stowage of cargo refers to the stowage of all cargo that cannot be regarded as an integrated part of the mobile offshore unit. Equipment used in production and drilling operations (e.g. third-party equipment such as wireline and logging units) should be handled and secured as permanent equipment – e.g. with permanent welds, container locks, or the equivalent.

Cargo securing devices: All permanent and movable equipment used to secure cargo.

Deck plan: A plan which identifies the areas/locations that shall be used for stowage, for both temporary and longer-term storage of equipment, and associated weight limits.

Rules and recommendations

Section 3 of the Framework Regulations

Regulations of 4 September 1987 No. 856 concerning the construction of mobile offshore units (the Construction Regulations)

Regulations concerning risk analysis for mobile offshore units (the Risk Analysis Regulations)

Regulations of 17 December 1986 No. 2318 concerning the construction and equipment of living quarters on mobile offshore units (the Living Quarters Regulations)

Regulations of 20 December 1991 No. 878 concerning stability, watertight subdivision and watertight/weathertight closing means on mobile offshore units (the Stability Regulations)

Regulations of 4 December 2015 No. 1392 concerning towing arrangement and transit of mobile offshore units (the Towing Regulations)

Regulations of 4 September 1987 No. 859 concerning protective, environmental, and safety measures on mobile offshore units (the Protective, Environmental and Safety Regulations)

NORSOK R-003 Safe use of lifting equipment

IMO Res.A.714 Code of safe practice for cargo stowage and securing

Norwegian Oil and Gas Association Guideline 116: Recommended guidelines for packing, securing and transport, as well as user inspection of load containers

GOMO chapters 3, 5 and 9

DNV-OS-H101 Marine Operations, General

Regulations

Norwegian regulations

Section 3 of the Framework Regulations states that relevant technical requirements given in the Norwegian Maritime Authority's regulations for mobile offshore units may be used. However, this also means that some of the Norwegian Maritime Authority's seafastening requirements are not directly required, since these are not regarded as technical requirements.

For Norwegian units:

The most important 'seafastening requirement' included in the Norwegian Maritime Authority's rules is found in section 12 of the Regulations concerning protective, environmental and safety measures on mobile offshore units: "All pipes, bits, spare parts, steel plates and profiles, etc., shall be stored in a suitable and proper manner, and secured to withstand a heeling corresponding to the maximum heeling angle which the unit may have at the assumed damage as defined in section 21 of the Stability Regulations (17 degrees)."

The Stability Regulations also set requirements regarding the stability information to be included in the operations manual. The Towing Regulations also include seafastening requirements.

Section 507 of the Norwegian Maritime Code regarding mobile offshore units registered in Norway specifies which of the Code's other requirements apply to such units. Section 131 states that "Before a voyage begins the master shall ensure that the ship is seaworthy, including that it is sufficiently equipped, manned and supplied with provisions and in proper condition for the reception, carriage and preservation of the cargo." Section 507 states that "What is laid down regarding the master and the first mate applies correspondingly to the person with the highest authority on board the unit and to his or her permanent deputy." This legal basis may therefore also be used as a seafastening requirement.

International legislation and standards

ISM Code: Internationally, this applies to self-propelled drilling units.

For units registered in Norway, this applies to all mobile offshore units.

SOLAS chapter II-1, rule 4 requires a "cargo securing manual", but this only applies to ships if the flag state does not require such a manual for mobile offshore units specifically.

IMO Res. A.714 concerns "safe practice for cargo stowage and securing".

GOMO sets competence requirements for onboard personnel (chapter 5) and cargo handling (chapter 9).

Good Practice – Seafastening

With regard to seafastening on mobile offshore units, it is important to remember that such units may have very different characteristics; they may be anchored or use DP, have differing heeling curves / undulations, and vary in how their stowage areas are designed. Some units feature wooden decks in these areas, while others have steel decks. These various conditions must be emphasised and considered when assessing seafastening needs.

All stowage areas should feature ample brackets/eyes for use with securing equipment.

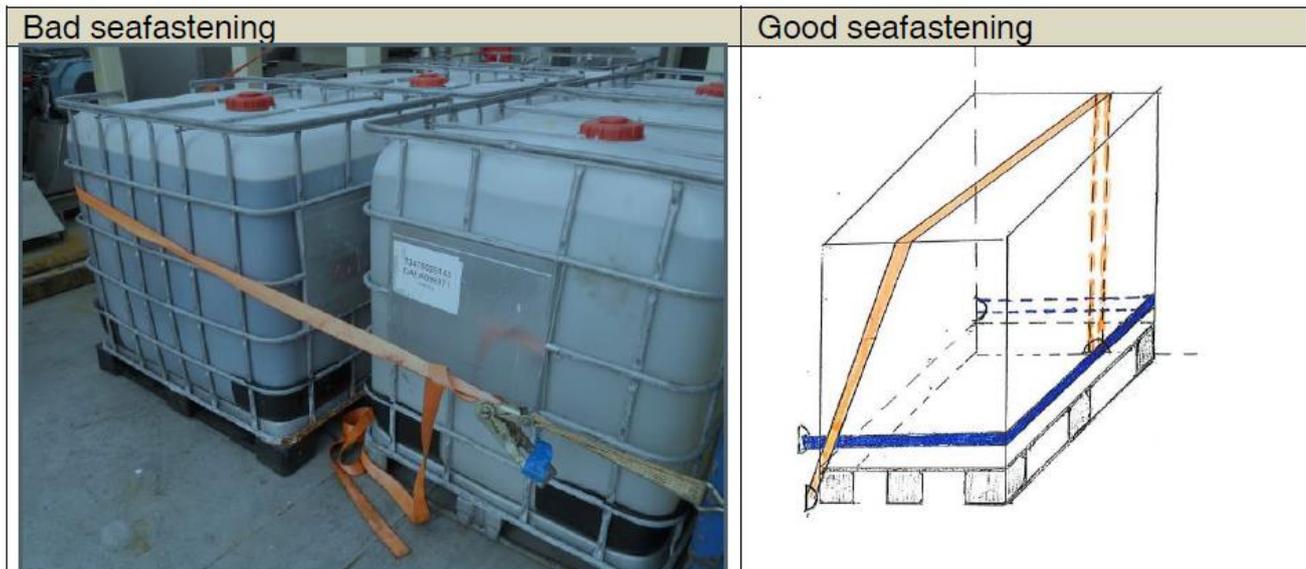


Figure 1: Cargo items should be secured to permanent eyes, not only to each other

Permanent steel bumpers are recommended between cargo areas and escape routes, emergency exits and hatchways, and cargo should be positioned as close to the bumpers as possible.



Figure 2: Cargo positioned as close to bumper as possible

Stowage areas should be kept clean and tidy, with securing equipment stored in boxes or similar close to the cargo areas.

Slippery steel decks should be avoided, unless they have solid bumpers/frames in all directions. Alternatively, high-friction paint or other types of anti-slip coating may be used, or a full or partial wooden deck. Note the increased risk of tripping where partial wooden decks are used.

The strength of the securing devices (minimum breaking load, MBL) should be at least half the weight of the cargo being secured.

All securing equipment should be visually inspected prior to use, and any devices showing signs of damage (deformed chain links, buckled wires, torn fibre straps, etc.) should be disposed of. The establishment of disposal criteria (equivalent to that for lifting equipment) should be considered.

Lifting equipment which has been used to secure cargo should not subsequently be used in lifting operations (due to unknown loads and therefore possible damage).

Chain hooks should only be secured to appropriate eyes/shackles, and not to the chain itself (see Figure 3).



Figure 3: Incorrect and correct use of chains

Containers or other items which are regarded as temporary but moved often (e.g. waste containers, gas bottles, etc.) should have a permanent location and be able to be secured with a minimum of extra securing work (use of frame, container lock, etc.).

Hazardous cargo (explosives, chemicals, radioactive substances, etc.) should not be stowed near other substances they may react with (cargo segregation principle), ref. sections 11 and 11(a) of the Protective, Environmental and Safety Regulations.

Remember that indoor items must also be secured:

- Office chairs should not have wheels

- Trolleys should feature wheels that can be locked
- Other equipment can be screwed/bolted in place, or secured using baggage straps / double-sided tape.

Responsibilities and roles:

All units should have a seafastening manual/procedure that includes an overview of where various types of cargo shall be stowed.

The master / platform manager has the overall authority and responsibility for making decisions regarding safety on board mobile offshore units. In addition, everyone on board has a responsibility to help ensure that the safety system is followed on board. Remember that this means that everyone must participate in securing not only containers, but also personal effects on board.

A practical way of delegating responsibility is to allocate responsibility for seafastening within the relevant area to the area responsible (as defined in the work permit system).

Planning and good routines:

It is important to monitor and regularly check all cargo to prevent items from shifting and potentially causing accidents. A dedicated adverse weather policy, which clearly defines what shall be done to prevent cargo from shifting in adverse weather conditions, should also be prepared. Unit-specific guidelines regarding what constitutes adverse weather, and what measures should be implemented in the event of the various criteria, should be developed in addition, e.g. in the event of winds of over 40 knots: No crane operations, restrict underhull access, restrict outdoor areas for usual access, etc. Routines for inspections following adverse weather must also be included.

In addition to securing cargo against undesirable shifting at sea, cargo should also be secured so that it does not block escape routes and means of evacuation in the event of collision/allision, running aground or failure of the ballast system.

Appendices

A: Examples of hazardous conditions

B: Overview of securing devices

Appendix A: Examples of hazardous conditions

Image	Element	Potential hazard	Measures
	Insufficient risk assessment prior to starting the work	All hazards that may occur during execution of the work not considered	All parties to be involved in the work must take part in the risk assessment
	Insufficient knowledge of cargo stowage and seafastening	Injuries to personnel Damage to equipment False sense of safety	Training in correct use of onboard securing equipment (what to use when)
	Low friction on deck Wet/slippery deck Steel on steel stowage Grease and ice	Sliding/shifting cargo Injuries to personnel Damage to equipment	Consider use of high-friction paint in the relevant area Wait for a break in the weather before commencing the work
	Adverse weather	Shifting of cargo Injuries to personnel Damage to equipment Insufficient/poor seafastening Unit instability	Check all temporary cargo and seafastening prior to bad weather Establish and adhere to adverse weather procedure
	Change in the unit's centre of gravity	Tilting/listing Injuries to personnel Damage to equipment	Check placement of cargo inside containers Ensure that seafastening maintains the cargo's centre of gravity
	Flammable areas Fire hydrants	Weakening of securing devices Blocked fire hydrants	Use chain and wire slings in these areas Check that fire hydrants are not blocked by cargo
	Blocking of escape routes	Integrity and safety of unit Injuries to personnel	Keep escape routes clear!
	Sharp edges on secured cargo	Injuries to personnel Damage to equipment	Protect lashing straps against sharp edges

	<p>Incorrect use of fastening points and bumpers</p>	<p>Integrity of unit Damage to equipment</p>	<p>Only use permanent fastening points to secure cargo</p>
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Appendix B: Overview of securing devices

The basic rule of thumb for securing cargo is as follows:

The sum of the minimum breaking load (MBL) of all the cargo lashing straps must not be less than 0.5 times the static weight of the cargo being secured.

Cargo	Weight	Recommended securing equipment	Minimum breaking load
Small items such as pallets, etc.	< 1-2 tonnes	Fibre straps	Two times the weight of the cargo
Medium-weight cargo	2-10 tonnes	Chain and wire securing devices	
Heavy cargo	> 10 tonnes	Consider welding of permanent securing points. Secure against bumpers or other cargo	
Pipes		Secure with dunnage and wooden wedges or in appropriate secured stacking racks	
Gas bottles		Gas bottles which are not stored in bottle racks must be secured with chain/wire. Loose bottle racks must also be secured	

TO AVOID INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT: RESPECT BARRIERS, ALWAYS REMEMBER TO DOUBLE-CHECK ALL SEAFASTENING, AND REPORT THE STATUS TO THE CONTROL ROOM AFTER CARGO OPERATIONS.