



GUIDANCE NOTICE

Unpowered Barges

Definition

Unpowered Barge - a vessel that is not propelled by mechanical means and is navigated by a powered vessel that moves it by pushing or towing.

General

This notice is intended to provide general guidance on the risks associated with the operation of unpowered barges. It aims to assist owners and operators in safe and safety management obligations under the *Marine Safety (Domestic Commercial Vessel) National Law 2012* (national law) and workplace health and safety requirements. It does not replace any requirements of the national law or any other applicable legislation.

Application

This guidance applies to unpowered barges used for operations including but not limited to:

- Carriage of deck cargo including:
 - Static cargo – building materials, garbage, wharfing piles
 - Wheeled or tracked vehicles
 - Contained liquid cargo
- Pile driving
- Lifting operations undertaken by:
 - Excavators
 - Cranes
 - Davits
 - Shearlegs / A - Frames
 - Winch and block assemblies

Safety Management

All owners of domestic commercial vessels are required to implement and maintain a safety management system (SMS) that ensures that the vessel and the operations of the vessel are, so far as reasonable practicable, safe.

Compliance

As part of an inspection or investigation by a Marine Safety Inspector, you will be asked to produce SMS documentation and demonstrate that the SMS is being implemented and complied with. This will include you being able to demonstrate that a risk assessment including measures to control identified risks has been conducted. Failure to provide adequate evidence that an SMS is in place and the documentation and risk assessment is relevant may result in the need for compliance action on the part of the National Regulator.

Risk assessment

The following information provides guidance with respect to some of the risks posed by operations involving unpowered barges to assist owners and operators in effectively assessing risk to their operations. This is not an exhaustive list and owners and operators are advised to undertake individual assessments of their particular operations to ensure all risks are identified and effectively controlled.

Deck loading

Where cargo is carried on deck, it is important to ensure that the deck plating and its supporting structure is strong enough to support the cargo and to avoid structural damage to the barge. Hence, the maximum deck loading limits must be known.

In addition, the deck plating may deform or fail in instances where the cargo load is concentrated at a point between deck stiffeners. This could be caused by the shape of the load or its design.

For example, wheeled cranes impose greater deck loading than tracked ones. The operator and crew need to be mindful of this and stow cargo accordingly. Use of timber beams known as “dunnage” placed under cargo can help. The use of dunnage allows for access under the cargo for lashing/lifting equipment and distributes the load across a greater area of the deck, which reduces the concentrated load problems described above.

Any deterioration of deck plating and its supporting structure, such as existing damage or corrosion, reduces the amount of load the deck can safely carry. This deterioration may be clearly visible, or go unseen. This is why regular and effective maintenance and inspections are so important.

Where plant such as excavators or mobile cranes and/or deck cargo is lashed to the deck, the attachment points and supporting structure must be fit for purpose.

Movement of cargo/plant

Unsecured deck cargo may shift due to:

- vessel motions;
- changing heel or trim due to lifting operations;
- wake from other vessels; and
- effects of wind and shipping of water/waves.

Shifting cargo can have a negative effect on the vessel’s trim or transverse stability and in serious cases, cause a barge to capsize. It also poses a hazard to personnel on deck.

Reduced freeboard from overloading

A barge must be loaded such that adequate freeboard (the amount of the barge above the waterline) is maintained taking into account the prevailing wind and wave conditions; the potential trim and heeling moments that the vessel may be subject to; and the potential for water on deck.

In simple terms, the less barge there is above the water, the closer it is to sinking and the greater risk to the safety of the cargo and people on board. In this regard, freeboard is critical to safe operations.

Technically, a reduced freeboard results in a reduction in reserve buoyancy. Reserve buoyancy enables the barge to return to the upright condition when it heels or trims. A low freeboard also makes the barge susceptible to water on deck which may shift the cargo, jeopardise the on board personnel, flood into openings leading below deck, or cause the barge to submerge and become unstable when underway.

It is recommended that maximum load freeboard marks be clearly marked on the sides of the vessel to give a visual indication of permissible loading. The freeboard marks should be located at a distance from the deck edge which is the greater of 25% of the depth of the vessel or a freeboard determined from the table on page 3.

The freeboard marks should be 25 x 400mm strips of contrasting colours and displayed on the sides of the vessel at the fore and aft ends and amidships.

Reduced freeboard from heel and trim

The trim or heel of a barge is initially determined by where the weights are placed on board.

Excessive heel or trim may result in the deck becoming submerged and/or the opposite sides and ends of the barge lifting out of the water. In these circumstances, the waterplane area reduces and the vessel can very quickly become unstable and capsize. Excessive heel or trim angles may also cause the downflooding of water into spaces below the deck.

These heel and trim changes can be caused by:

- Uneven distribution about the centreline and amidships of masses including plant (cranes, excavators, winches); deck cargo and dunnage; personnel; fuel, ballast, and fresh water tanks.

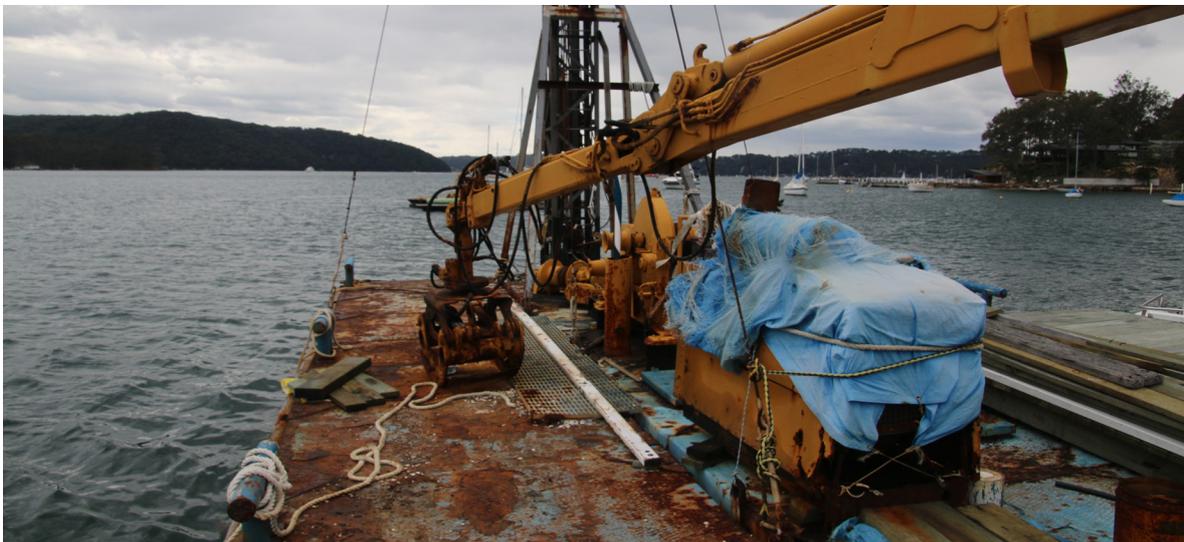


Figure 1: unpowered barge with corroded deck



Figure 2: unpowered barge with unsecured cargo



Figure 3: unpowered barge with insufficient freeboard

- Lifting of masses external to the vessel including shore-side items; mooring weights; salvage weights; navigation aids; existing piles; mud/sand from sea bottom by lifting equipment on the barge.
- Adding, removing or moving deck cargo using the vessel plant such as a davit, crane, excavator or pile frame.
- Adding, removing or moving deck cargo using tracked or wheeled vehicles such as excavators, forklifts, ATV's, trucks, trailers, wheelbarrows, utes and cars.
- Adding deck cargo that has a high centre of gravity or large windage profile.

Additional consideration to excessive heel and trim during loading should be given where wheeled or tracked vehicles are loaded as deck cargo from the shore or are used to load deck cargo from the shore.

In assessing the risks of barge operations, it is the owner's responsibility to ensure that the barge has adequate stability for the operations carried out on board.

AMSA recommends that a marine surveyor accredited to assess stability be engaged to conduct a stability analysis.

Flooding of buoyant spaces

Unpowered barges typically have flat bottoms which, when partially filled with water, create significant free surface moment which reduces the vessel's stability.

The bilges must be checked regularly to ensure they are dry and a means to pump out any water contained in the bilges must be provided. Contaminated bilge water must be responsibly disposed of.

Water ingress into the bilges, tanks or void spaces may occur through deteriorated deck and shell plating, poorly sealed hatches, deteriorated hatch coamings, or ventilator pipes.

Plant installed on the vessel

It is the general safety obligation of the owner/operator to ensure that plant permanently or temporarily installed on a barge is maintained and serviced in accordance with the manufacturer specifications and/or WHS regulations. It is also the obligation of the owner/operator to ensure that the plant is operated by suitably competent persons who are licensed where required under WHS law.

Barge Length (m)	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Min F'bd to deck (mm)	400	400	414	429	443	457	471	486	500	514	529	543	557	571	586	600	600	600	600	600

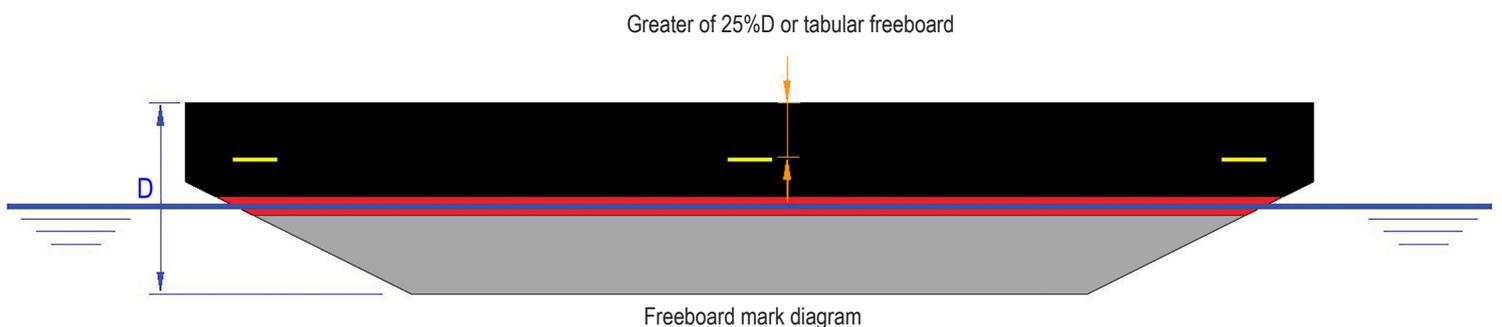




Figure 4: unpowered barge with excessive trim

The operations undertaken on board the barge are to be addressed in the vessel's SMS and must include a risk assessment to mitigate and manage risk to the vessel, its personnel and the environment.

Safe Work Australia has developed a Code of Practice on Managing risks of plant in the workplace (<https://www.safeworkaustralia.gov.au/doc/model-code-practice-managing-risks-plant-workplace>) and other supporting guidelines (<https://www.safeworkaustralia.gov.au/cranes>; <https://www.safeworkaustralia.gov.au/system/files/documents/1703/guide-to-mobile-cranes.pdf>; <https://www.safeworkaustralia.gov.au/collection/cranes-guidance-material>)

Fire-fighting and fire prevention measures suitable to the plant carried must be provided.

Environmental pollution response equipment must also be carried commensurate with the risk of pollution posed by the plant carried.

Considering risks of collision or grounding

The vessel in attendance of a barge must be able to safely navigate the barge. Consideration should be given to the following factors:

- waterway hazards
- local traffic
- wind and tide conditions



Figure 5: unpowered barge with holed deck



Figure 6: unpowered barge with both fitted and loaded lifting appliances

- weather
- visibility
- ability to keep a proper lookout
- towing/lashing ropes and attachment points on the barge and the attending vessel
- emergency arrangements including secondary tow ropes and anchor
- adequacy of the vessel in attendance to safely manoeuvre the barge.

Preventing man overboard

Means of preventing personnel from falling overboard must be provided where practicable. Ideally, permanent railings should be installed around the deck perimeter where personnel may access. In many cases where railings may impede the vessel's operations, removable railings may be another option. Where railings cannot be fitted, yellow "No access" markings around the deck perimeter at a distance of 1 metre from the deck edge to provide a visual barrier to keep people well within the confines of the deck should be considered.

Personnel should wear inflatable 150N lifejackets at all times and a means of re-boarding must be provided. Depending on the remoteness of the area of operations, time of work, and the speed of the water flow where the vessel is operating, additional personal protective equipment (PPE) could include Personal Locating Beacons (PLB's) and lifejacket lights. It is also recommended that lifelines with hauling lines attached are provided in readily accessible positions around the vessel.

More Resources

Marine Safety (Domestic Commercial Vessel) National Law Act 2012 – Part 3 – General Safety duties relating to domestic commercial vessels.

Marine Order 503 (Certificates of survey — national law) 2013

Marine Order 504 (Certificates of operation – national law) 2013

National Standard for Commercial Vessels (NSCV) Part E - Operations

AMSA Exemption 02 - *Marine Safety (Certificates of survey) Exemption 2017*

AMSA Exemption 03 - *Marine Safety (Certificates of operation) Exemption 2017*

AMSA Exemption 41 - *Marine Safety (Unpowered barges) Exemption 2017*

State, territory and commonwealth work health and safety laws.



Figure 7: unpowered barge attended by an inappropriate vessel