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Carriage of Break-Bulk Cargoes

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Introduction

The proper, adequate and satisfactory stowage and securing of items of cargo are of utmost importance for the safety of the crew, the carrying ship, and the items of cargo themselves. If items of cargo are not stowed and secured in a proper manner, bearing in mind the intended voyage and the time of year, those items of cargo might shift from their stowage position, and damage might be sustained by the item of cargo or the ship, or ship's staff might suffer injury. This can be as a result of differences in the size, shape, weight and packaging of the cargo, and/or due to a lack of lashing points or the ability to over-stow.

A typical break bulk load which may create problems when lashing

By properly planning, loading and securing breakbulk cargoes significant damage to the cargo and the vessel can be avoided.

This briefing provides loss prevention advice on the planning, loading, stowage and securing of breakbulk cargoes, and addresses some of the issues which have contributed to recent incidents.

Cargo Planning

To ensure effective loading and lashing detailed information on the intended cargo to be loaded should be provided. This information should include:

- accurate dimensions of the cargo,
- weight,
- centre of gravity,
- nature and strength of any packaging,
- location of lifting and lashing points including any requirements for a specific type of lashing material,
- whether or not the cargo is fragile and is not to be over-stowed,
- whether or not the cargo is suitable for carriage on deck,
- whether the intended cargo is a dangerous good, requiring a declaration in accordance with the IMDG Code.

This detailed cargo information will allow appropriate stowage and lashing plan to be developed based on the requirements of the Code of Safe Practice for Cargo Stowage and Securing (CSS Code), and the vessel's Cargo Securing Manual (CSM).

The CSS Code contains general guidance on the stowage and securing of both standardised and non-standardised cargoes. The CSM contains information specific to the vessel and the cargoes normally carried as well as details of the lashing and securing equipment actually carried on board. It is worth bearing in mind that the CSM will not cover every possible type of cargo which may be carried. If the intended cargo is not included in the CSM and there is insufficient guidance to allow its safe loading, stowage and securing, then additional guidance can be sought from the vessel's Flag State, Classification Society or third party consultants.

Detailed planning should also determine the number, size, and positioning of lashing and securing equipment based on the actual stability condition of the vessel and the acceleration forces to which the cargo and lashings will be subjected.

The need for the use of appropriate dunnage should be considered an integral part of the loading plan. Dunnage will contribute to the securing of the cargo by increasing the coefficient of friction. However, the amount required and its positioning will be determined by the tank top strength limits and the footprint of the cargo.

When planning the location and distribution of cargo, due consideration must be given to the size and weight of the cargo in relation to the number, size and location of securing points. This becomes even more critical when cargo is to be loaded in multiple tiers.

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Loading break bulk cargo

Vessels which have not been specifically designed for the carriage of breakbulk cargoes may not be fitted with sufficient lashing points for the securing of these cargoes. If this is the case then additional lashing points may need to be fitted. Proper consideration should be given to the location of additional lashing points in order to avoid incorrect positioning and potential damage to the vessel's structure. If required, Class or third party consultants may be able to provide additional guidance on positioning and fitting.

Hot Work

Care must be taken when welding additional fittings to ensure that the area of hot-work is not adjacent to a bunker tank or that the heat will not cause damage to protective paint coatings in adjoining tanks or spaces.

In addition, it is important to protect any cargo already loaded, its dunnage and packing materials when conducting hot-work to minimise the risk of fire within the cargo spaces. Where possible it is preferable to conduct all hot-work prior to commencing loading when the hold is free of cargo.

Lashing Point Certification

It is likely, particularly when carrying project cargo, that any additional lashing points or sea fastenings fitted will require testing and certificates to be issued.

Additional Cargo Requests

Whilst details of all intended cargo should ideally be advised prior to commencing loading, requests to load additional cargo once loading has commenced are common. Before agreeing to load additional cargo, proper planning should be carried out. This should take into account the nature of the cargo already loaded, the integrity of the stow, available means of lashing and securing and the stability of the vessel.

Irrespective of any instructions to load additional cargo, the Master is obliged to ensure that the safety of the vessel, the crew and cargo will not be compromised in complying with these instructions.

Commonly Carried Cargoes

Whilst breakbulk cargoes can consist of any non-standardised units, common types of cargo carried include pallets, crates, bags, coils, pipes, vehicles and project cargoes.

While the loading, stowage and securing of these cargoes can be approached in a similar fashion, some have unique considerations to be taken into account during the planning stage, some of which are included below.

Example of project cargo

Jumbo Bulk Bags

Jumbo bulk bags also known as Flexible Intermediate Bulk Containers (FIBCs), are commonly carried and can be used for any number of bulk cargoes. As a result of the bag construction and the properties of the cargo contained within, bulk bags cannot be considered as a solid, strong or secure base and so should not be over-stowed with other types of cargo.

If cargo is permitted to be loaded on top of the bags, then it is likely that the bags will move or settle throughout the voyage resulting in lashings slackening and with the potential risk of the stow collapsing. The construction of the bags will determine the maximum compressive load and as a result the maximum height to which the bags can be stacked. This is normally a maximum of three tiers high.

Cargo in jumbo bags

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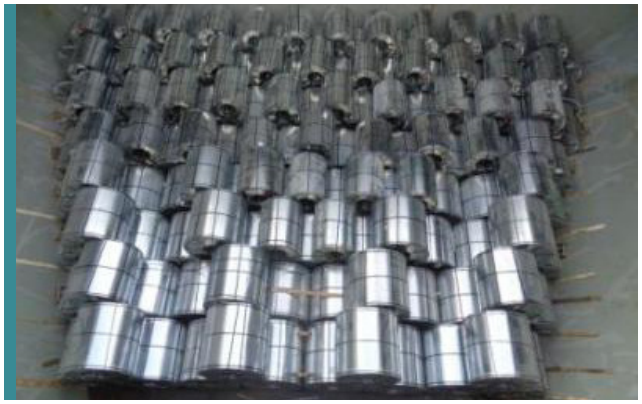
Damage caused during loading or stowage can also result in contamination of other cargoes and, depending on the nature of the contents, can cause significant damage to other sensitive cargoes such as finished steel products. Care should therefore be exercised in planning, segregating and protecting cargoes.

Steel Coils

Coils of steel usually range from 5T up to as much as 25T. They can, depending on their weight and the strength of the tank top, be loaded up to three tiers high. Coils up to 10T can be loaded in three tiers whereas those weighing more than 15T will only be loaded in a single tier. This ensures that the point loading on the tank top is not excessive and also ensures that the coils on the lower tiers are not crushed or ovalised by the weight of the coils loaded on top. The vessel may have sufficient tank top strength, with the use of sufficient dunnaging, to allow more coils to be loaded. This will have been calculated by a naval architect and will be stated in the vessel's CSM along with specific instructions on dunnaging and lashing.

Coils must not be loaded on top of other cargo as this will likely result in significant damage to the other cargo, which may lead to an unstable base for the coils and cause cargo shift. Loading cargo on top of coils should also be avoided given the potential for damage to the lower coils and the tank top strength limits being exceeded. When stowing steel, consideration should be given to the need for locking coils to secure the stow and the method of lashing, particularly in way of flares in the holds.



Finished steel coils

Vehicles

Vehicles range from cars and trucks to heavy plant and machinery. Loading and securing vehicles can be difficult due to their lack of suitable securing points, small footprint, high centre of gravity and the need to chock wheels to prevent movement. But it is the fuel, oil and battery which have caused the majority of incidents. This is especially true for vehicles loaded on deck where leaking fuel or oil has resulted in pollution incidents and electrical faults such as when vehicles have been exposed to seawater.

While the above highlights some of the more common types of breakbulk cargoes where incidents have occurred it is by no means exhaustive. It is important when planning the loading of any breakbulk cargo that the hazards and risks presented by the particular cargo are assessed fully.

Tracked vehicle secured on deck

Lashing and Securing

Once the location of the cargo and the forces to which it will be subjected has been determined, the type of lashings to be used will need to be identified. The type of lashings will be determined by the size, weight and nature of the cargo. For example chains or wires should not be used to secure rolls of paper as these will damage the cargo.

As there are significant differences in the strength and physical properties of different types of lashings, care should be exercised to ensure that the most appropriate type is used. Given the differing characteristics, such as their elastic properties, different types of lashing should not be used together to secure an individual item.

Correct placement of the lashings should prevent the cargo from either sliding or tipping. It is also important that not only is the cargo lashed securely to the vessel but that it is also securely lashed to any frame or cradle in which it is stowed. There is no point in applying lashings which will have no effect in securing the cargo. The CSS Code and the CSM provide guidance on the correct use of lashings.

When loading either very heavy cargo or cargo with no suitable lashing points it may be necessary to apply sea fastenings. A sea fastening is a securing arrangement usually bolted or welded to the ship's structure which may or may not be used in conjunction with conventional lashings to prevent movement in the cargo. When considering the use of sea fastenings, care must be exercised in their placement so as to avoid transmitting forces into an area of the vessels structure which is not designed to withstand them.

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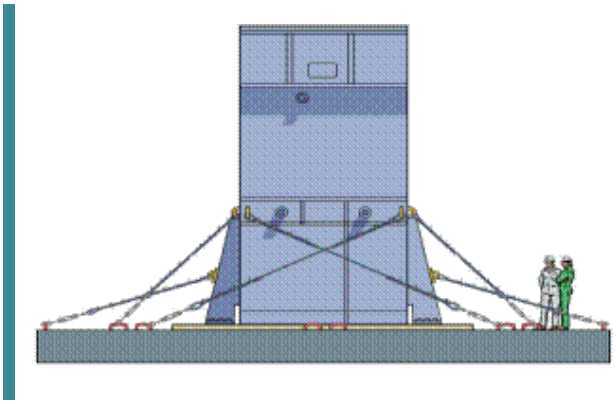

Project cargo being secured on deck

There are two recognized ways to determine lashing requirements for a particular piece of breakbulk cargo. Both are covered in the CSS Code and are as follow:

Advanced Calculation

This is an accurate method of determining the efficiency of lashing arrangements which takes into account details of the cargo, its stowage location in relation to the vessel's centre of rotation, the stability condition of the vessel, external forces likely to act on the cargo and the effect of friction.

Detailed information on conducting the advanced calculation can be found on pages 98 – 107 of North's *Loss Prevention Guide on Cargo Stowage and Securing*.

Rule of Thumb

This states that the maximum securing load (the load capacity of a device used to secure cargo based on a proportion of its breaking strength) of lashings on each side of the cargo should be equal to the weight of the unit.

While both are acceptable methods of determining the required amount of lashings, the advanced calculation method is the most accurate and will usually require fewer lashings to be used as it takes their positioning into account.

In any system, the lashing is only as strong as the weakest part. Therefore care should be taken to ensure that all components used to secure the cargo are of an adequate size and strength and are capable of withstanding the required securing load for the voyage.

All lashing equipment should be inspected prior to use to confirm it is undamaged and fit for the intended use. Any lashing equipment identified as defective must be removed from service and suitably quarantined.

It may not be possible for the crew to access lashings after additional cargo has been secured or during the voyage should any component fail. It is therefore critical that lashings are applied effectively during loading in accordance with the CSS Code and the vessel's CSM.

Common Lashing System Deficiencies

The following deficiencies are some of the most commonly encountered:

- mixed types of lashing material used on single units of cargo
- insufficient number of lashings being applied
- lashings of insufficient size for weight of cargo
- lashings being applied at unsuitable or ineffective angles
- lashings being applied to weak points on cargo
- multiple lashings being applied to a single securing point exceeding its SWL
- additional securing points being poorly fitted or fitted in areas with insufficient structural strength
- heavy cargoes loaded over light or fragile cargoes

Example of poor loading practices with vehicles loaded over jumbo bags

Contractual Obligations

The responsibility for stowage and securing of the cargo may, depending on the terms of the charterparty, fall to charterers; however this is not always the case. As a matter of common law, the responsibility will lie with owners so it is essential that Members and masters are familiar with the specific charterparty terms under which the vessel is operating.

There have been numerous cases where masters were unaware that the owners were responsible under the charterparty for loading and securing the cargo. As such, no instructions or supervision was given to the stevedores and lashing gangs.

Irrespective of who has responsibility for loading and securing the cargo under the terms of the charterparty, masters have an overriding duty and authority under the SOLAS Convention Chapter V, Regulation 34-1, to take any action deemed necessary to ensure the safety of the vessel. While this authority allows masters to challenge charterers and / or stevedores in situations that may pose a hazard to the vessel, care should be exercised in how this is carried out.

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Understanding Supervision Duties

It is therefore extremely important not only for parties to establish their contractual obligations in relation to cargo operations, but also to understand the different duties with regard to responsibility and supervision.

If a party has responsibility for cargo operations, it has a duty to ensure that those operations are carried out as they would be by competent stevedores exercising due care for the safety and preservation of the cargo. This includes other cargo carried on the same voyage, persons who are likely to come into proximity with the cargo and the vessel itself.

If the operations are carried out to the standard of competent stevedores then a party will be discharged from liability and should not be held responsible for any resulting damage or loss.

On the other hand, supervision involves overseeing an operation and imposes a duty to inform the appropriate party if problems and / or issues arise with that operation. Prudent masters will wish to supervise cargo operations to ensure the seaworthiness of the vessel.

However, where charterers are responsible, specific instructions on what actions are to be taken should not be given by masters. They must ensure that their supervision does not become an intervention, as they may then be assuming responsibility for cargo stowage and securing and liability in the event of an incident. An intervention is defined as an act by a master that limits a charterer's right of control of the stowage, which may then transfer the liability for that stowage from a charterer to an owner.

Clause 8 of the NYPE time charterparty will specify which party is responsible for the lashing and securing of cargo.

There have been instances where masters have challenged stevedores on the method of stowage and / or securing of the cargo and stevedores have ignored these objections. It is vital in situations such as these that masters exercise their authority and stop further loading until satisfied the stow is safe.

It is worth involving charterers as soon as any problems are discovered to minimise disruption. If concerns are not addressed by stevedores, a written note of protest stating the concerns and deficiencies should be issued.

Supercargo

It may be beneficial for Members to consider appointing a local supercargo to assist masters, whether they are responsible for loading or are only required to supervise loading.

A competent supercargo will have extensive experience of loading, stowing and securing breakbulk cargoes and should be able to provide practical guidance and advice to the master and crew.

A further advantage is that a supercargo will be able to communicate effectively with local stevedores. They will be aware of local operating practices and will ensure that the master's concerns (when supervising) or instructions (when responsible) regarding loading and securing of the cargo are clearly relayed to stevedores.

The appointment of a supercargo will not, however, relieve masters of their obligations under SOLAS (The International Convention for the Safety of Life at Sea) to ensure the cargo is loaded, stowed and secured appropriately for the intended passage.

Safe Working

The nature of breakbulk cargoes can create additional hazards for the crew and stevedores when handling the cargo. This can be as a result of:

- the additional manual handling required
- the proximity to forklift trucks maneuvering within the hold
- difficulties in ensuring safe access
- working at height
- the depletion of oxygen within the hold due the properties of the cargo.

It is therefore critical that robust safety procedures, including conducting effective risk assessments as appropriate, are followed throughout the cargo handling process. This could include restricting access, the use of appropriate additional safety equipment or through the stringent application of the permit to work system.

Fires have occurred as a result of hot work being carried out in the cargo spaces. Factors which have contributed to these incidents have included:

- working without suitable permits in place
- failure to follow proper safety procedures
- failure to have suitable safety equipment in place
- a lack of suitable supervision from the ship staff.

It is critical to the safe completion of hot work that good onboard safety practices are adhered to in order to minimize the risk of fire.

It is essential that all personnel are aware of the risks and follow good safety practices throughout.

Dunnage

The carriage of breakbulk can require significant quantities of dunnage to be supplied on board for use in spreading the load of the cargo, increasing the coefficient of friction, to support one shipment of cargo on top of another, to chock or support cargo or to protect cargo from contact with the vessel's structure.

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To be effective, the dunnage must be cut from suitable timber to ensure its strength and be dried so as to avoid introducing high moisture levels into the hold.

While most if not all of this dunnage will only be used for a single voyage, it is all required to have been treated and certified free from any insects or pests. Failure to provide this certification can create problems at the discharge port not only in disposing of the dunnage but also potentially in discharging the cargo.

Care should therefore be taken at the load port to ensure that all dunnage is appropriately marked and that this matches what is stated in the certificate.

Certified dunnage ready for use

Conclusion

Remember these straightforward steps in order to minimize problems when loading breakbulk cargoes:

- Ensure that all relevant information on the cargo has been provided.
- Properly plan the stowage and securing requirements in accordance with applicable regulations, industry best practice and company procedures.
- Ensure that all cargo is loaded, stowed and secured strictly in accordance with the plan.
- Ensure that all safe working practices are adhered in accordance with company procedures.

Additional detailed information on the planning, loading, stowage and securing of breakbulk cargoes can be found in North's Loss Prevention Guide on Cargo Stowage and Securing.

Disclaimer

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