Making sense of risk
Risk engineering
Asia Pacific

Minimising loss in prefabricated steel shipments

Liberty
Specialty Markets

Minimising loss in prefabricated steel shipments

Prefabricated steel includes structural steel, such as beams, angles, flats, channels, reinforcing bars, squares and rounds, as well as non-structural steel, such as deck grating and ladder sections. Prefabricated steel is usually shipped in six- or 12-metre bundles secured by wire lashings or strapping bands.

Adherence to suitable handling, stowage and securing practices may help to reduce the risk of damage and the need for subsequent repair to this type of cargo before use on the project.

Liberty Specialty Markets (Liberty) risk engineers have prepared this guide as a handy reference for project risk management teams. It provides practical guidance on the proper loading, stowage and securing of bundled prefabricated structural steel.

Stowing and securing structural steel bundles – points to consider

Structural steel products are usually shipped in bulk carriers or general cargo or multipurpose vessels. This type of cargo may sustain damage and deformation due to shifting, chafing and crushing; however, such undesirable movement of the cargo can be avoided by careful stowage and the correct use of packing material – known as 'dunnage' – in the hold.

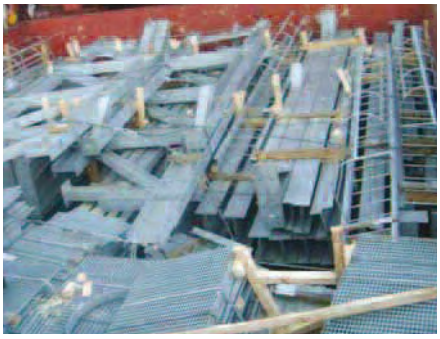
- Before loading begins, a reasonable inspection of the cargo holds should be carried out and the suction capabilities of all bilge lines should be ascertained and checked.
- Loading should not begin before a detailed stowage plan has been agreed upon – even when shippers are pressed for time.
- Competent supervisors or surveyors at the load port should help to ensure that suitable stowage procedures (including the use of proper dunnage) are consistently followed throughout the loading and stowage of this type of cargo.
- Proper attention must be paid to the weight of the steel product that will be placed on the upper tiers of the cargo hold to avoid crushing damage to the cargo in the lower tiers. A detailed and well-designed stowage plan is therefore of paramount importance.
- Stowage of this type of cargo on deck should be avoided.
- Incompatible cargoes (such as chemicals, fertilisers, sulphur-bearing materials and hygroscopic cargoes) should not be stowed in the same compartment as steel cargo.
- Non packed or unwrapped steel cargo that is stored on an open quay may be loaded during light rain provided that it is not stowed in the same hold as dry cargo.
- Before loading begins, suitable dunnage should be arranged appropriately across the tank top plating. (Typically, wooden boards, blocks, chocks or planks are used as dunnage.)
- The space between the lines of dunnage fore and aft should be adjusted depending on the size of the bundles on the lower tier. In general, the pattern of dunnage should be alternated between every tier, in order to bind the cargo together and to aid re-slinging at the discharge port.
- Appropriate dunnage should be used throughout the loading of each tier to ensure that the next tier can be loaded on as even a surface as is practicable. When positioning dunnage, due regard should be given to protruding flanges and fittings.
- Vertical dunnage between bundles should be kept in line where possible. Every effort should be made to have beams (with their webs) placed vertically in the hold.
- When using untreated wooden dunnage at the load port, consideration should be given to local quarantine laws at the port of discharge.

- Structural steel cargo is usually handled using chains and wire slings, and care must be taken not to overload the slings. This is especially important when handling beams, which may become bent or dented at the flanges, or bundled grating and decking, which may become damaged by chain slings.
- This type of cargo should ideally be stowed in a fore and aft direction, parallel to the ship's sides, in the lower cargo hold. It is acceptable, however, to stow bundles athwartships, in which case they should be placed fore and aft in the wings against the hopper tanks or hold bulkheads.
- Steel products should never be permitted to rest against the ship's structure in the hold. Dunnage should always be used to prevent this from occurring and to avoid the potential damage from 'steel-on-steel' contact.
- Wire lashings used to secure steel cargo in the hold should not be secured to component parts of the vessel's structure, such as hatch coaming supports and underdeck pillars.
- Large beams or channels should be stowed and secured in the upper tier(s), using wooden wedges and timber dividers as dunnage between the gaps.
- Irregular bundled cargo should also be stowed and secured in the upper tier. Again, timber wedges should be driven between the bundles. The use of wire lashings is also a common and effective securing strategy.
- Ventilation of the cargo hold should take into account the dew point, the relative humidity of the air in the hold and that of the atmosphere, and the sea temperature. If the hold air cools below its dew point, condensation – known as 'sweat' – may form on the cargo (cargo sweat) and/or vessel structure itself (ship or vessel sweat).

Cargo sweat occurs especially when a vessel travels from a colder to a warmer place and the outside air has a dew point above the temperature of the cargo.

Ship sweat occurs when the hold air is moist and warm and comes into contact with the cold vessel surface, such as when a vessel loads in a warm climate and proceeds to a cooler climate.

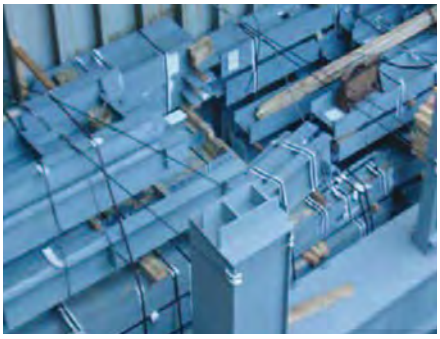
Overhead drips or the accumulation of condensate at the bottom of the hold from cargo and/or ship sweat can cause damage to both galvanized and ungalvanized steel products.



Full cargo hold with inadequate dunnage, showing little regard to the weight imposed on the lower tiers

Well-stowed structural steel (athwartships direction) in the hold bulkhead

Well-stowed structural steel (fore and aft direction), with adequate dunnage between tiers



Bundles of prefabricated structural steel on the top tier adequately secured with wooden chocking and wire rope lashings

Want more information?

UK P&I Club, *Carefully to carry – carriage of steel*

Murdoch E, Spencer, C, 2009, *Standard Cargo – a guide to the carriage of steel cargo,* The Standard Club

libertyspecialtymarketsap.com

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