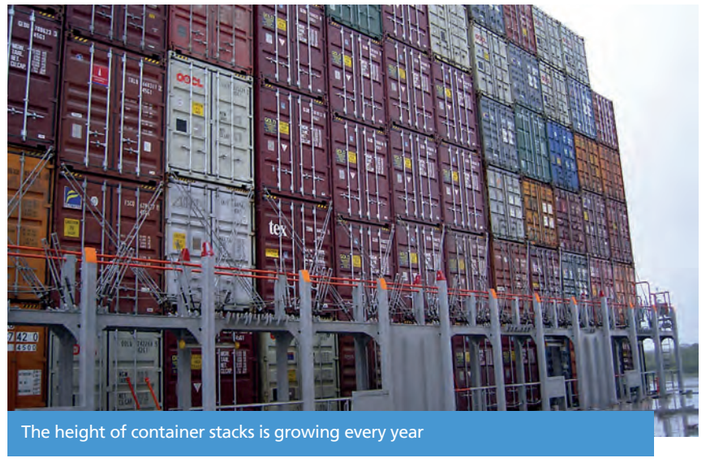
LR develops new technology for container ships

Lloyd's Register's lashings specialists have been using state-of-the-art analysis techniques that will enable owners of ultra-large container ships to extend their vessels' cargo-carrying capabilities

Most of the world's goods are transported by container



The height of container stacks is growing every year

"By introducing an innovative approach to container stowage, shipowners who class their container ships with LR will achieve world-leading container carriage capability – without increasing the risk of container loss or damage."

Luis Benito,
LR's Marine Marketing Director

Lloyd's Register's experience and expertise in container ship technology and the current market has enabled us to produce a series of proposals and guidelines on the safest, most cost-effective methods of stowing and lashing container cargoes.

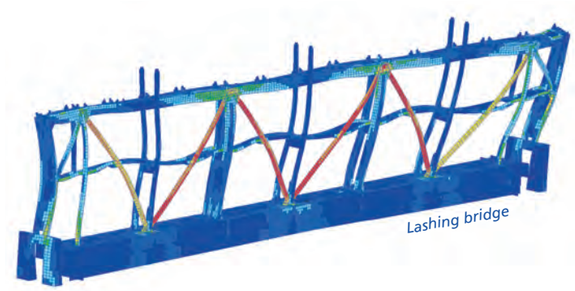
Our technical teams have investigated the rising heights and weights of the container stacks that today's ULCSs can carry and produced new rule proposals to help designers, owners and masters handle these ever-expanding cargoes.

One of the key findings of the work, led by Nigel White, Technical Manager for Hydrodynamics with LR's Structural Analysis and Hydrodynamics Group, is based on vessel speed. Our research demonstrates that the speed at which a ship sails has a significant and predictable effect on its rolling motions – this is a crucial factor in cargo-carrying.

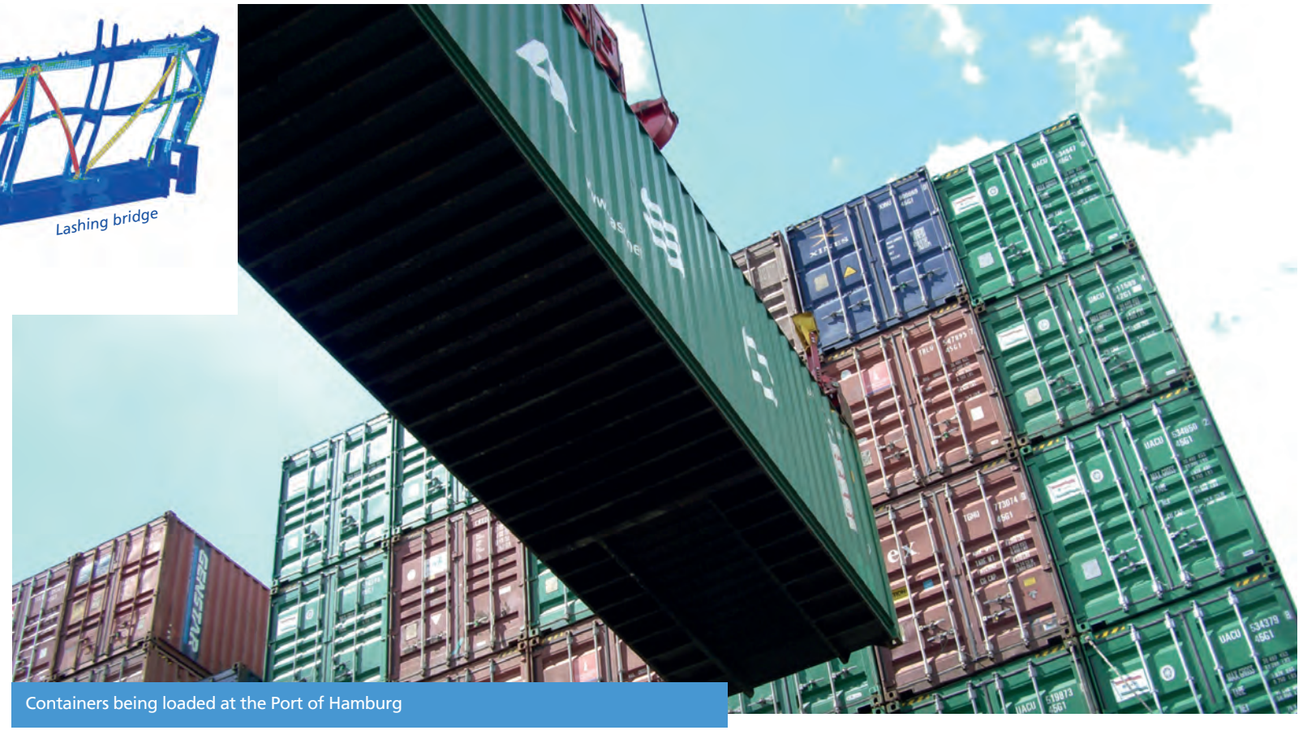
So instead of designing container stows as if a ship is sailing at full speed in the harshest seas of the Atlantic or

David Tozer, LR's Business Manager for Container Ships, said: "Secure, efficient and ergonomic lashings are an overriding priority for owners as the sizes and capacities of ships increase. At Lloyd's Register we are constantly developing and revising our rules and their technical application for these giants of the sea."

Nigel White, LR's Technical Manager for Hydrodynamics, said: "For such a simple concept, the technical problems involved in the safe assessment of container stowage arrangements are very complex. Lloyd's Register has been undertaking vast amounts of non-linear finite element analysis and ship motion analysis as well as linking this to experience in order to ensure the safe passage of containers."



Finite element analysis of the deformation of a lashing bridge due to the forces from lashing rods



Containers being loaded at the Port of Hamburg

Pacific oceans we have produced a methodology based on a combination of ship speed and stability and the height and direction of the prevailing waves.

Another significant finding is based on the development of lashing twistlocks (see box). Operators who use the latest fully automatic twistlocks (FATs) will have the advantage of securing their cargoes safely and effectively with minimum intervention from the stevedores.

Combined with the introduction of high lashing bridges (see image above left), they will be able to safely carry stacks of 10 or more tiers of containers on deck.

Twistlock technology

Container lashing equipment has to survive the rigours of the marine environment

A key area of investigation by LR has been the performance of fully automatic twistlocks (FATs) compared with semi-automatic twistlocks (SATLs).

When a vessel arrives in port, SATLs must be unlocked manually. However, it is often impossible for stevedores to reach the highest tiers, so designers developed a fully automatic version of the twistlocks which enable the containers to be unloaded from the ship without prior intervention by the stevedores.

While both types of twistlock allow for a small degree of vertical movement before they take up the slack as the containers lift when the ship rolls, some early models of FATs had clearances which were on the large side.

However the latest FATs have a smaller clearance and, crucially, LR's latest research shows that container stacks are less sensitive to this clearance than was previously believed.

The commercial benefit to owners and operators of this new knowledge is that ships can now carry more loaded containers than was previously believed possible.