Presented by Beat Zwygart of Conductix Wampfler, inventor of the LASSTEC container weighing system
Agenda

- History of the issue
- IMO Regulation
- Options and related issues for weighing in the container terminal
- Opportunities for terminal operators
- Benefits of the shipping lines
Does it really matter to be a ton or so out for a container going onto this vessel?
Why Container Weighing?

.... It did matter for this vessel!
Background

Up to now SOLAS Convention only required that prior to loading a shipper must:

- Provide ship’s master or representative with the gross mass of the container.
- “Ensure” the actual gross mass is in accordance with the declared gross mass.

- No effective enforcement in most jurisdictions.
- No IMO requirement to verify actual weights.
A British investigation of the MSC Napoli structural failure incident in 2007 found that:

- 20% of the containers on deck had actual weights that differed more than 3 tons from their declared weights.
- The largest difference was 20 tons.
- The total weight of the 20% misdeclared containers was 312 tons heavier than on the cargo manifest.
The Problem....
The Problem....

Here another example....

How did it go in?

And how was it taken out?....
The Problem...
The Problem....

To return to the terminal and to rectify the loading can be very costly.
Misdeclared weights can lead to:

- Risk of personal injury
- Ship instability
- Collapsed container stacks
- Capsized vessels
- Vessels burning excessive amounts of fuel
- Re-handling and re-stowing of vessels
- Delays in the supply chain
- Road safety problems
The simple solution

September 4, 2013

Shipping Industry Urges the IMO to Approve Container Weight Verification Requirement

Just weigh these containers!....
The IMO regulation

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- September 2013, IMO accepted to make container weight verification mandatory.
- November 2014, IMO announced the adoption of the legislation into the SOLAS regulations.
- 1st of July 2016, the amendment will go into force. (In 133 days!...)
The IMO regulation states that:

- "The responsibility for obtaining and documenting the verified gross mass of a packed container lies with the shipper".

- "A container packed with packages and cargo items should not be loaded onto a ship to which the SOLAS regulations apply unless the master or his representative and the terminal representative have obtained, in advance of vessel loading, the verified actual gross mass of the container".

- "If the shipper does not declare the correct container weight, then a third party, for example the terminal, may weigh the container and charge the shipper".
The SOLAS regulation prescribes two methods by which the shipper may obtain the verified gross mass of a packed container:

**Method No.1:**
After the container is loaded and sealed, the shipper may weigh, or have arranged that a third party weighs the container.

**Method No.2:**
The shipper may weigh all packages and cargo items, including the weights of pallets and other packing and securing material to be packed in the container, and add the tare weight of the container to the sum of the single masses using a certified method.
Weighing systems need to be certified and calibrated. No specific requirements are given by IMO. The law of each country will apply.

Accuracy: No details are given. The law of each country will apply.

Empty containers will not have to be weight verified.

Transshipped containers will not have to be weight verified.
What is new is that containers are not allowed to be loaded onto vessels any more unless the weights are verified!

The IMO regulation

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- This regulation is not new. It re-instates the existing rule which obliges the shippers to provide the correct container weight!

- What is new is that containers are not allowed to be loaded onto vessels any more unless the weights are verified!
The objective of IMO is to weigh containers at the beginning of the supply chain which is at the point of loading the containers.

However, this is not always possible.

The most practical place is to weigh containers in the terminal as they arrive by road or by rail.
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What if the regulation is not followed?

- Containers which will be loaded onto vessels after 1 July 2016 and which are not weight verified may not be covered by the shipping line’s maritime insurance. The vessel may not be considered seaworthy.

- The shipping line will therefore have a vital interest to load only containers which are weight verified.
The Key Point:

The key point is from 1\textsuperscript{st} July 2016 there will be NO exceptions!

The shipper will have to arrange for the physical weighing of the container itself, or weigh all the constituent parts that go into it. The so-called method 1 or 2. Ports could become involved in method 1.
Where to weigh in a terminal?
Where to weigh containers?

Terminal Entry Gate

This is the most precise option, but it is not the most practical solution
Truck tare weights can not be measured because they often depart with another container. Tare weights vary if fuel tanks are empty or full. The weighing accuracy of the container is therefore not sufficient.

- If a truck arrives with 2 x 20ft containers, they cannot be weighed individually.
- Weigh bridges are in the wrong place if trans-shipped container need to be weighed.
Where to weigh containers?

Ship to Shore Cranes

Weighing with the STS cranes is too late to verify container weights and to update the stowing plan.
Where to weigh containers?

Weighing in the stacking yard is the best option. All containers pass through the stacking yard, even trans-shipped containers. There is enough time to update the stowing plan before loading the vessels.
Where to weigh on a RTG?

- Measure on the trolley with load cells in the sheave pins.
- Measure on the trolley on the wire rope anchors.
- Measure on the headblock / spreader pins.
- Measure on the headblock / spreader twistlocks.
- Measure on the spreader twistlocks.
Using the spreader twistlocks allows to weigh each container individually in twinlift applications.

In addition, it provides several operational safety features.
The LASSTEC system is easily retrofitted into existing spreaders and cranes.
There are several alternatives to send the data to the TOS.
- VGM
- Time stamp
- Container ID
Benefits of the LASSTEC System

Our Solutions

- Container Weighing
- Operational safety
- Data logging function

Our Advantages

- Single- and twinlift weighing
- Determin load eccentricity of each container
- Overload and over-eccentricity detection
- Snag load detection
- Dragging detection
- Trailer Lifting Detection
- Twistlock not carrying a load
- Twistlock life cycle monitoring
- Statistical load cycle analysis
- Data logging capacity
The same LASSTEC system fits every application and every spreader
Weighing of containers can be a lucrative business for terminals!

Business case assumptions:

- Number of RTGs: 20 cranes
- Number of TEUs: 1 million TEU
- Number of containers to be weighed: 500’000 containers
- Equipment investment to provide weighing service: $300’000.-
- Charge by terminal to shippers to weigh 1 container: $10.-
- ROI: 1 month
- Cost of weighing one container: $0.24 / Container
- Net annual revenue: $4’900’000.-

The IMO regulation
Why shipping lines have an interest in knowing the exact container weight....

- The center of gravity of the load in a vessel needs to be in the center and as low as possible in the vessel.
- Vessels are typically loaded only up to 90% of its capacities.
- The actual gross weight is often higher than declared.
- Water is used to balance the vessel if the load is not balanced.
- Fuel consumption of a vessel is a very high proportion of the total sailing cost. (A 8’000 TEU vessel can consume up to $ 4 million worth of fuel for a 25 days voyage).

Conclusion: There is a high interest and benefit for shipping lines to know the exact container weight in order to optimise stowing and minimise trimming!
The UK Maritime & Coast Guard Agency has taken a leading role in establishing a guideline for container weighing accuracy:
(Many countries worldwide have not yet decided on a weighing accuracy!)

20 tons – 40 tons: +/- 2% in dynamic mode
At 20 tons this represents: +/- 400kg
At 40 tons this represents: +/- 800kg

Below 20 tons: +/- 400kg in dynamic mode
At 10 tons this represents: +/-4%

Weighing equipment manufacturers have confirmed these accuracy levels to be attainable.
Physical and Administrative Process

**Physical process**

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<tr>
<th>Shipper</th>
<th>Modality of transport</th>
<th>Terminal Process</th>
<th>Sea transport</th>
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<tbody>
<tr>
<td><img src="image1.png" alt="Images of transport and terminal processes" /></td>
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**Administrative (booking) process**

- **Merchant haulage**
- **Forwarder**
- **Carrier haulage**
- **Shipping line office**
- **Load information**
- **Terminal Operator**
Supply chain parties need to talk to each other about:

- Obtaining
- Providing
- Transmitting
- Receiving
- Using proper verified container weights.
A verified weight is a condition for loading a packed container onto a ship.

No Verified Weight → No Load
Publications on container weighing

- PEMA – Ports Equipment Manufacturer Association has issued a publication on container weighing.

- This publication describes different options to weigh containers in terminals.

- The publication can be downloaded from the Internet under [www.pema.org](http://www.pema.org)
You can find this document with Google under “Verified Gross Mass Industry FAQS”.

It provides answers to questions related to the SOLAS amendment.
Thank You for your Attention!

Manufacturer of Mobile Electrification and Data Transfer Systems for Industrial Machinery and Container Handling Applications.