



TWISTLOCK CONTAINER WEIGHING SYSTEMS

A ROBUST AND ACCURATE WAY FOR GROSS MASS VERIFICATION



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In the first PTI Container Weighing EBook, published this April, 2016 the advantages and disadvantages of weigh bridges and twistlock based weighing systems have been outlined in detail.

Also, weighing systems installed on headblocks or in sheave pins versus spreader twistlock based systems have been discussed. One important fact to consider is that a weighing system installed on a headblock belongs to the crane, while a weighing system installed on a spreader is not a fixed part of the crane but of the spreader. The spreader can be removed to install, for instance, a coil boom or hook beam under the headblock. On the other hand, a headblock mounted weighing system does not allow determination of container load eccentricity as easily and as accurately as a spreader twistlock installed weighing system. It has already been voiced that the next regulation which IMO will issue on container handling, will be on

limiting the eccentric loading of containers which will require weighing systems with load eccentric measuring capabilities. The other evident disadvantage of headblock based weighing systems is the impossibility to determine the weight of each container in twin-lift applications.

I would like to elaborate on different possibilities of using spreader twistlocks to weigh containers and verify the gross mass. There are solutions with load cells around the twistlock or products with a sensor inserted into the centre line of the twistlock, like LASSTEC using fiber optic technology with a Fiber Bragg Grating (FBG), which provides high measurement accuracy, an ideal compensation for temperature variations and insensitivity to shock loads and electromagnetic interferences.

FIBER OPTIC TECHNOLOGY

The major advantage of fiber optic technology is the load measuring range of

the sensor that ranges up to the breaking point of the twistlock. This is based on the fact that the Young's modulus of fiber is much lower than that of steel and therefore fiber remains elastic and can still measure a load while the twistlock is reaching its breaking point. Once the twistlock breaks, the fiber also breaks as it is glued into the twistlock. But this high measuring range still allows accurate container weight verification when a twistlock has been overstretched and needs to be replaced. Overstretching of twistlocks can happen when a container is accidentally lifted only on one side.

In addition to the accurate container weight, following operational signals can be sent to the crane PLC to give notice of hazards:

- One or more twistlocks are under no load while lifting a container, e.g. when a twistlock is not correctly locked to the container