WEIGHTY MATTERS: HOW TO MAXIMIZE VESSEL CAPACITY & MINIMIZE FUEL COSTS

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Controlling the weight of your vessel is one of many steps owners and operators can take to ensure that they maintain the operational efficiency necessary to remain viable in an increasingly competitive business climate. Ultimately, controlling vessel weight leads to an increase in operational efficiency, reduced costs and improved customer satisfaction. Perhaps most importantly, a lower vessel weight ensures that your vessel operates safely. This article addresses various techniques you can use to maximize capacity, minimize fuel costs and increase the overall operational efficiency of your vessel.

RULES & REGULATIONS
There’s no doubt about it: every pound of weight that is removed from a vessel is one less pound that craft must move through the water. A lighter, more efficient ship pays off in a number of ways. For example, current United States Coast Guard (USCG) stability regulations, which may dictate the number of passengers that can be carried, have presented vessel operators with a dilemma: shed weight by reducing the number of passengers carried and forgo potential revenue, or devise a way to increase capacity while maintaining stability. These rules, which went into effect on December 1, 2011, apply not only to ferries, but to sightseeing boats and American-flagged international cruise ships. Earlier versions of the proposed regulations included a provision to require operators to verify their vessels' light ship weight every 10 years. SOLAS vessels have a requirement to do so every 5 years, and the guidance contained in MTN 4-95 on updating vessel weight verification is still applicable.

DOES YOUR SHIP NEED TO GO ON A DIET?
There are a number of sources that add weight to your vessel. In some cases weight control can be achieved easily and quickly; others may require a more complex solution and outside help. Included among these sources are modifications – either planned or driven by regulations, e.g., new furnishings – bars, restrooms, new machinery, electronics and paint; and variable weight
sources including such deadweight items as outfit, and any increases in spares and stores.

All of these items can serve as sources of increased weight for your vessel and negatively impact your bottom line. Understanding and decreasing these sources of weight aboard your vessel can offset increased operating costs, higher fuel use for the same speed, decreases in your vessel's range and increased port time.

**DEFINING VESSEL WEIGHT**

Now that we understand some of the regulatory background and sources of extra weight aboard vessels, it's time to move on to the specifics of how to manage the issue of weight. First, it's vital that we arrive at a precise definition of what weight is and why it's so important. So let's take a look at the various components that make up vessel weight and what those entail.

**Light ship or Lightweight**

Everything aboard your vessel that is nailed down or stationary goes under this category. This includes all vessel structure and machinery, bar and galley equipment, fixed furniture as well as all life safety gear and anchor, chain, mooring equipment.

**Deadweight**

Deadweight refers to any materials aboard the ship that are not nailed down, mobile or can potentially be moved. People and vehicles (cargo) go under this category as do fuel, water, sewage, stores and other consumables. Other important components would be those items making up the outfit, which consists of all loose furniture, spares and effects. If ballast is permanently installed, it may be considered as part of the light ship weight but if it is moveable, it is considered part of deadweight.
Weight Limits
There are several vessel characteristics that limit place limits on a vessel's capacity to add weight.

Subdivision Draft
Reserve buoyancy is essential to meet USCG damage stability regulations. The subdivision draft is the maximum draft that provides sufficient reserve buoyancy to survive damage and flooding to a single compartment or to two compartments, depending upon the vessel's stability requirements.

Load Line (Minimum Freeboard/Maximum Draft)
The Load Line is a function of the vessel's geometry and structural strength and may be required by route. It represents the maximum draft to provide sufficient reserve buoyancy that an intact vessel will not founder due to extreme weather. For passenger vessels, the subdivision draft usually dominates.

Intact Stability
If weight growth occurs high in a vessel, the light ship vertical center of gravity (VCG) will increase and the compliance with intact stability standards may be jeopardized. Sometimes an increase in light ship VCG must be compensated by changes to deadweight such as carrying liquid ballast or limiting the amount of fuel that can be burned.

Rather than concede any capacity, many vessel owners and operators have chosen to undergo new stability tests to prove that they can meet the new weight rules and still maintain the same number of passengers. This is certainly a viable avenue to pursue on the journey toward operational efficiency for your vessel. However, there are other modifications that can be implemented prior to, and in addition to, a stability test that will assist in controlling the weight of your vessel.
A vessel owner might benefit from making modifications to lightweight items, or change the way that deadweight items are handled.

THE DIET PLAN – GETTING YOUR WEIGHT UNDER CONTROL

Lightweight Changes
Add no more than you remove
Use the lightest materials possible
- Counter and Bar tops, Galley and Bar Equipment
- Sound, PA and Entertainment Equipment
- Navigation Equipment
- Joiner Materials – Linings, Ceilings Deck Coverings
- Paint – take off the old

Deadweight - Outfit
Keep extra stores and spares on the beach
For every box that comes aboard, take one off
Clean house regularly
Look for lighter weight alternatives
Conduct a Deadweight Survey
- Take everything off that isn't permanent
- Make an itemized list of any remaining stores, provisions, or equipment
- Put back aboard only what is needed
- Weigh everything

Implementing these suggestions may only result in a slight change in your vessel's lightweight but every bit helps. The accumulation of loose items can be difficult to detect and is often easy to justify "just in case". There certainly needs to be balance. Assigning weight control to a senior manager as a specific responsibility will help keep the issue alive in your operational discussions. In
addition, never underestimate the effect of paint accumulation over the years as a factor of your vessel's weight.

**IS IT WORTH IT?**

Once you've decided to move forward with your vessel's diet plan, it's crucial that you make a full assessment of the weight changes to ensure any actions you undertake pay off in terms of value and the impact on the vessel and your operations. In some instances, particularly with newer machinery, there can be a weight decrease. This is not always a benefit since the removal of weight low in a vessel can impact the stability equally to adding weight high up. It may also affect the ride of your vessel so always be mindful of any weight changes.

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