

NAUTICAL NOTES

NOTE No 3

21.05.90

Errors in Draft Surveys



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Possible sources of errors in draft survey are many and varied, owners and charterers alike would do well to ensure their crews are aware of some of the problems that surveyors are looking for and thus ensure that they protect their interests.

- Sources of error reading the drafts
- Reading the hydrometer
- Incorrect estimate of ballast density
- Estimates of mud quantities in ballast tanks
- Errors in soundings
- Errors in calibration tables
- Underkeel clearances in respect of squat and water density in deeper layers.
- Engine room bilges
- Positions of hatches, pontoons etc.

It is imperative for an accurate draft survey to actually sound all the spaces or to see them overflowed. Sounding pipes and caps are the perennial problem and a good surveyor is not put off from obtaining a sounding by the "too difficult" brigade.

Of particular interest to owners will be charter party clauses such as:

"NOR WILL NOT BE GIVEN UNTIL ALL BALLAST TANKS ARE EITHER COMPLETELY EMPTY OR COMPLETELY FULL AND / OR SATISFACTORY TO THE DRAFT SURVEYORS REQUIREMENTS". AND

"THE CHARTERED VESSEL TO PROVIDE FAILURE TO PRODUCE THE AFOREMENTIONED DOCUMENTS AND ACCESS AND CHARTERERS WILL HAVE THE OPTION TO PAY 90% B/L WEIGHT ANY BALANCE ON OUTTURN OR NOT TO ACCEPT NOR UNTIL SUCH PROOF COMES TO HAND.

1. DRAFT MARKS

These should be accurately cut into the steel plating of the hull and clearly painted so as to be easily readable. Errors do occur in reading ship's draft marks but we have also come across marks marked in error.

If they are clean clear and accurate there is less likelihood of any guesswork creeping into the surveyor's observations, remember this could be midnight as easily as midday....

If the marks are not positioned on the perpendiculars then ship's staff should be aware of the distances of the marks to the perpendiculars and understand the corrections to apply.

2. DENSITY

Reading the hydrometer inaccurately can be a source of error but it is more usual that the sample of ballast or supporting medium is not representative of the whole and this can introduce quite large errors.

The difference between fresh and salt water is 25 tons per thousand so that it is absolutely necessary to check on ballast and supporting mediums to ensure as much accuracy as possible and to be as representative of the whole as is practicable. This can mean taking bottom samples of the dock or river water and overflowing ballast for a reasonable period. It would help for instance if vessels when departing rivers waited until they were well clear of the estuaries before taking ballast to minimise the quantities of brackish being taken.

3. SOUNDINGS

Double bottom tanks can collect substantial quantities of mud which inevitably have a much lower stowage factor and thus greater weight.

The sounding pipes themselves can cause additional errors as it is rarely that anyone knows where the pipe terminates in the tank and the sounding rod can be at some very shallow angles which will once again give erroneous readings.

Common errors are blocked sounding pipes close to the full depth sounding and thus never showing water, others are very dirty and always cover the rods in mud which is then added into the calculation.

The engine room bilges are forgotten by many surveyors and by ship's staff whilst sounding every other space on board. It is worthy of note that if the vessel discharges any dirty liquids during her stay and it is not taken into account it will have the effect of losing cargo and certainly no freight will be paid on invisible cargo. The opposite is true if any water is brought on board during the loading and all stores water and fuel should be recalculated for the final survey.

4. UNDERKEEL CLEARANCES

Squat has been discussed in many learned documents and it is not our intention to reinvent the wheel at this point in time. However squat remains a problem for many ships particularly in river berths where restricted drafts and fast flows are experienced. Part of the problem is due to the squat effect and in part to the bow wave and pressure wave effects which distort the flow around the vessel.

Another problem affecting many coasters is the mud berth in the water giving a high solids level in the water thus giving an exaggerated supporting situation in the lower levels of water.

The problem is compounded by the practicalities of completing cargo, achieving the survey and sailing in a very short time scale whilst the vessel remains afloat.

To be pulled off the berth and into the river to complete the survey introduces other errors of Bow wave/current/wave slap and so forth.

5 POSITION OF HATCHES

Ideally these should be in the closed position for both surveys, unfortunately this is rarely the case and thus errors of hogging and sagging are introduced.

These errors are compounded in small vessels with large scissor hatches as all the weight is moved to the ends.

It must also be remembered that the Midships Drafts are those that supply the greatest input to the calculation for Mean Draft and any error is therefore magnified 6 times. Viz:

Mean Draft = Ford + Aft + 6x Midships Draft

So the Midships draft supplies 75% of the accuracy of the Draft Survey. On many ships they are not even marked and a series of calculations and measurements have to be undertaken.

6. Other common sources of errors in draft surveys are:

Leaking valves, allowing tanks to run out as soon as they are overflowed and the pump stopped.

Hydrostatic tables and Deadweight scales not agreeing.

Freeboard + Loadline not agreeing with Loadline certificate.

Structured alterations to the vessel not reflected in ship's data.

Finally to ensure technical accuracy at all times it may be necessary to obtain the service of a well experienced and qualified draft surveyor. It may be of interest to the reader to note that our draft survey manual runs to some 30 pages of technical notes.