AUSTRALASIAN INSTITUTE OF MARINE SURVEYORS

Shipshape

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Common big ship surveys

The two parts of this article were first published in July and November of 2020. They formed the first two articles in a series to address calls from members to have some "technical" articles.

I WOULD not class this article as "technical", but most of the technical stuff is nowadays handled by a computer program, so I am assuming some level of prior knowledge.

Consider this as a guide or a checklist only. We will not be discussing the actual calculations required; however, I do emphasise the importance of manual draught survey calculations to provide an understanding of the process. Our computers are a constant and reliable companion these days and we rely on them to a great extent; nonetheless, having the ability to conduct a timely manual calculation is good professional practice.

The article is based on my experiences and is my opinion only, as a genuine reflection of the real world I work in. The draught survey is quite simple – using a few tricky (accepted) formulas applied to the Archimedes Principle. Thank the Gods for the Greeks!

It is used for dry bulk cargo vessels but can be used on occasion for other vessels in unique circumstances (such as molasses tankers – see at end of article).

Reading draughts – no magic-bullet solutions, sorry. You must establish your own method and then compare with peers. You may be doing this in a mirror calm harbour or in two to three-metre swells at DBCT, so you may require several different approaches. I believe it is common for some to typically read a little high and some to typically read a little low. I am not talking about a C/O trying to get something for nothing but Australian-based surveyors operating in an acceptable manner and doing the job properly.

You may, in time, get feedback from a colleague at the discharge port to highlight your average accuracy. Over time, a preferred process will become apparent and you are on your way. If you can't get this right after a few weeks, I suggest you try something different.

Reading the off-side draughts – maybe via boat (not commonly accessible for surveyors these days), someone else who can read draughts who happens to be there in a boat (lines launch during tie up), water tube / manometer (ship's or own), using ladder (safety rules may prevent this in some places) or sending a camera down the side. (Any others?) These methods generally provide only the midship draught and shall be used on a case-by-case basis.

"How do I obtain the fore and aft off-side if only the mid-ship is known?" you may ask. "Usually by comparing the estimated width at water level of the draught marks with the mid-ship width," I would answer. Is it one-quarter, a half, etcetera?

Simply apply this to the read draughts and you have a reasonable estimate. Small differences in fore and aft draughts will make a minor difference in calculation of mean draughts, but difference in mid-ship draughts will have a much greater impact on the accuracy of the survey. (Note to self.) On some vessels, the forward draught marks are visible from the forecastle, thus leaving only the aft draught to estimate. This is a worthwhile exercise, as it will give a good idea of how well you estimate.

In what cases are accurate draughts important? "All," I hear you say! Generally, high-value cargoes like alumina, mineral sand, concentrates, etcetera, for obvious reasons. Coal and iron ore, for example, being big-volume revenue-earners, may call for somewhat less diligence, as dictated by industry and client acceptance of same, so, please, no self-righteous rants over this subject!

Calculate the corrected draughts using the appropriate distances corresponding to read draughts. What now? Keel corrections. This was almost a dirty word and I place the blame squarely with Chinese shipbuilders. Once such a thing was rare but now it is common. You can adjust your corrected fore, mid and aft draughts before calculating the quarter mean or calculate as read and then deduct.

Alternatively, your snazzy software may cater for this in some tricky way. (Ours does.) Nonetheless, it can be confusing if you wish to compare with C/O. Best compare the displacement in this case (getting to that shortly). It is important to read the "instruction" within the loading manual for how to calculate, so you can understand what is going on. Better still, only attend for Japanese-built with simple tables!

John Holden.

Once you have the mean of mean of means (quarter mean draught), then onto displacements. This is where the "tricky" maths occurs, including two trim corrections and a density correction (and, no, that's not a reference to your mental capacity). Dock-water density should be measured with a draught-survey hydrometer (the most common and industry-accepted being the ZEAL brand made in England), using a sample of water drawn from about mid-ships at half the vessel's mean draught. Density can also vary a lot during rainy seasons or if in a river, so take care and check often during these times.

Known weights – acceptance of engine room log fuel figures and freshwater figures is universal in Australia (okay, perhaps freshwater is occasionally checked), but ballast tends to go hand-in-glove with off-side draught reading: high-value cargo, check ballast; and high-volume cargo, agree constant. (See below.)

Constant – if it seems way too big, then likely it is. Ask for proof (previous surveys) or, better still, sound ballast to confirm. It is a good practice in any case. NB: Check for changed light ship weights due to fitting of exhaust scrubbers to comply with Sulphur Cap 2020.

Okay, so you have completed the initial – have you confirmed with C/O that you both have same displacement? Do you agree about the constant? Any other concerns?

Final survey – have they used freshwater or just turned it into grey water – did you discuss this at initial survey? (Note to self.) Discharge into harbours is strictly regulated!

Is ship listed (heeled) and is the manometer accurate? How do you check that? Are you using a ladder? Maybe a boat is available. Heeling gauges found in ship's office or ballast room may not be very accurate but give a reasonable idea to compare with manometer.

If loading (or unloading) at an established terminal, they may have reasonably accurate belt weighers that can greatly assist if required; they will certainly be used for cargo distribution, as there is little else to go by.

Some vessel loading programs will be quite accurate for this as another option but don't rely on that.

There you go – simple! Well, it may sound simple, but we have not discussed the biggest issue we all face: communication! Just remember that draught survey is only 10 per cent mathematics, and success comes down to how well you get along with the Master and C/O.

Good luck.

What is the correct spelling: "draught" or "draft"? I am in the "draught" camp; however, if your client wants "draft", just do it! That bit really is simple!

My parting advice – if things are not working out, slow down, check thoroughly and don't panic. When all seems lost, phone a friend. The Australasian Institute of Marine Surveyors has many dedicated, experienced members who will support you to become the competent, ethical surveyor we are renowned for.

So, now you all realise that this was not a technical article after all. I did try to warn you! However, I trust it has been helpful for some and entertaining for others. No doubt it will upset a few. We are a weird bunch like that! At the end of the day, it is simply to help those who are starting this journey.

Conundrum to help avoid Alzheimer's disease: why do a draught survey of a tanker with a molasses cargo? Answer, next time!

Hang on, what's a conundrum?

Common big ship surveys, Part 2

Here, in Part 2, I will share my experiences of On and Off Hire Surveys from a survey practitioner's point of view.

On and Off Hire Surveys go hand-in-glove – "a pigeon pair", one might say! Simply put, these surveys are conducted to provide a before and after perspective to enable a client or clients to come to a mutual agreement on the changes to condition of a vessel during a given period of hire or charter, and establish responsibility for any costs arising from these changes.

In the same way as car hire companies request you walk around before and after hiring to gauge condition and sign a waiver stating who will pay for what – a differentiation between damage and fair wear and tear!

Additionally, the quantity of bunkers (fuel) on board before and after may be assessed for the same reason. On and Off Hire Surveys may require both bunkers and condition to be established; however, this will depend on how the hire agreement or charter party is written.

Marine surveyors will be engaged for such surveys, with the appointment stating whether bunkers, condition or both should be assessed and reported to the appointing client. As with all such engagements, it is most important that the scope of work is clearly understood, and concerned parties are aware of the intention to conduct the surveys.

This is especially important if you have to travel; there is nothing worse than getting on board a vessel, only to find that the Master is not aware of the requirement and exercises their right to refuse you access to the vessel or crew to conduct the surveys.

So, key take-out number 1 – positive communication is key! If issues arise, this is where it will generally start. Focus on the appointment – you are looking at condition (and maybe bunkers), not conducing a hold cleanliness inspection.

Okay. You have all the preliminaries in hand, you have arranged permission to attend the terminal of facility to access the vessel, and you may also have gathered relevant information to assist with efficiently conducting the required surveys. Take some photos of the vessel at berth (or elsewhere as the case may be) and read the forward and aft draughts to enable calculation of vessel trim if doing a bunker survey. Please make sure you are allowed to take photos, as some facilities and vessels require prior permission for this to take place.

Once on board the vessel, introduce yourself to the Chief Officer or Master, stating why you are there. If doing bunkers, request to meet the Chief Engineer. Depending upon the situation, you may need to do some juggling with your time on board so all the survey tasks can be managed in a reasonable timeframe.

If the vessel is about to load, you should consider how your survey activities may impact cargo operations. You must also consider how to get bunker tank soundings and do cargo hold or other inspections at the same time.

Soundings should be taken prior to cargo / ballast operations so the vessel is not moving about. You will need about 20 to 30 minutes for this. "But how do I also inspect the ship at the same time?" I hear you ask. Cleverly allocate your resources. Consider not entering the first loading hold if you are conducting cargo-hold inspections; rather, take some notes and photos from deck level. If the ship-loader has positioned above that hold, it will provide enough light for night-time photos.

While the loading operations and ship-shore checks are being conducted, you can take the bunker soundings, then go back to inspections. (Ensure all terminal, ship and your own safety requirements are being met – hatch-covers positioning and radio / phone communication, for example). You should always have a ship crew member accompanying you as a spotter.

Never enter holds that are not partially open – ask the ship to test the atmosphere if uncertain – and never enter if wood products or chemicals have been previously carried without a full risk assessment. Cargo holds may be considered "confined spaces" in some instances; however, approached with caution, they are more often referred to as "restricted spaces" or "enclosed spaces". This is a rather grey area and open to a great deal of interpretation and debate.

As a ship surveyor, you will likely consider a cargo hold as a place of work, since crew are regularly required to enter and work in these spaces during hold cleaning and maintenance. Cargo spaces on tankers, however, are most definitely "confined spaces".

So, now that you are completely knackered and wet with sweat from climbing all those ladders, you can advise the C/O and ship-loader that you have completed your inspections and go back to calculating the bunkers.

Key take-out number 2 – safety, communication (again), time management, fitness and not impacting cargo operations. Although some terminals may wait for inspections to take place, it will inevitably be recorded as a delay on account of the appointing party, so I suggest you avoid causing any such delays unless agreed prior to the job.

I am making the assumption

that it is an on-hire, you are attending alone, and the vessel is a bulk carrier or similar. Of course, this may not be the case. It may be a barge, a tug, or any number of other vessels or craft that are hired or chartered. If the scenario is applied to off-hire, all the same principals apply. You may have to contend with remnant cargo; however, you must focus on the scope of appointment and see through this to describe condition. Mention the residual cargo by all means, but do not focus on it.

If you have enough personnel, I suggest attending with two surveyors, so that all the required tasks can be adequately completed in a timely manner, especially if the job involves substantial inspection time – a cape-size ship or a large multi-compartment barge, for example.

Key take-out number 3 – although principles remain the same, scope of appointment and circumstances will dictate how the job should best be undertaken.

I am not going into detail of bunker surveys here, as this will give me something to write about next time, nonetheless, you will find that they will test your mettle – and your patience.

Reporting styles vary greatly within our profession and there is no standard that would dictate best practice – in my humble opinion. The more traditional reporting styles will include a lot of information which is readily available to the clients in our internet-connected world. A modern reporting style may be tabular, contain only basic vessel identifiers and concentrate on the scope by providing little more than condition descriptions supported by photographic evidence.

The ease with which we can share high-quality photos has completely changed how we report. Personally, I prefer the middle ground with reporting – sufficient vessel-specific information with tabulated condition description and quality, meaningful photos. This is a very individual thing that develops between you and your clients. If they like your style, they will come back for more!

Key take-out number 4 – the resulting report that clients pay for is open to your own nterpretation. Most of us have taken the best bits from others and come up with our own style.

"I am not getting many on hire jobs" you say. This marine surveying business is a bit like hull fouling – it takes some time to grow but, once established, it can flourish under the right conditions. There are no secret recipes for success, so you must stick with it for the long term and offer cost-effective, quality service and reports if you want to get onto clients' radar. When I say cost-effective, I do not mean cheap.

It is a fickle business: clients will pay for good service, ethics and trustworthiness – but not too much.

Key take-out number 5 – you cannot build a successful business on these surveys alone and it is more of a supplement to your core business. The market is competitive, and it takes time to establish your reputation and client base.

Equipment revolution!

When people started using mobile-phone cameras about six years ago, I was somewhat skeptical. Would they provide the sort of image quality I was used to after having a high-end compact camera that could take photos in extreme, low-light conditions? However, I am a convert. For several years, I have used my smart phone camera with excellent results.

The software trickery enables very good quality photos across a wide range of conditions, both day and night. You may need to do some homework before you buy but, if you choose wisely, your phone can achieve great results as your principal camera, communications device and at-hand computer all in one.

This is the single greatest advance for a professional who is constantly on the move: constant communication, being on time for jobs and meetings, accessing scheduling and berthing web pages, and recording quality images to use in our reports.

Another item I have come to rely on in recent years is a quality, powerful headlight. This is attached to my safety helmet and offers two levels of brightness and adjustment from spread to spot beam. It is good enough to readily read draughts at distances up to 20 metres, so it provides more than adequate light for cargo-hold inspections.

The beauty of a headlight is that you still have both hands free to climb ladders and operate your camera / phone, thus improving safety while working. The additional weight soon becomes unnoticeable and you find yourself using it in all manner of situations where you require decent light – traversing decks, taking soundings, and noting features and damages, to name a few. The model I have is an intrinsically safe unit that I can use on tankers and in tank farms and petroleum terminals.

I trust that this will provide a few insights for those who are starting out in this field.

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