



How many
hats can an
engineer wear?

THE EXPANDING ROLE OF THE SUPERYACHT ENGINEER

BY JACK HOGAN

Superyacht engineers are the great multi-taskers, but their list of responsibilities is ever-growing. Here, TSR talks to training providers and recruitment specialists about the new challenges engineers face on increasingly high-tech vessels, and what should be done to ease the transition.

I can clearly recall one relatively simple observation from my time as a deckhand and deck officer: the engineers seemed to have a very diverse range of duties. And, as is evident from the numerous high-concept designs and environmentally mandated changes, this range is multiplying.

The increasing reliance on electronic systems on board, the prevalence of diesel-electric propulsion and correlating need for an ETO, the weight of responsibility placed on AV/IT and the alternative fuels of a decarbonised future outline a challenging dynamic for the engineering department, regulators and training providers.

Tom Holdway, marine engineering lecturer at Warsash Maritime School, says, “I think the role of the engineers on board has developed significantly, especially in the last decade. Previously, there was a perception that engineering was a ‘nuts and bolts’ role. The position of chief engineer was often thought of as more of a ‘chief mechanic’. However, as technology and legislation have developed, we have seen the role broaden in terms of responsibility.”

In recognition of this, the MCA published an STCW review in May, in which a diverse cross-section of on-board maritime professionals was surveyed to identify areas of the current training and certifications that required updating and those that were antiquated. The entire 108 pages are worth reading. Some key recommendations for engineers and ETOs advised an increased need for a more comprehensive ETO certification under STCW, including a more senior ETO qualification, the integration of AV/IT and the imminent need for alternative-fuel-training.

Some of these challenges are already here, others will face us in the near future. Training and certification can be adapted to anticipate these changes, but the timescale has been compressed. Liam Dobbin, managing director at wilsonhalligan, explains, “A superyacht engineer now needs to be an electrician as well. Equally, their focus will have

to shift to the complexities of lithium-ion batteries, different fuel types and solar power. It’s getting more and more complex every year.”

The digital elephant in the crew mess is undoubtedly the internet and AV/IT. Dobbin says, “The functionality of the internet has become the ultimate reliance for owner satisfaction. In a previous generation, it was the food and the chef’s skill. The biggest driver has now become the owner’s internet. Any superyacht without an ETO will still need somebody, be it the chief or the second engineer and down, who is a superstar on the AV/IT.”

This confirms my own extremely unscientific analysis while watching the engineers work. A disproportionate amount of their time was increasingly spent buried in the AV/IT rack, fielding the same question, from guests or crew, every hour about the internet speed or on the phone to a shore-side support. The light-hearted yachting cliché that an owner will notice the internet dropping out before they pay attention to the engine room flooding has become less light-hearted. Newly qualified small-

vessel code chief engineer Richard Maxwell says, “If an engine fails, at least there is another one. If the internet drops out, your job is on the line.”

The internet has become the existential lifeblood of a superyacht’s operations, guest satisfaction and, increasingly, safety-management systems, all of which depend on its functionality – and the responsibility for keeping it running smoothly falls squarely on the shoulders of the engineers.

Maxwell says he feels fortunate to be working on a 90m-plus motoryacht because with great size comes a greater delegation of responsibilities. “I am lucky to be operating in a team with a chief, a 2nd, two 3rds and a full-time ETO/AVIT specialist. He is, in many ways, the busiest guy on the boat.” However, the majority of vessels still don’t have a designated specialist. The assumed expertise of the engineers on AV/IT is the reality on many superyachts.

It’s a competitive landscape, and any gap in an engineer’s knowledge on AV/IT is very quickly evident and usually very public. I would much rather the

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Diesel engine training at Warsash Maritime School.



owner watch over my shoulder as I brush up on my collision regulations during a challenging manoeuvre than be standing in the main salon trying to unfreeze the owner's internet during a contentious business meeting. That's real pressure. Equally, as was hinted at in the cliché about the internet, this pressure can be career-defining. Specialist training has come a long way in the past 10 years, with experts such as Bond Technology Management in Monaco offering comprehensive courses to support their colossal on-board installations.

Closer to home, specialist training is diversifying, and there is a recognition that the experts on board can be anyone in the crew. The ability to ease some of this burden from the engineers may have broader implications. Scott Molloy, founder and managing director of AV/IT training provider Seacertify, says there is a need to free up the engineer's mental bandwidth, as well as the boat's connection. "From my experience as an on-board AV/IT specialist, I know exactly how many systems engineers are responsible for. These are highly trained mechanical engineers and they are very focused on safety, and rightly so, but what can happen is that the technology tends to distract from that."

The ETO as a specialist in AV/IT is itself a misconception. There's a temptation (one that I have been guilty of in the past) to think of an ETO as the person who is fluent with anything with a microchip. If it's electric, it's in the name, right? As Molloy highlights, this is a common misassociation. "It's something the superyacht industry needs to be clearer about. The ETO is exactly what it is in the commercial sector: power distribution and marine electronics. The adoption of an ETO COC has theoretically clarified that, but historically we have been guilty of designating the ETO as responsible for anything electronic, including the exponentially expanding AV/IT systems."

Having an AV/IT specialist, although vital, has not necessarily been met with the required enthusiasm in terms of training support in the same way that supplemental deck and interior courses are on many vessels. Molloy estimates that 90 per cent of his students are self-funded, and mentions the 'black magic' association that many in the industry still have towards AV/IT and its implications on budget allocation. In Malloy's





experience, it's not uncommon to have on-board AV/IT systems on a yacht worth multi-millions, yet with no budget allocated for training the crew. The irony here also is that the vast majority of calls to shoreside support could be handled with ease by a trained individual on board.

The recent formation of a multi-faceted and broadly represented working group to create fully accredited AV/IT certification is a proactive step. Engineering, and yachting in general, attracts incredibly talented people, some of whom will excel down that career path if it's available. It will also disentangle AV/IT from the assumed engineer's responsibilities and provide a clear framework for employers to identify talent and crew the boat effectively.

A deeper understanding and potential to ringfence AV/IT is needed because the engineer's responsibilities will continue to expand and diversify. The MCA STCW survey report was also acutely aware of the current shortcomings concerning training. One conclusion was. "We need more teaching on IT systems. It is ridiculous to be sent on board with so many training record-book tasks on computers yet have zero understanding due to no teaching from college on this". Elevating the baseline of understanding gained through the existing training pathways is needed, combined with a more comprehensive senior ETO qualification.

The application of more diverse training and certification, such as that which is in development for the ETO COC, provides a template for how to solve the next challenges that lie ahead. The adaption of the Small Vessel Code for engineers provided a broader recognition that the skill set acquired by superyacht engineers is applicable across the maritime sector.

Holdway adds, "It's not just a hands-on role anymore. Chief engineers on superyachts are also expected to be managers and leaders of their

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departments. They're also expected to be subject-matter experts and well versed in environmental law because the buck stops with them. The transition to the Small Vessel Code has been great and adds to the recognition that the skills of superyacht engineers are very much transferable to other parts of the maritime industry. It helps support maritime engineering as a career option."

Having just completed his Small Vessel Certification, Maxwell is well placed to comment on the new pathway. "It's a great next step; there was no need to keep the smaller end of the merchant marine separate from yachts because they are increasingly similar. Having said that, being examined on boilers was interesting! And, equally, I'm sure there are many aspects of our roles as large-superyacht engineers that the MCA will not be so familiar with."

There's a perception of slow development in training across the maritime industry. As a profession, it's steeped in tradition but this deep association with the past is about more than just sentimentality; our safety standards are high and that is underpinned by a willingness to learn from this history. We need to be dynamic as we continue to learn and, increasingly, we'll need to look ahead as much as backwards in time.

Lars Lippuner, director of the Warsash Maritime School, is clear about the strength of the development in syllabus in the UK. "You would be hard-pressed to find a flag state that is as responsive as the MCA in terms of listening, adapting and amending, and I believe that is why they have been so successful in the yacht sector," he says. "The last round of syllabus changes is a good example, there was excellent industry representation. It was conducted in consultation with active engineers and with training providers. The lesson for us, the MCA and the industry is that it is essential to keep that momentum going because the pace of change will only pick up."

Engine control room training at Warsash Maritime School.

Therefore, the challenge has been outlined. The interplay between regulators, educators and active engineers will play a vital role. Superyachts are continuously pushing the envelope in terms of technology, and this creates a dynamic set of challenges for a regulator. Ajit Jacob, chief examiner and head of seafarer technical policy at the MCA, says, “Superyachts are more advanced than conventional ships in terms of equipment and the technology that they use. So, from the training perspective, we have been playing a catch-up game with technology for a long time.”

The demarcation between a commercial deck officer certification compared to a superyacht COC, for example, is relatively easy to quantify. The engineering department will soon be presented with a more complicated set of differentiations – it will no longer be a simple question of kilowatts. The capability to adapt the training to suit this need for specialised expertise to support the increasingly divergent technologies on board will be fundamental. Jacob adds, “Presently, it’s very difficult to give bespoke training for specific equipment because, increasingly, every ship may have different equipment on board.”

The way in which the ETO certificate has been adopted, through various rounds of discussion and analysis of the sector, has been vital for the continued safe manning of the superyacht fleet but, as Jacob points out, there’s still a need to grow. “The ETO COC was the first step because the ETO’s responsibilities are increasing, such as high voltage becoming more common,” he says. “We are looking to have a UK-specific senior ETO certificate. That is not an international requirement under STCW, but it is, however, something that we could add to other streams and create a senior ETO COC.”

Disparate technologies require specific training, and the divergence of propulsion systems creates a scenario





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whereby experience doesn't necessarily cross over to other vessels. This was highlighted and acknowledged in the MCA recommendations that the sea-time minimum for chief engineers is extended to 36 months. However, this will not guarantee that an engineer can gain the experience needed, and the way we approach engineer training may need to change with the technology.

Jacob adds, “We are exploring the use of simulators in maritime education so that we can cover the maximum type of equipment possible because it's not possible within a sea-time requirement of 12 months, for example, for an engineer to go on all types of vessels.”

Simply assigning engineers based on the kilowatts of the system on board does not fully grasp the complexity of the technology involved. Increasingly, engineers are required to broaden their knowledge base. “When they get their COC, engineers then expand their knowledge,” says Jacob. “The expectation would be that they will start performing duties on a vessel with the equipment they are not familiar with. This is why having VR training, augmented reality, and mixed reality can give us the ability to offer different possibilities for simulations and creating scenarios.”

Lippuner is also quick to highlight the disparity between simulator use for deck and engineer training “We have a state-of-the-art £8 million simulation facility, and on the deck side, simulation is a mandatory part of your education.

However, on the engineering side, it isn't. And that's a shame because making full use of this fantastic technology is a great opportunity.”

Recent high-profile yacht commissions, such as the hydrogen-powered Lürssen project, further add to the new set of challenges that lie ahead, and by and large, the advancements will all be the responsibility of engineering departments. Lippuner believes this next step will require a combined effort. “The speed of development is taking flight, and keeping up – from a regulatory perspective – is a challenge the entire industry must tackle.”

The environmentally mandated transition from fossil fuels brings with it a corollary need for more specialised training. Many of the systems we are comfortable with and have operated and trained to use for a generation exist in a status quo of safety considerations, and this will need to be broken if we are to successfully and safely navigate this transition.

“Heavy fuel is a catastrophe if it comes into contact with the maritime environment, but it is relatively forgiving to handle. This transition to liquefied natural gas, ammonia, hydrogen and other low-flashpoint fuels will require a significantly higher safety culture across the maritime industry,” says Lippuner. “There is a huge challenge on the horizon, we need to retrain a workforce to handle these fuels. We have got no other option if we wish to meet the required decarbonisation targets.”

Jacob echoes these sentiments. “Soon, the construction of vessels, and the conversion of existing vessels to environmental standards, will be mandated. The obvious consequence is that we will not have the engineers on board who can operate these systems. That is an unacceptable scenario.”

Flexibility and a willingness to adapt will be vital to rise to these challenges. The communication channels are open between the providers, the regulators and the engineers and, as highlighted, they will be needed more than ever to keep up with the expanding responsibilities of engineering departments.

Much like the early reports around the best-case scenario for vaccine development in 2020 now appearing to be far too cautious, perhaps we need to re-evaluate how long it will take to develop the training. The engineer's responsibilities mirror the growth of the industry. In conjunction, the rate of technological development will dictate how that role will change and evolve.

The department is approaching a crossroads and a point at which the need for specialisation may spread the engineering department too broadly. It's a testament to the skill and adaptability of the engineers already that, so far, they have expanded their remit and assimilated everything the changing fleet has thrown at them. The future is exciting and may be not as far away as it felt a few years ago. **JH**