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POWER PLAY

ABB Turbo Systems' **Thorsten Bosse** talks about how his efforts to increase **power generation efficiency in the marine turbocharging sector** appeal to his versatile nature

Words: Namrata Nadkarni

Mechanical engineer Thorsten Bosse has found that his role as GM and head of product line upgrades at ABB Turbo Systems is the perfect match for his personality. "I have versatile interests and have always been competitive, whether it comes to work, skiing or even playing the piano," he tells *The Marine Professional*.

"In fact, originally I was very interested in pursuing a career in physics, but, I realised early on that I could never be as good as Stephen Hawking and so switched fields to mechanical engineering, which I really enjoy," he adds, with a laugh.

In his current role, he effectively competes against previous versions of his company's technology, as he is tasked with managing and growing ABB's turbocharger upgrades business in industries including marine, oil and gas, offshore and locomotion. While upgrading equipment is not a new concept, having a department solely dedicated to this aspect can be seen as a marker of cultural change, particularly in the marine world.

"This is a new paradigm that started a few years ago and is moving across different sectors. We have always seen enquires from customers for retrofits and upgrades, but these were more ad hoc," he states. "Now things have changed and customers tend to make their power installation more competitive during the lifecycle of the asset. It's about increased efficiency and performance in the long term and goes beyond just capital investment and maintenance to the total cost of ownership. And this is where turbocharger upgrades come into play as it is typically much easier to do and financially much more attractive than completely replacing equipment."

Blending benefits

Bosse's urge to push harder has paid off for ABB's customers who benefit from his business acumen, technical knowledge and long-term experience with the company. The German national, who has a PhD in

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fluid dynamics from ETH Zurich in addition to his mechanical engineering degree from the Karlsruhe Institute of Technology as well as additional training in corporate finance, joined ABB 11 years ago as an R&D engineer for turbocharger turbines. "I did a lot of research during my PhD and realised that, in terms of my personal effectiveness, I'm more naturally attuned to the commercial sector rather then academic deep dives.

"As an R&D engineer, I was able to better connect with the practical aspects of the knowledge I had gained on fluid dynamics and it felt natural to transition to a more business-oriented role over time and see the good that our technology is doing for our customers," he says, adding that his career path involved time in the marketing and sales, business development, and strategic, portfolio & sales planning departments.

His ability to look at the big picture was one of the reasons he was part of the team that set up the product line upgrade organisation two-and-a-half years ago.

Upgrade considerations

The modus operandi for the team is to look at all existing turbochargers in operation across industries and approach customers that could benefit from an upgrade. Bosse believes that enormous cost pressure since the financial crisis hit in 2008, combined with stronger regulations in the marine world, have created a business case that wasn't there before.

He cites the fact that several cruise lines nowadays have larger teams that are dedicated to optimising the cruise fleet by a set amount each year. "Even small savings add up year on year, and over the lifetime of a vessel this can mean serious money," he says, adding that optimising an engine and turbocharger is an obvious target to etch away at fuel consumption.

While the ABB expert acknowledges that the current low bunker prices have eroded the urgency of the past few years when it comes to reducing fuel consumption, he believes that in the long term they are likely to rebound and justify the investment.

Other benefits from the upgrades include reduced thermal load, increased reliability of the engine and turbocharger, optimisation for part load operation, higher power output (avoidance of de-rating), lower maintenance costs and also increased spare part and service availability. He points out that upgrades can be bundled with service agreements, which are also seeing a spike in popularity.

That said, he recommends taking a holistic view of the vessel and monitoring individual components in order to determine how best to spend one's money. The ABB team draws up a payback business case for the owner, which usually falls within the industry benchmark of between one and three years – even with the lower fuel prices.

Market reception

Although turbocharger upgrades are popular on shore, particularly in power plants, Bosse admits that the marine business has proved tricky in the beginning. "It was a bit of a slow start simply because our marine customers didn't know that they could upgrade rather than completely replace their turbochargers. Even our knowledge on what we can offer customers has expanded since we began offering this service two-and-a-half years ago."

The head of product line is quick to point out that marine upgrades are a different kettle of fish as compared to power plants for technical reasons. "There are technical limits to what can be done by an engineer on a vessel. Unlike the case of a power plant, you cannot just increase the boost pressure of the engine and there are also more regulations to contend with in the marine world," he elaborates. "Depending on what is changed in the engine, there may need to be recertification by the classification society, which increases both costs and effort.

"In the beginning, this looked like quite a hurdle, but requirements are actually far more practical and are becoming easier to realise. For example, expensive lab testing is not required," he says, adding that the procedure and specific requirements can be queried with the relevant class society so that the process becomes easier. "So overall, recertification is not a problem at all if you work with the original equipment manufacturers such as ourselves and the engine OEM, as we can support the process."

Holistic view

Bosse maintains that in many cases the best results from an upgrade are achieved when both the turbocharger and engine are modified, which is why his team prefers working with engine manufacturers during the process.

He illustrates his argument with the example of a cruise ship with a 12-cylinder medium-speed large-bore engine, fitted with an ABB TPL73-A30 turbocharger: "In this case, you can do an upgrade of the turbocharger to the TPL73-A32, which has a new compressor stage with improved efficiency. This will lead to fuel savings of 0.5%-1%. However, if you also do the engine and change the camshaft to introduce Miller timing, it is possible to realise over 3% of fuel savings.

"You can of course just upgrade the turbocharger or replace a part – and we sometimes recommend this if it is the most beneficial solution," Bosse says, citing an upgrade of an ABB TPL73-A30 turbocharger to a TPL73-A32 (with new improved compressor stage) performed for Norwegian ferry operator Color Line in Denmark.

In this case, although there were no hardware engine modifications, ABB worked with Wärtsilä for some engine tuning with the overall result that the *Color Fantasy* experienced not just fuel savings but also significantly lower temperatures and thus, increased reliability and reduced maintenance costs.

Quick turnaround

The mechanical engineer is extremely proud of the efficiency his team has achieved, particularly when it comes to turnaround times on projects. He states that the organisation has got the upgrades down to a fine art, with turbocharger component upgrades (such as TPL73-A30 upgraded to A32 – which is typical for cruise ships) usually requiring only a day to change the cartridge. "This can be done during port stay

or during sailing if the engine can be fully shut down, as in the case of cruise liners with diesel-electric propulsion and multiple engines," he tells *The Marine Professional*.

The process is understandably longer for a combined turbocharger and engine upgrade that involves a new camshaft for Miller timing. "This requires about a week and can be done during dry-docking or a port stay," he says.

Typically, ABB has a two-to-four-month lead time on the projects it undertakes (depending on the scope of the work, particularly in cases where the vessel is dry-docking), but there have been a number of cases in which the team have been called out to replace third-party turbochargers that had proven unreliable.

In cases of emergency replacement, the biggest challenge is usually the time it takes for new pipework, particularly in cases where the unit being replaced is by another brand. "We need certain data about the engine so we can do simulations to determine what the right turbocharger size and specifications should be. This can be done in one or two days in the best case.

In addition, the interfaces between the engines and turbochargers differ from brand to brand, so we need different piping to mount the new turbocharger to the engine – although occasionally we can just drop in the new turbocharger," he informs readers.

Team spirit

The project Bosse is perhaps most proud of was for an emergency turbocharger replacement on a vessel that had broken down in the Philippines. "This was our fastest retrofit to date! We worked on a MAN two-stroke engine in port and managed to complete the entire work – from customer enquiry to vessel sailing again – in just two weeks.

Typically retrofits of this kind would take two to three months of advanced planning, but we took a great effort as a team to expedite the process. In fact, our local ABB representatives used local suppliers for the pipe work to further accelerate the process" he states.

Bosse visibly swells with pride when talking about his co-workers. "The most rewarding part of my job is working with the people in my team. My understanding of leadership is that you help people get the most out of their own strengths and abilities. You set this energy free and use it to do the right things that make your business successful. "

He is energised by how his team deal with the versatile problems that they are tasked with on a daily basis. "If you manage to set the tone right at your company, it comes back to you as an inspiring and energised team culture – it's fun to work in such a setting!" ■