Statsraad Lehmkuhl – the wind and the sails

During a voyage from Ishigaki to Manila aboard the tall ship Statsraad Lehmkuhl, our author glimpsed what it means to have wind in our sails. He will take you on that voyage and what we can learn from the master and the crew; the ship and the sea; and the wind and the sails as well as some lessons that will inform decisions toward upcoming carbon emission reduction targets.

Published 13 May 2025

Written by Kunal Pathak

The master and his crew

Statsraad Lehmkuhl is a 108-year-old tall ship (Barque) registered under the Norwegian Flag and has been an icon in her home port of Bergen since 1923. While the vessel is old, it is fitted with state-of-the-art technology for navigation and ocean research. The vessel can run at 11 knots on a 750 rpm,827 kW Diesel generator and 18.5 knots using her 22 sails. It is manned by about 20 permanent crew, 10 trainees and is designed to carry some 150 apprentices. There were 77 apprentices onboard for the voyage from Ishigaki to Manila. We were a diverse group of trainees, ranging from 16 to 66 years of age, a close to even spilt between men and women from sixteen countries, and an even more diverse personality distribution. I was fortunate to be an apprentice on board, together with a few Gard colleagues. Our participation was organized by various Norwegian Shipping Associations.

The six-day voyage included lessons on safety, the weather and the winds, leadership and stewardship, and how it all comes together to form the essence of the " One Ocean Expedition ". Let's start with the master, Capt. Jens Joachim Hiorth. I chatted with him about his views on safety on board a tall ship where the crew and the trainees are expected to carry out a lot of work aloft in the rigging. "The rigging" means all parts of the ship that make up her sails. In simple terms, it is a 45-meter vertical climb up the masts using shrouds (the vertical steel ropes) and planting your feet firmly on the ratlines (horizontal ropes). To my question the master's response was that "if you remove all distractions, I trust in every individual's will to live and self-preserve". Statsraad Lehmkuhl has comprehensive written procedures for working aloft which are ingrained in every crew member's psyche as was evident in our safety briefing on board the vessel. In addition to the procedures, the crew members were skilled in rope work when working aloft and were able to guide the rest of us to make the climb safely.

Capt. Jens Joachim Hiorth briefing the trainees.

According to the master, his job is to ensure that the weather conditions are conducive for the climb and then he relies on individual's willingness to make the climb following all safety protocols for working aloft. Here lies an important aspect of safety given that Statsraad Lehmkuhl has had zero "fall from height" accidents in its history. Procedures alone may not guarantee safety unless they become a way of working for the crew. The captain believes that the most important safety equipment is the human brain and its ability to focus and protect itself when it counts. If the procedures are practical and not burdensome for those involved in the work activity, the people involved in the work will instinctively follow the procedures.

Capt. Jens Joachim is a man of aesthetics. He says, "I may never have an office job because if I don't like the colour of my office's walls, I may end up in painting it". So, my follow up question was, "what is the most beautiful part of your life on board this ship? "The crew", he said, without skipping a beat. The captain believes that his crew is his second family, and they are the most essential and the most beautiful part of his life on board the ship. He believes in his crew and trusts their judgement. Trust is a two-way street and we observed how the crew reciprocated the master's trust with loyalty towards him and the ship. For a captain to trust his crew is to accept the consequences of their decisions as he believes that the crew are well trained and competent in performing the job. Trust is a starting point of safety as distrust creates distractions. With distractions we lose our ability to focus and perform as a team. Amongst many things, Statsraad Lehmkuhl is a demonstration of the close relationship between trust, safety, and human instinct.

The ship and the sea – lessons for the coming GHG regulations

It takes special competence to operate a sailing vessel with 22 canvas sails with a total surface sail area just over 2000 m2. The crew needs to undergo rigorous training to obtain their certificate of competency to maximise the use of the wind energy and minimize the use of diesel for propulsion. Statsraad Lehmkuhl is a square rigger, which makes the vessel more of a downwind vessel. That said, with efficient seamanship, the vessel can sail at 60 degrees up-wind. For anyone who has sailed on a sailing vessel or even a power-driven vessel, it is not exactly "straightforward" to sail up-wind.

According to the captain, efficiency means the ship's ability to harness the full potential of the wind. While they have all the hardware in the form of sails and riggings, they rely on two factors that compliment the hardware to operate efficiently. It is essential to understand how the vessel works as we can draw some parallels here given that owners will be investing significantly in the next few years in order to comply with the upcoming EEXI (Efficiency eXisting ship Index) and CII (Carbon Intensity Indicator) regulations.

The first factor is the crew competence in handling all the sails in conditions that may not always be conducive and that is when their investment in training and development starts to show results. To optimize a vessel's design index and efficiency ratio, several owners are contemplating alternative fuels, hull designs, wind turbines, solar panels and a plethora of other energy saving devices (ESD). While the investment in these new technologies is a no brainer, the investment in the crew training and competence is also necessary and perhaps the need of the hour. Not only will the owners need to get the crew "up-skilled" in the use of the new technology, the owners will also need invest in retaining their crew for the long term.

These investments are likely to pay dividends in the years to come as IMO GHG regulations are going to be progressive to the point of net zero emissions. Managing a vessel's carbon emissions is going to be as much about the human factor as it will be about the technology. The two are and perhaps will always remain inseparable and interdependent.

The CII regulations will very likely increase the pressure on owners and charterers alike to reduce their carbon footprint voyage-on-voyage and year-on-year. A bottom-up approach where the seafarers are involved in the decision making involving a new technology or fuel type and maximising efficiency will yield long term gains in terms of commercial viability, crew loyalty and most importantly, safety on board the vessel. The seafarers must remain central to such decisions as they will be expected to operate the vessel under conditions which may be difficult to imagine sitting behind a desk. January 2023 is the beginning of our race towards zero emissions, and it is not a race between one shipowner against another. The race is against time to cut our emissions enough to keep in line with the 1.5-degree limit as set out in the Paris accord and IMO's ambitions to get to net zero by 2050.

The second important factor is the weather data. According to the captain, trade winds are reliable to estimate ETA's and consumption. Accurate, real time weather data is crucial for voyage planning and execution. Before the start of the expedition, Capt. Jens Joachim was asked by the project managers to give an estimate of fuel consumption for the One Ocean Expedition. Estimated fuel consumption for an expedition is a rather complex mathematical calculation based on several variables. According to the master, the weather data we currently receive is reliable enough for only 5 days, at best. This is because our main source of data is shore based meteorological stations. If we were able to install weather observation stations on global tramping vessels, we will benefit significantly from being able to gather more accurate real time data to plan voyages in the most efficient way and at the same time to better harness the power of the wind.

Going back to the IMO's EEXI and CII regulations, the significance of vessel's "design speed" is limited when it comes to CII calculations. This is an important point for vessel operators as the vessel's design speed may not be its most efficient speed. The calculations are based on carbon emissions per ton-nautical mile (AER) or transport work (EEOI). This means a vessel's design speed will be secondary to its emissions. Vessels may not run at full speed all the time as long as its emissions are in line with the required CII rating (A to E), which will be progressively reduced every 2 years to reduce GHG emissions. In other words, the target is not high speed, it is reduced emissions with efficient speed. We know that over the years, charterers have required vessel to run at "eco speed" to ensure that the vessel arrives at the destination port "just in time" for its operations. As an example, if we take the voyage average speeds for the last 10 years, a handy size bulk carrier has done 11.33 knots, a neo-panamax container ship has done 16.05 knots and the VLCC segment has performed just over 12 knots *(Calculations are based on Clarkson's monthly average time series based on vessel movement data)*.

As an industry, we have always been driven more by efficiency than speed over the past 10 years and perhaps even before then. Efficiency requires vessels to optimize their speed to make certain arrival schedules and do its part to fit in the "derived demand" from the global trade. After all, in the words of Mr. Martin Stopford in Maritime Economics, " *the product in demand is not a ship, but transport*" . With

better weather data, masters will be able to maximize efficiency and calculate accurate consumption and time of arrival. These reliable calculations would allow owners and their masters to prepare more reliable arrival schedules and at the same time optimise their consumption.

The Statsraad Lehmkuhl's One Ocean Expedition is 14 months and 10 days old as of the day of this writing. The master's initial estimated fuel consumption (MGO) is about 2% off from the actual fuel consumption. The vessel had a draft of about 5.2 meters and has made good an average speed of 4.6 knots over a period of 436 days, including the port stays. Through all her voyages across the seven oceans the vessel has covered a total distance of 37,492. nautical miles with total fuel (MGO) consumed to be about 515 kilo liters on arrival Manila. The total expected distance that the vessel will likely cover is about 55,000 NM by the end of this expedition.* *The fuel consumed was primarily to run the accommodation and galley and some for the main propulsions, when necessary. While the Statsraad Lehmkuhl is below the tonnage threshold for CII regulations (GT 1516), if we calculate the CII rating using the distance travelled and MGO consumption, its AER would be 24.82 gCo2 per GT nautical mile. With an AER at this level the vessel would be rated "A". This is a 108-year-old vessel!

The wind in our sails

So what is so special about Statsraad Lehmkuhl? Is it the vessel, the state-of-the-art navigation systems, the crew competence and training, or is it the leadership of the master? Statsraad Lehmkuhl is of an iconic relevance for Bergen and has had many captains over the years. Several thousand seafarers have manned the vessel during her life and have maintained her in a state so that the vessel can still sail the seas. So how has this vessel lasted over a century and why is it still relevant?

The maritime industry is at a juncture where we as an industry will need to challenge the status quo and perhaps make significant investments in the fuels, vessels and seafarers of the future. This is no small feat and owners will remain under regulatory pressure for years to come. When owners invest in their crew, their crew invests themselves in the vessel and the owners. This is what makes vessels' trade and stay commercially viable in the long run. The crew operates the vessel with a sense of purpose rather than an obligation to complete their sea-time.

In the case of Statsraad Lehmkuhl, my question to the master was: what makes this vessel a home away from home for not just the master, but also the crew? According to the captain, it is their passion for sailing, the social cohesion and support they get from each other, and knowing that they matter to their captain, to the owners and a sense of association with a purpose. For the rest of the 77 trainees, it did not matter where we came from, how old we were, what gender we were, what race or religion we followed or what titles or designations we had in our jobs. We all mopped the floors, scrubbed the decks, climbed the rigging, jumped into the sea and sang shanties like children. It didn't matter what we were, all that mattered was who we were.

Sometimes the glimpses of our future may lie in the past, if only we are willing to pause and look. Sometimes we need to go back to see the future. Statsraad Lehmkuhl's One Ocean Expedition exemplifies a perfect resonance between the master and the crew, the ship and the sea, wind and the sails; all coming together as

one unit, one team, One Ocean.

We thank the master and crew of Statsraad Lehmkuhl, Maritime Bergen, Norwegian Shipowner's Association, Bergen Shipowners' Association and Edwin Pang who assisted with the CII calculations. He is Founder at Arcsilea Ltd & Chair of the RINA IMO Committee.