



*What drives us?*

*Achieving the  
seemingly impossible.*

How do you control the extremely challenging physics of water movement in a transverse pool on a yacht?

By doing a lot of math, physics, prototyping, simulation, and eventually by inventing a clever solution by implementing a hydraulically driven system of two flaps that can fold together in the middle of the pool and lock into position – or in short: with bespoke solutions by Lürssen. And this was just one example of how we manage to fulfill our clients most daring wishes. Dream it up, and we will make it possible.

LÜRSSEN – innovative yachting makes the difference.

**LÜRSSEN**  
The difference.

# BESPOKE SOLUTIONS

The Lürssen Think Tank  
Technical Whitepaper



# THE LÜRSSEN THINK TANK

The main objective of every Lürssen project is to fulfil the client’s aspirations, and usually this means thinking outside the box across departments to create bespoke solutions. Frank Lürssen, team leader of yacht equipment in the outfitting design department, reveals how the shipyard successfully incorporated a 12m transverse swimming pool on 136m *Flying Fox* – a first for a superyacht of this size – and overcame fundamental challenges in the process.



## BESPOKE SOLUTIONS

Swimming pools are one of the most important features on a superyacht and have a significant impact on the on-board guest experience. So, when the client and designer presented the general arrangement for *Flying Fox*, featuring a 12m infinity pool running transversely across the main deck that was crucial to the overall design, Lürssen was committed to finding the right solution to transform this aspiration into a reality.

The main challenge with incorporating a pool of this size running transversely across a yacht is associated with the effect that movement has on a contained body of water. Because a yacht is longer than it is wide, when it encounters waves, the rotation along its longitudinal axis (the roll) is always more pronounced than it is along its transverse axis (the pitch). By turning the pool by 90 degrees from the norm; therefore, the risk of creating an involuntary

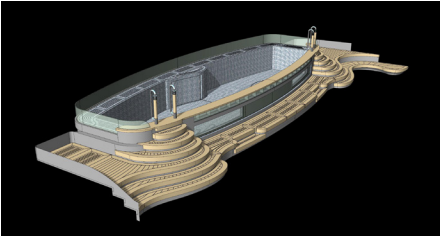
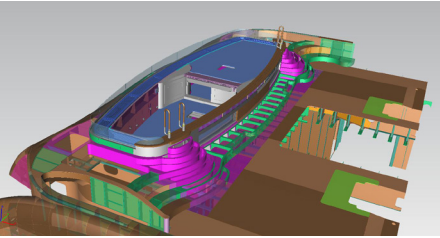
wave pool and losing a substantial amount of water increases dramatically.

To understand the effect that this yacht’s movement would have on the water in the pool, we first used computational fluid dynamics (CFD) software and estimated that the pool would empty half its water contents within 10 minutes and lose its functionality in anything other than calm conditions. We then undertook real-life model testing at the University of Duisburg-Essen, using its sophisticated Hexapod motion simulator to precisely simulate the motion of this specific vessel in a particular sea state and show how the body of water in the pool would react. This testing confirmed our previous calculations and convinced the client that it was necessary to find a solution to make the pool workable.

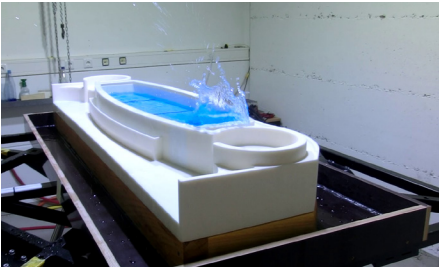
After a thorough analysis of the issue, we found that the key solution was to divide the

pool into two subdivisions with a retractable bulkhead in the middle, so that when pronounced rolling of the vessel occurs, the amount of water sloshing in the pool is limited. When the yacht is operated in gentle conditions – supported by the high performance of the vessel’s stabilisation system – the bulkhead is able to fold away. It was engineered as a hydraulically-driven system consisting of two flaps that fold out into the middle of the pool and lock into position – a significant feat considering the pool holds 50 tonnes of water.

The additional challenge for Lürssen was to harmonise this system with the other technical features in the pool. For example, there is a lifting floor that transforms the pool into a stage area when raised and other amenities including a counter current system and massage jets. A large part of the pool facing forward is also made of glass, so all these features needed to fit in aesthetically as well.



Finding a solution and overcoming such a challenge requires strong teamwork across many different departments, as well as a good working relationship with the designer and owner’s representative – in this case Imperial Yachts – who are willing to listen to and follow our advice. Thanks to this joint dedication, *Flying Fox* now has a pool that can be enjoyed in its full size in calm conditions and, when underway or in choppy seas, the deployed bulkhead prevents any water being lost. As such, the pool is now one of *Flying Fox*’s most recognisable and distinctive features, being the largest to be incorporated on a superyacht in transverse direction. Furthermore, it demonstrates Lürssen’s ability to create bespoke solutions that enhance the traditional way of building superyachts.





  
LÜRSSEN