DIGITAL SOLUTIONS · SESAM™

SAITEC ON NEW PATH WITH SESAM

Customer story – Saitec

Saitec Offshore Technologies is completing the final detailed design stages of a unique floating wind turbine with cost-efficient single point mooring. Their pioneering design and engineering work was done using DNV GL's Sesam for offshore wind.

Software for floating wind design

The SATH development team at Saitec has been using Sesam for offshore wind since 2014. Prior to using Sesam, they had used an in-house solver. "We were looking for software that could combine everything," says David Carrascosa, CTO at Saitec Offshore Technologies, headquartered in Bilbao, Spain. "We needed software that could analyse in detail the complex hydrodynamic behaviour of a barge-type floater – one solution that could perform coupled analysis. This would include wind turbine capacities and wind effects on the tower, floater, mooring system – all the actions of waves, currents and wind. We found that the hydrodynamic analysis you can do with Sesam is quite a lot more detailed than you can perform with other packages," says Carrascosa.

User interface is key

"User interface is also a key point," he says, noting the visual aspect of working with models in Sesam. "There is an easy way to work with Sesam and this is something others don't have. Sesam is well above other software."

The design, which is advancing from the concept phase to the detailed design of a full-scale prototype, is called SATH (Swinging Around Twin Hull). It features a catamaran ship-shaped concrete floater with submerged plates. The twin hulls are bonded to a single point, allowing efficient single-point mooring, which reduces the stresses on the mooring lines. The design removes barriers for offshore wind turbines related to water depth.

Already the SATH design has been tested as scaled models in water tanks, where it showed good performance in operational and extreme environmental conditions. The key advantage of SATH is the reduction of levelized cost of energy (LCOE). This can reduce both investment costs due to quick installation and operational costs, making the floating wind solution highly competitive to monopile foundation designs.

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David Carrascosa, Chief Technology Officer, Saitec Offshore Technologies

High commitment to innovation

Saitec, an engineering company working in several different domains, has always had a high commitment to innovation. "Our president has always looked into new developments and new markets. We saw that offshore wind was an interesting area and concluded that a different approach, mixing the oil and gas approach with a civil engineering approach, could result in greater cost reduction," says Carrascosa.

Saitec Offshore Technology has become an important partner for DNV GL – Digital Solutions, giving feedback to the Sesam developers that results in a more powerful final product for all customers.

"Due to the innovative nature of the solution, during different phases of the design we have come up with some specific situations that have been addressed in collaboration of DNV GL - Digital Solutions and Saitec Offshore Technologies," says Carrascosa. "It's a win-win collaboration. We have organized workshops with the development team. And with new developments in the software we could reduce the amount of tank testing."

Coupled analysis for floating wind

"We needed accurate structural response of the structure under coupling conditions. In Sesam, the integrated capabilities of Sima and HydroD now allow us to obtain hydrodynamic pressures for the coupled analysis, taking into account that the mooring system and the wind turbine are already implemented. This is just one of the areas where we have been collaborating to ensure a more accurate design of the complete system," says Carrascosa.

Carrascosa commends the DNV GL - Digital Solutions software support team, which is always interested in improvements and new developments. "Communication between Saitec Offshore and DNV GL is very useful for addressing situations specifically related to the SATH concept," he says. "They have been providing new updates on requested functions," he says.

When the prototype has been tested in full scale, commercialization of the project is expected, with opportunities being discussed in several countries, including Japan, Taiwan, France, Scotland and the United States.

"We are looking forward to seeing the full-scale prototype, it will be interesting to show to market that this is real. It would have been quite difficult to reach this point without Sesam," says Carrascosa.

SAITEC OFFSHORE TECHNOLOGIES IN BRIEF:

Saitec Offshore Technologies is a subsidiary of Saitec Engineering. It was created around the floating wind technology SATH. Saitec Offshore Technologies has earned a deep know-how in offshore wind combined with expertise built during the last 25 years in energy. The parent company, Saitec Engineering, provides a wide range of top quality engineering services, from a comprehensive multidisciplinary perspective. Its main activity involves the development of transport infrastructure projects (railways, roads), water engineering, architecture, town planning, environment, industry and energy. Its scope of action covers the entire engineering value chain (planning, design, construction and operation), providing services to public and private companies, and joint ventures.

PROFILE

- Customer name: Saitec Offshore Technologies
- Web address: saitec-offshore.com
- Market: Engineering and project development
- Employees (in Saitec Engineering): 300

BRIEF ACCOUNT

Why we chose DNV GL – Digital Solutions
- DNV GL is a trusted partner
- Sesam's capabilities and performance are well above other solutions

This is what we gained:
- Dynamic and straightforward optimized workflow in modelling the entire mooring system
- Easy to make changes in the design process
- Quick and efficient design, fast access to accurate and optimized results
- Working partnership with DNV GL – Digital Solutions development team