

Motion-compensation tackles heave, sway and roll

The idea of compensating for the motion experienced by the helideck on a vessel is not new, but Barge Master and Bayards Aluminium Constructies in the Netherlands have taken the concept a step further and can compensate for heave, sway and roll

In the offshore oil and gas industry, maximising uptime and minimising downtime is essential, but weather conditions often interrupt crew and client transfer operations undertaken by helicopters. If conditions exceed those prescribed in regulations such as CAP 437, an aircraft cannot land, and key crew and client personnel cannot join or leave a vessel.

Offshore vessels have been fitted with motion-compensated helidecks before, notably one fitted to the Petroleum Geo-Services seismic vessel *Ramform Sovereign*. This system was developed by Uptime in Norway, working closely with Marine Aluminium, but is believed to be the only such system in operation currently. Using Uptime's roll compensation system, the Norwegian company claims, a vessel's helideck can be upgraded from category B+ to A+ (during daylight) by the helideck's certification agency.

At the 2014 Offshore Technology Conference (OTC) in Houston earlier this year, Barge Master and Bayards unveiled a new type of motion-compensation system they have been working on. It differs from other systems in its ability to compensate not just for sway but for motion in three dimensions, that is, for roll, sway and heave. The system is based on a motion-compensation system that Barge Master originally developed for cranes and uses a specially developed drive and control system to 'neutralise' roll, sway and heave.

Barge Master's motion-compensating unit has been described in *OSJ* before on a number of occasions. One of the most recent applications is the development of a compact unit, the T40, that is capable of compensating an offshore knuckleboom or telescopic boom crane. Not surprisingly, the concept of a motion-compensated crane is attracting a lot of attention from vessel designers and owners alike and is a



Artist's impression of the Barge Master/Bayards motion-compensated helideck

feature of a new vessel under construction for Wagenborg for a charter to Shell/NAM.

The motion-compensated helideck that Barge Master and Bayards are now marketing is driven by three actuators compensating two translations (sway and heave) and one rotation (roll) of the vessel the helideck is installed on. This ensures that the platform stays in a fixed position and that the influence of wave-induced vessel motion can be reduced.

Speaking to *OSJ* in July, Jim Koppenol, lead R&D engineer at Barge Master, said the company saw a need in the market for such a system and had received a number of serious enquiries since launching the concept at OTC. As he explained, any production version of the motion-compensated helideck would be a customised version of the concept because the motion characteristics of vessels and location of helidecks on vessels varies greatly. The type of helicopters used also varies, so Barge Master has developed a system that would be capable of handling the largest helicopters in their class – including aircraft in the 14.5 tonne range such as the Sikorsky S92 and the EH-101.

Although oil and gas provinces such as the North Sea, where weather conditions are usually much worse than, say, the Gulf of Mexico or West Africa, might seem the most obvious areas for application of the technology, Mr Koppenol highlighted the fact that even in more benign climates, swell can adversely affect operations

and can travel over very long distances.

Albert Hogewoning, Bayards' technical director, told *OSJ* that, depending on the weather and conditions, the system could completely compensate for vessel motions. In more challenging conditions, he said, the system could reduce motions to acceptable levels and enable aircraft to land and take off in conditions that would not otherwise be possible.

Helicopter operations in support of the oil and gas industry over the open seas on the UK Continental Shelf began in earnest in the mid to late 1960s and the number of such operations has grown significantly since then, not just in the North Sea but worldwide. Many vessels, particularly those with client personnel on board such as construction vessels, are fitted with helidecks.

Helidecks on vessels used in support of the offshore oil and gas industry are designed to comply with the requirements of CAP 437 and standards from NORSOK in Norway. In 2008, the ICS also published an updated version of the *Guide to Helicopter/Ship Operations*, which comprehensively describes physical criteria and procedures on ships having shipboard heliport landing or winching area arrangements. However, for the time being, the standards do not address the use of motion-compensated helidecks, and classification societies would need to be involved in the approval of any system installed on a vessel. **OSJ**