

The Correlation of Offshore Vessel Design Trends and Operational Challenges

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In recent years, the offshore industry has been confronted with operational challenges resulting from the need to venture further from shore and operate in deeper waters and harsher environments for oil exploration and production. These circumstances have generated design trends producing larger, more advanced, safer and environmentally friendly Platform Support Vessels pushing 300 ft in length, with some designs in excess of that.

Coupled with operations in more difficult conditions is the need for increased cargo capacities and greater product variety to ensure profitable operations. Locating the engine room above the main deck, a concept pioneered by GPA several years ago and made possible by the implementation of diesel-electric propulsion systems, allows cargo capacities to be increased by 30% compared to similar sized vessels.

Today, offshore vessels are not just larger and more advanced but are also being built at an unprecedented rate to meet the growing demands worldwide. Therefore, designs incorporating simplified construction methods allow shipyards, some of which were newly created solely for the construction of offshore vessels, to facilitate heavy construction volumes.

Design trends need to also address heightened concerns about environmental degradation. Approaches to minimize the environmental impact of offshore operations are mainly regulatory driven and today primarily focus on tank segregation to decrease the risk of oil spills. Beyond Tier II compliance, further emissions reductions and improved fuel economy can be partially addressed by a diesel-electric propulsion configuration.

Combined with Dynamic-Positioning Systems, the diesel-electric propulsion system optimizes operations and crew safety, another challenge arising from more difficult conditions, by providing exceptional maneuverability and the capability to maintain precise position-keeping alongside rigs and platforms, even in adverse weather conditions, as well as improved power management, power utilization and efficiency. Crew comfort is also improved by the implementation of diesel-electric systems due to the decrease of noise and vibration levels.

While offshore designs are successfully responding to operational challenges, these design trends induce new challenges. The demand for increased cargo capacities complicates adhering to regulations, such as MARPOL Annex I and Annex II, as well as Subchapter L, while increased vessel demand, crew safety and fuel economy have placed a heavy burden on mariner training programs. Operators must convey the technical advances of a modern PSV to their crews while simultaneously producing new, qualified crewmembers to facilitate the frequency of new vessel deliveries. Unforeseen challenges will undoubtedly drive future design trends in the years to come.