46ESS-26 Ship Propulsion – Water Jets

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Water Jets, originally bounded to small high-speed crafts and work boat situations where a high level of manoeuvrability was required, were initially discarded as popular configurations for vessel propulsion. The reason was partly due to the universal acceptance of higher simplicity, lower weight and higher propulsion efficiency of the screw propeller. However, the development of more efficient pumps, the increase demand for higher-speed crafts or its capability of operation in very shallow depths alongside other characteristics, have contributed to its rapid growth utilization.

In spite of its advantages, different challenges arise during the design phase of this type of propulsion system. Two examples are the difficulty of predicting the change in performance due to the water jet – hull interaction and the duct inlet design, which has to avoid flow separation and cavitation while minimising losses and creating an adequate flow field for the impeller.

In this paper, some of the aspects relative to this propulsion system that will be reviewed are: working theories and evolution; configuration and design considerations; applications; challenges and future development.