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High strength steel joints through FSW using PCBN tools

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Friction stir welding (FSW) is a solid-state welding process invented by TWI in 1991. The technology is used for structures that require high strength, fatigue resistant joint. FSW has been used in the Aluminium, Magnesium, and copper industries for several years, known to produce strong, tough fatigue resistance joints. Benefits of FSW has been demonstrated in both low temperature and high temperature metal joining, however, the technology has not been successful commercially for high temperature metals such as steel due to lack of consistent and long-life tool. Objective of this work to demonstrate that PCBN tool could consistently weld difficult to join shipbuilding grade steel and produce joints with excellent mechanical properties.

Steel forms large part of structural metal application globally and Shipbuilding is one such industry where joining of steel is important. Some of the benefits of friction stir welding (FSW) such as, minimum distortion, ability to automate welding, high strength joints for longer part life, could be extended to shipbuilding industry. This paper will discuss welding of shipping grade steels with thickness of 6 and 12mm with a PCBN tools.