

Image source: Sandvik Materials Technology

BPP-TECH initiated a Joint Industry Project (JIP), the Steel Tube Umbilicals or STU JIP. The STU JIP was a study of tubing materials for steel tube umbilicals.

The study included an evaluation of the performance of conventional and potential tubing materials for use in dynamic and static umbilical applications. It also provided a compendium of steel tube material data and performance to support umbilical specifications and selection.

Umbilicals and flexible pipes are key areas of BPP-TECH's capabilities and experience. Participants in the STU JIP included offshore oil and gas operating companies as well as companies involved in the installation of offshore umbilicals.

The need for the STU JIP arose from three factors:

- Recent manufacturing and field experiences indicated there had been a significant number of problems and failures associated with the design and manufacture of steel tubes in dynamic umbilical applications
- With the continuing need to produce oil and gas at ever increasing water depths and, additionally, over longer distances through subsea tiebacks, the use of steel tube umbilicals is predicted to increase significantly

- Many of the fields developed will be prolific producers in areas of minimal support infrastructure and hence will be high cost developments

Problems with or failure of steel tubes have had a major impact on such development programmes due to the potential loss of production and the ability to rectify or replace the affected product. This could, individually or collectively, result in potentially very high levels of cost to operators.

The STU JIP consisted of the following phases which were carried out over a twelve month work schedule:

- Operator Reliability Survey
- Steel Tube Manufacturer Survey

- Review of Materials and Screening Exercise
- Laboratory Material Testing
- Flexural Fatigue Testing

The STU JIP addressed aspects influencing the mechanics and ultimately the quality of manufactured tubes, the reliability of steel tube umbilicals, and included an investigation into inherent manufacturing defects, cracks, residual stresses, cold work hardening and process monitoring to verify the quality of the produced tube.

It also addressed the influence of the ambient environment within the umbilical in respect of the corrosion fatigue.

