

Joint Event

International Conference on

Petroleum Engineering, Oil and Gas

December 06 -07, 2018 | Dubai, UAE

Property enhancement of mandrel for SET Applications

Sayyad Zahid Qamar

Sultan Qaboos University, Oman

For more than a decade, solid expandable tubular (SET) technology has been used for both completion and production purposes in oil and gas wells. SET helps to increase fracturing rates, thus resulting in improved conductivity and superior hydrocarbon production. Expandable tubulars have also proved their value as an alternative to conventional zonal isolation techniques. SET technology is built around the cold expansion of a tubular by forcing through it a conical mandrel made from a special tool steel. Good design and manufacturing cannot be achieved without indepth knowledge of the mechanical properties of the cone material. A test rig has been designed, fabricated, and commissioned at the Sultan Qaboos University for full-scale expansion tests of SETs. This facility

uses expansion cones made from AISI D6 steel, which is a highcarbon high chromium cold-work tool steel. Published work on D6 steel is mostly focused on surface hardening methods and wear related issues, rather than heat treatment. Work reported in this paper is based on devising an optimum heat treatment strategy for property enhancement of expansion cone material. The heat treatment process consists of annealing, hardening/ quenching, followed by single and double tempering. Mechanical testing includes hardness, tensile properties (yield strength, ultimate strength, and ductility), and impact strength. Optimum material properties would ensure dimensional accuracy of the expanded tubulars and a longer mandrel life.

e: sayyad@squ.edu.om

Notes: