

**Title:** Weak Point Analysis of Deepwater DST String in Service

**Abstract:** Considering the deepwater test technology, in this study, temperature and pressure loads of deepwater drill-stem tested (DST) string in string deployment, pressure perforation, flowing test, and shut-in well stages are evaluated. In view of the large displacement and contact problem, a mathematical model is established for the deepwater DST string system to assess the weak point based on nonlinear contact theory. The results show that the temperature and internal pressure of DST string are mainly determined by test production in the flowing test stage. The pressure perforation and shut-in well stages are more risky for DST string in water, whereas the string deployment and shut-in well stages are more risky for DST string in downhole. With increasing test production, the stress level of DST string decreases in water and increases in downhole as a whole. Extra attention should be paid to the string units adjacent to the top, lower flex joint, hanger, and packer, which are the strength weak points of deepwater DST string. The weak point assessment method provides powerful support for operation risk management and decision-making of DST string in offshore test process.