Tubing Movement & Forces

3 days **TUBMF-EN-P**

Overview

LEVEL

Skilled

PURPOSE

This course provides a thorough understanding of tubing movement and forces.

LEARNING OBJECTIVES

Upon completion of the course, participants will be able to:

analyze data and decide which element(s) or parameter(s) of a completion equipment must be modified to solve problems related to tubing movement,

write a completion program taking tubing behavior into account,

analyze correctly a tubing behavior-related problem encountered during operation and provide an adequate solution.

WAYS AND MEANS

Exercises and a large case study.

Numerous animation and videos.

LEARNING ASSESSMENT

Quiz.

PREREQUISITES

Knowledge of well completion equipment, well operations and/or well intervention.

Agenda

GENERAL PRINCIPLES — 0.5 d

Presentation of the problem.
Parameters to be verified (worst place and case) and possible cures.
Reference state and present states of the well, various conventions.
Calculation principle.
Computation of temperature and pressure changes.

CASE OF A DOWNHOLE BINDING DEVICE PERMITTING FREE TUBING MOVEMENT — 1 d

Temperature effect.
Ballooning effect.
Piston effects (not including buckling).
Effect of the friction resulting from the fluid flow.
Buckling effect:
Awareness to the key parameters.
Buckling criteria.
Location of the neutral point and determination of the movement resulting from buckling.
Global effect: movement of the sliding binding device, tension force at the wellhead…

CASE OF A DOWNHOLE BINDING DEVICE PERMITTING NO TUBING MOVEMENT — 0.5 d

Calculation principle.
Estimation of f_{link}.
Determination of f_{link} taking buckling into account.

CASE STUDY — 0.75 d

KNOWLEDGE ASSESSMENT — 0.25 d