

Load case - green cement pressure test

Oliasoft

Abstract

In this document we describe the load case *Green cement pressure test* available in the Oliasoft™ application.

Introduction

Green cement pressure test is a burst load case, where the unknown is the pressure profile of the tubing¹. The internal and external pressure profiles are based on the hydrostatic pressure from mud and cement, and then a test pressure is applied on the inside of the tubing from the hanger to a float/plug. When using these pressures in axial loads calculations, the cement is treated as any other fluid, and does not restrict movement.

Inputs The following inputs define the green cement pressure test load case

- 1) The true vertical depth (TVD) along the wellbore as a function of measured depth. Alternatively, the wellbore described by a set of survey stations, with complete information about measured depth and inclination.
- 2) The true vertical depth/TVD of
 - a) The hanger of the tubing, TVD_{hanger} .
 - b) The shoe of the tubing, TVD_{shoe} .
 - c) The float/plug, TVD_{float} .
- 3) The temperature profile of the wellbore, T .
- 4) A complete description of the fluid columns on the inside and outside of the tubing.
- 5) The test pressure, P_{test} .

Calculations The external pressure profile is just the hydrostatic pressure profile from the external fluid column,

$$P_e = \text{'Hydrostatic pressure from external fluid column.'} \quad (1)$$

The internal pressure profile is divided in two, from hanger to float, and from float to shoe,

$$P_i = \begin{cases} P_{\text{test}} + \text{'Hydrostatic pressure from internal fluid column.'}, & \text{TVD} \in [\text{TVD}_{\text{hanger}}, \text{TVD}_{\text{float}}] \\ P_{e,\text{shoe}} - \text{'Hydrostatic pressure from internal fluid column.'}, & \text{TVD} \in [\text{TVD}_{\text{float}}, \text{TVD}_{\text{shoe}}], \end{cases} \quad (2)$$

where $P_{e,\text{shoe}}$ is the external pressure at the shoe.

¹We denote any tubular by tubing. All calculations encompass both tubings and casings.