Performance of dual lips elastomeric seal for spigot-socket push fit joint using finite element method

ABSTRACT

Spigot-socket push fit joint leakage analysis for piping system is presented in this paper. A new design of dual lips elastomeric seal characteristics has been investigated in order to prevent leakage from happening. The seal was part of the spigot-socket joining system for steel pipeline used for water distribution. Finite element method was used to analyse the joint performance by employing finite element software, LS-DYNA3D and LUSAS. Money-Rivlin strain energy equation was used to identify the seal permissible working pressure that occurred at the top and bottom surface of the elastomeric seal using squeezing analysis. The result shows various working pressure by changing the seal thickness and width. The highest pressure value for top surface is at 28.5 MN/m2 and 23.8 MN/m2 for bottom surface occurred at 3 mm thickness and 0.5l mm width. These pressure values were higher than the water pressure which valued at 3.1 MN/m2. This is attributed to higher pushing force that must exceed 10 kN to overcome the elastomer shear stress and for the ease of joining.