

## Effects of Geometrical Parameters on Static Strength of Tubular KT-Joints at Fire Condition

**Authors :** Hamid Ahmadi, Neda Azari Dodaran

**Abstract :** This paper aims to study the structural behavior of tubular KT-joints subjected to axial loading at fire induced elevated temperatures. At first, a finite element (FE) model was developed and validated against the data available from experimental tests. Then, a set of 810 FE analyses were performed to study the influence of temperature and dimensionless geometrical parameters ( $\beta$ ,  $\gamma$ ,  $\theta$ , and  $\tau$ ) on the ultimate strength and initial stiffness. The joints were analyzed under two types of axial loading and five different temperatures (20 °C, 200 °C, 400 °C, 550 °C, and 700 °C). Results show that the ultimate strength and initial stiffness of KT-joints decrease considerably by increasing the temperature. In the joints having bigger values of the  $\beta$ , the temperature elevation leads to less reduction in ultimate strength; while in the joints with bigger values of the  $\gamma$ , the temperature elevation results in more reduction in ultimate strength. The influence of the  $\theta$  on the ultimate strength is independent from the temperature. To our knowledge, there is no design formula available for determining the ultimate strength of KT-joints at elevated temperatures. Hence, after parametric study, two equations were developed through nonlinear regression, for calculating the ultimate strength of KT-joints at elevated temperatures.

**Keywords :** axial loads, fire condition, parametric formula, static strength, tubular KT-joint

**Conference Title :** ICCEAM 2018 : International Conference on Civil Engineering and Applied Mechanics

**Conference Location :** Dublin, Ireland

**Conference Dates :** July 23-24, 2018