

COMPARISON BETWEEN ALTERNATIVE FE MODELLING STRATEGIES FOR RIVETED CONNECTIONS CONCERNING FATIGUE ASSESSMENTS

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ABSTRACT

Nowadays, fatigue assessment of ancient riveted metallic bridges has deserved special attention. Despite those structures are reaching the end of their lifecycle, their replacement in a short period is economically unsustainable. Therefore, more research is required to better understand the behaviour of riveted bridges, in particular the fatigue behaviour of their riveted connections, in order to circumstantiate any decision regarding the extension of their life cycle. Riveted bridges were manufactured connecting angles and plates using rivets. Multiple rivet joints are typical in those structures. This paper presents a methodology, based on the finite element analysis, to assess the local stresses in multiple rivet connections, taking into account friction and clamping stresses on rivets. In particular, stress concentration factors for uncracked connections are evaluated as well as the stress intensity factors for several crack configurations. The stress intensity factors are evaluated using the virtual crack closure technique.