The Fuselage structure is a rather complicated system of parts consisting of skinsheets, tear-straps, stringers, frames and doublers. These parts are interconnected by mechanically fastened and bonded joints, or a combination of both. The complex fuselage structure in the present research is reduced to specimen level size for laboratory testing and theoretical analysis.

This thesis contains several topics all related to the mechanically fastened joints in monolithic aluminum and fiber metal laminates fuselage sections. An extension of the neutral line model is presented to calculate combined tension and bending stress distribution in joints. These stress calculations allow for an estimation of the stress at the most critical fastener row likely to develop fatigue cracks. To complement earlier research on developing stress intensity factors for cracks emanating from fastener holes, an experimental and analytical investigation in the crack growth behaviour of cracks emanating from countersunk holes is conducted. For riveted joints, the final shape of the formed rivet head indicates the squeeze force used to form the rivet. This squeeze force is also an indicator of the joint quality. Additional research to demonstrate the residual strength of joints with fatigue cracks is presented.
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