PARAMETER STUDY OF NOTCH EFFECT ON ALUMINIUM CROSS JOINTS WITH DIFFERENT ANGLES CONSIDERING MULTIAXIAL STRESS STATES

Content

The fatigue behavior of aluminum components is of great importance in lightweight construction. In the course of a research project, the influence of multi-axial stress conditions on fatigue strength is to be investigated, among other things. A series of static and dynamic tests is planned for this purpose. Cross joints with different angles between longitudinal weld direction and force direction are to be tested and analyzed.

In a completed master thesis at the chair, the basic numerical models (Figure 1) of a cross joint with different weld angles (30°, 45°, 60°, 90°) were created, and initial analyses of the stress concentrations were carried out. Based on this, a parameter study (e.g. variation of widths and thicknesses) will be carried out in the course of this master thesis, from which a first general analytical description of the stress concentrations and an approach for a design concept will be derived. The focus is on the multi-axial stress states at the weld. If appropriate, possible eccentricities can also be implemented and considered.

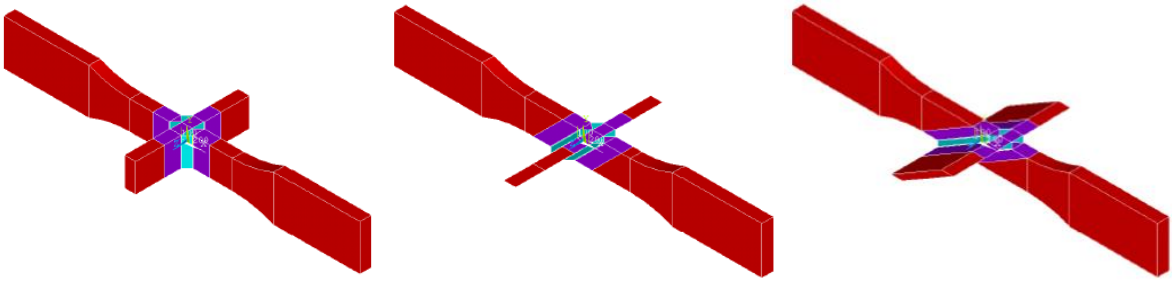

Figure 1: Numerical models of cross joint with different weld angles

Tasks

- Familiarization with ANSYS and the theory of fatigue behavior of aluminum
- Parameter study of notch effect at the cross joints with different weld angles
- Investigation of the multi-axial stress conditions at the weld seam
- (if appropriate implementation of eccentricities and possible influences from the restraint)
- Development of a first design concept for inclined welds
- Preparation and summary of the results

Processing period

flexible, from now on

Prerequisites

Good knowledge in mechanics, FEM and basics in fatigue knowledge beneficial

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