

# Influence of an Incremental Deformation on Material Behaviour and Forming Limit of Aluminium Al99,5 and QT-Steel 42CrMo4

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**Abstract.** By cyclic torsion tests on thin walled tubular specimens the influence of a resulting strain increment per cycle on the plastic flow behaviour of Al99,5 and normalised QT-steel 42CrMo4 has been investigated. Thereby large shear amplitudes were chosen and the amount of forward and backward shear was varied. In both materials with increasing portion of backward shear a transition from cyclic hardening to cyclic softening was observed. It has been demonstrated that a certain ratio of forward and backward shear can cause a rise of the forming limit, which can exceed by far the value for monotonic deformation. The mechanical behaviour under cyclic incremental deformation is associated with certain substructure evolution. In dependency on deformation parameters especially the formation of dislocation cells and subgrains has been observed.