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Effects of Cross-Loading on the Material Behaviour

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The prediction of material behavior following non-proportional load paths is still a major challenge in forming technology. In-situ synchrotron experiments are used to investigate the material behavior of a microalloyed and a dual-phase steel after different pre-strain levels and directional changes. It is shown that the material behavior is strongly dependent on the pre-forming level and the level of the change in the loading direction. Temperature-based methods can be used to determine the actual physical onset of flow. A significant change in the onset of flow as well as in the strain hardening behavior can be observed.

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