The effect of mechanical surface pre-treatment on the strength of the adhesive joint of high strength sheets

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Abstract:

Nowadays, in the car body parts production, the quenching is often replaced by adhesive joints. The adhesive joints have a lot of advantages – they allow to keep the protective layer, enable to join different material and prevent from the formation of heat affected zones. With respect to passenger's passive safety, plenty of car body parts are manufactured of high strength steel sheets. The body parts are hot-formed at a temperature of 900 °C to the desired shape followed by subsequent rapid quenching to achieve the required strength. The sheets are covered with an AlSi 60/60 layer which should protect them from high-temperature oxidation during the forming process. However, brittle intermetallic interlayers form during the high-temperature treatment due to the reaction of iron from the substrate with Al/Si from the protective cover, which negatively affects the final strength of adhesion joint. The paper deals with the comparison of different possible ways of removing the layer on the final strength.

Key words:

Adhesive joint, cohesion, strength