

Cross-Wedge Rolling of PTA-Welded Hybrid Steel Billets with Rolling Bearing Steel and Hard Material Coatings

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Abstract. Hard material coatings such as Stellite 6 or Delcrome 253 are used as wear or corrosion protection coatings in industrial applications. The Institute of Materials Science welded these hard material alloys onto a base material, in this case C22.8, to create hybrid a workpiece. The Institut für Integrierte Produktion has shown that these hybrid workpieces can be formed without defects (e.g. detachment of the coating) via cross-wedge rolling. After forming, the properties of the coatings are retained or in some cases even improved (e.g. the transition zone between base material and coating). By adjustments in the welding process, it was possible to apply the 100Cr6 rolling bearing steel as of now declared as non-weldable. 100Cr6 was formed in hybrid bonding with C22.8 and made it possible to produce component-integrated bearing seats. Even after welding and forming, the rolling bearing steel coating could still be quench-hardened to a hardness of over 60 HRC. This paper shows the potential of forming hybrid billets to tailored parts. Since industrially available standard materials can be used for hard material coatings via this approach, even though they are not weldable by conventional methods, it is not necessary to use expensive, for welding designed materials to implement a hybrid component concept.