A new generation of tool steels for shaping AHSS and UHSS

B.Casas, D. Marco, I. Valls

ROVALMA S.A.

Apol.lo 51, PI Can Parellada

08228 Terrassa (Spain)

ABSTRACT

Advanced high strength steels (AHSS) and ultra high strength steels (UHSS) are extensively applied as components in automobile industry because of their unique combination of high strength, excellent energy absorption during deformation and strain hardening. However, forming processes of such high strength materials involve severe difficulties, including a severe increase on die and punch requirements. In this work, new tool steels are developed in order to reduce these drawbacks. In doing so, a detailed characterization of tool steels used in forming processes of AHSS has been assessed to distinguish main failure mechanisms and tribomechanical functionality of different carbides, nitrides, borides and oxides. The microstructural optimisation, in terms of matrix composition as well as nature, morphology, size and distribution of second phase particles, has been crucial in the development of a new generation of tool steels with exceptional combination of properties at comparatively low cost, which make them the best candidates for shaping AHSS.