

Improved Toughness in a 690 MPa Q&T High Strength Structural Grade based Upon a New Low Mn Alloy Design.

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Abstract

BlueScope Steel has supplied greenfeed plate to Bisalloy Steels for the manufacture of quench and tempered plate products, for over three decades. Bisalloy Steels have supplied Q&T plate from this greenfeed material for a wide range of applications such as high hardness wear plate (400-600 BHN hardness) for the mining industry, fabrication of high strength (690MPa YS) structural beams for buildings, crane booms etc and high hardness armour plate for ballistic applications. In recent times the customer demands for improved toughness, bendability and weldability have focussed efforts on further alloy design and inclusion engineering initiatives to provide the required improvements in steel performance. Whilst the traditional approach of steelmakers to this emerging challenge has been principally to place increasingly severe restrictions on S levels and utilise Ca treatments for sulphide shape control, the use of a low Mn alloy design at BlueScope steel has provided an alternative approach. This low Mn approach has now been introduced for the commercial manufacture of the high strength structural plate grade offering a 690 MPa minimum yield strength, which has delivered enhanced toughness to the grade, with Charpy V-notch impact toughness in the order of 200J at -40°C, being achieved. This paper describes the new alloy approach and presents the mechanical properties being realised.