

## **The Financial and Metallurgical Benefits of Niobium Grain Refined As-Rolled 460 MPa H-Beam to the Construction Industry in SE Asia**

**Authors :** Michael Wright, Tiago Costa

**Abstract :** The construction industry in SE Asia has been relying on S355 MPa “as rolled” H-beams for many years now. It is an easily sourced, metallurgically simple, reliable product that all designers, fabricators and constructors are familiar with. However, as the Global demand to better use our finite resources gets stronger, the need for an as-rolled S460 MPa H-Beam is becoming more apparent. The Financial benefits of an “as-rolled” S460 MPa H-beam are obvious. The S460 MPa beam which is currently available and used is fabricated from rolled strip. However, making H-beam from 3 x 460 MPa strips requires costly equipment, valuable welding skills & production time, all of which can be in short supply or better used for other purposes. The Metallurgical benefits of an “as-rolled” S460 MPa H-beam are consistency in the product. Fabricated H-beams have inhomogeneous areas where the strips have been welded together - parent metal, heat affected zone and weld metal all in the one body. They also rely heavily on the skill of the welder to guarantee a perfect, defect free weld. If this does not occur, the beam is intrinsically flawed and could lead to failure in service. An as-rolled beam is a relatively homogenous product, with the optimum strength and ductility produced by delivering steel with as fine as possible uniform cross sectional grain size. This is done by cost effective alloy design coupled with proper metallurgical process control implemented into an existing mill’s equipment capability and layout. This paper is designed to highlight the benefits of bring an “as-rolled” S460 MPa H-beam to the construction market place in SE Asia, and hopefully encourage the current “as-rolled” H-beam producers to rise to the challenge and produce an innovative high quality product for the local market.

**Keywords :** fine grained, As-rolled, long products, process control, metallurgy

**Conference Title :** ICSE 2015 : International Conference on Structural Engineering

**Conference Location :** Singapore, Singapore

**Conference Dates :** July 04-05, 2015