

Super Bainite (High Hardness) Steel

Background

Super Bainite Steel is a high performance armour steel, which, following live fire trials has been demonstrated to have significant capability, with a hardness matching that of alternative high hardness armour steels and some ceramic armours at a much reduced cost.

Technology

Now at Technology Readiness Level (TRL) 7. One of the key attributes of the Super Bainite Steel as an armour steel is its two phase production process. The steel is produced using conventional strip steel furnace/production processes to make the low-alloy steel, which in its hot state can be rolled/ coiled as conventional strip steel.

Following production the steel is in a relatively soft pearlite phase and not hardened. The steel can then be worked i.e. cut, machined, bent etc to be made into final armour components, using conventional machine shop tooling. It can then be hardened by using a simple isothermal heat treatment process where the steel converts to fully hardened super bainite steel.

Applications

- Armoured Vehicle Protection
- Wear Steel Components
- Extrusion/Bar Components

Intellectual Property

- Patents Granted: GB/0913382.8
- WO-GB2009/050947

Benefits

- Made as a Pearlite - easy to process
- Super Bainite Steel is low alloy – 4.7% (Si Mn Cr Mo) – 0.8% C - with no Al, Co, Ti, Ni.
- Proof Stress at 0.2% (0.2PS - $R_{p0.2}$) is - 1673 MPa
- Ultimate Tensile Strength (UTS) (RMm) is - 2098 MPa
- Elongation (EI) is ~ 11% and Reduction of Area (RA) is - 5%
- Charpy Notch Impact number is based on a 10mm x 10mm specimen measured at room temperature is - 5 Joule
- Vickers Hardness (HV30) of 690HV30 \approx Brinell (10 mm Ball, 3000 kg load) of 574HBW \approx Rockwell C (20 degree cone 150 kg) of HRC 57
- Available in a fixed width of 1250mm up to 5.5m length and two gauges 6.3mm & 8.5mm.
- In a perforated steel armour system has been shown to offer a ballistic mass efficiency of 2.5

Licensing & Partnering Opportunity

For further information, please contact:

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