



ABSTRACT OF PAPER

Title of Paper: QUALIFICATION OF FLASHBUTT WELDS FOR HEAVY HAUL SERVICE

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Abstract :

Flashbutt welding using mobile welding equipment is now well-established for in-field welding during track construction and upgrading, and is increasingly being used for maintenance welding. These activities, which are generally performed by contractors, may involve a number of different rail grades within the same railway operation or between different railway operations. In addition, the qualification requirements for such welds, which are often based around the use of fixed or stationary welders used for fabrication of long welded rail, may not be suitable for mobile welding equipment and differ from one railway operation to another.

The specifications for flashbutt welding identify key qualification requirements in terms of bond integrity, hardness and metallurgical structure. However, these requirements can vary significantly within Australia as well as internationally, and the interpretation of results can be ambiguous in key aspects. These include the:

- i) definition and size distribution of “flat spots” when performing slow bend tests,
- ii) hardness requirements, including the differential in hardness that is or is not acceptable,
- iii) in-field weld validation testing frequency requirements,
- iv) precise definition of the air quenching process for heat treated rail grades,
- v) rigorous consideration of new rail grades offered by manufacturers, and/or
- vi) ambiguities or unrealistic microstructural requirements, for example bond line decarburization width or maximum allowances for untempered martensite.

While the intent of rigorous qualification is to provide the best possible weld quality, some of the requirements are difficult to achieve in practice, and do not necessarily provide significant reduction of risk. Conversely, as welding machines can become faulty during production runs, proper operation at the start of a project does not necessarily guarantee that all welds will be acceptable throughout.

This paper identifies and examines issues that can cause difficulties in terms of reconciling the specification with the actual operational requirements of the railway network, along with proposed



guidelines to provide more objective or practical acceptance criteria for the acceptance or rejection of welds for qualification.