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Industrial Member Report Summary – Key Findings for Industry

Surface Characterisation and Preparation for Thermal Spray Coatings: Technical Review

TWI Core Research Programme

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Industrial need

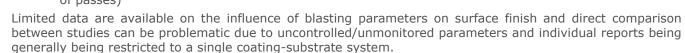
Thermal spray processes are widely used in industry to deposit a range of coatings. The bond strength between substrate and coating is critical for many applications and is dependent on both (a) good substrate surface preparation and (b) optimised spray parameters. While spray parameters are usually carefully monitored and controlled, most surface preparation is performed by manual grit blasting, with little or no process monitoring or calibration.

This report covers a technical review of surface preparation techniques for the application of thermal spray coatings, with a view to improving surface preparation using mechanised processes to ensure tighter control of grit blasting and repeatability. In addition to the state-of-the-art review of grit blasting, methods of surface characterisation are included and other surface preparation techniques are considered.

Key Findings

Topography of the substrate surface is considered to be the key consideration for the application of thermal spray coatings and grit blasting is the main technique employed to achieve a rough surface.

- Grit blasting parameters can be split into three main categories:
 - □ Blast media (composition, purity, size, morphology)
 - Media feeding (equipment, pressure, feed rate, nozzle)
 - □ Geometry (angle, standoff, traverse speed, no of passes)



- No conclusive consensus has been reached as to what the desired surface profile should be for optimum adhesion between a substrate and thermal spray coating.
- Further work is needed to understand the relationship between grit blasting process parameters, surface profile and coating adhesion using mechanised setups and process monitoring tools.

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