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Tribo-Mechanical Evaluations of		
HIPed Thermal Spray Cermet Coatings		
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HIPing POST-TREATMENT

- Two Different HIPing temperatures of 850°C and 1200°C were adapted at a pressure of 150 MPa.
- Cooling and heating rates were optimised to 4°C/minute.
- Holding time was 60 minutes.

• Uncapsulated HIPing conditions.















HERIOT UNIVERSITY	SLIDING	WEAR TESTS		
Normal load	Test conditions			
Ţ	Counter Body (balls)	440C Steel Si ₃ N ₄ ceramic		
	Load	12 and 22 N		
Ball	Sliding Speed	0.012m/s		
Coating	Dry/Lubricate	Dry		
Sliding direction				
Reciprocating ball on plate apparatus				















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CONCLUSIONS

- 1. Uncapsulated HIPing can be successfully applied to post-treat thermally sprayed coatings.
- 2. HIPing post-treatment can improve the sliding wear resistance of thermal spray cermet coatings.
- 3. Wear resistance improves with the increase in HIPing temperature.
- 4. Improvement in sliding wear resistance is thought to originate from the increase in coating's hardness, elastic modulus and fracture toughness.
- 5. HIPed coatings show WC recovery and formation of complex carbides.
- 6. Results indicate higher elastic modulus after HIPing due to higher bonding between lamellas.

WORK IN PROGRESS

- Influence of HIPing pressure, HIPing vs. Vacuum Heat Treatment.
- Influence of Coating Materials, especially WC-Co
- Coating Substrate Bonding Mechanism.
- > Measurement of Adhesive and Cohesive strength.
- > Optimisation of HIPing Parameters
- Influence on Fatigue and Impact performance