

Speaker 5



Soumyajit Koley

## Challenges in wire-arc additive manufacturing (WAAM) of Fe-Co-V alloy using metal powder-cored wire

**SPEAKER / LEAD AUTHOR:**  
Soumyajit Koley

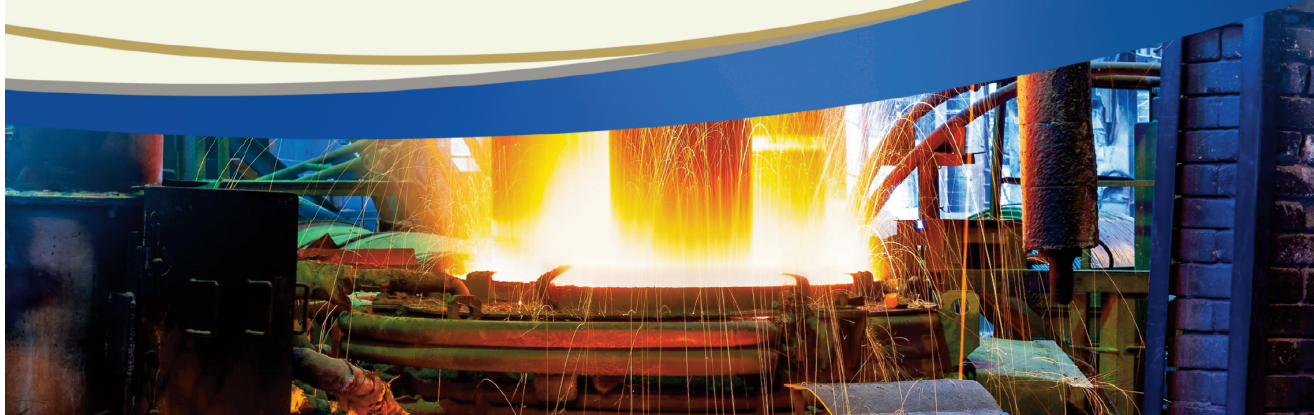
**INSTITUTION:**  
Cranfield University

**OTHER AUTHORS:**  
Kuladeep Rajamudili, Cranfield University  
Professor Supriyo Ganguly, Cranfield University

### ABSTRACT:

Fe-49Co-2V alloy is suitable for high power density electrical machines owing to its high magnetic permeability, saturation magnetisation and electrical resistivity. An attempt has been made to produce Fe-49Co-2V alloy using the wire-arc additive manufacturing (WAAM) route. A conventional plasma arc torch with cold wire feeding attachment was used in the process. A metal powder-cored wire with Co sheath and Fe and V powder filled inner core was used as feedstock.

Several challenges must be overcome to deposit the alloy. Firstly, controlling the oxygen content in the deposition atmosphere below 500 ppm was essential as V gets preferentially oxidized otherwise. Secondly, the orientation and geometry of the substrate plays a pivotal role in mitigating cold cracking of the deposit. A vertical plate type substrate with horizontal slots parallel to deposit was engineered to get crack free deposit. Thirdly, melting of V particle in plasma/arc column is still a challenge.



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