

SPARK HELPS FORM AN OPINION

What's the story?

Outokumpu Holton, formerly Holton Machinery, is a global leader in supplying continuous extrusion machinery used around the world for a vast variety of applications, from copper bus bars to micro multiport tube used in automotive heat exchangers. One of the processes that Outokumpu Technology offers is Conform™, a well-established process for the continuous extrusion of a range of non-ferrous materials.

The Conform™ process uses a rotating grooved wheel to feed rolled rod into a deformation zone where sufficient heat and pressure enable extrusion. The process also operates when using a feedstock of particulate materials, especially for the extrusion of materials that prove difficult if using traditional feedstock. With this in mind, an investigation was launched to discover whether particulate Titanium could be consolidated using the Conform™ process.

What went on?

A suitable particulate material for the investigation was identified and characterised by the Department of Materials, Imperial College London. Once material suitability had been established, attention was then turned to process set-up, which differs greatly depending on the materials being used. For the purpose of these trials, a set-up traditionally used for highly alloyed aluminium alloys was adopted.

In order to use the Conform™ process, the grooved extrusion wheel requires coating in a 'tyre' of whatever the material to be extruded is, in this case Titanium. Initial attempts to coat the wheel in pure Titanium failed. However, an Aluminium/Titanium 50:50 mix proved successful.

Lowering Aluminium amounts to the necessary levels made extrusion difficult and so Copper was substituted (Copper having a melting point and strength closer to Titanium).

Finally, the investigation suggested that modifications to the tooling were also required that would raise temperatures within the wheel groove to create the correct environment for successful extrusion.

What happened?

These initial feasibility investigations have, as anticipated, proven that the extrusion of titanium using

the Conform™ process is possible, a fact which has massive implications for the future of alloy manufacture.

The testing process has also significantly improved knowledge of tooling design and construction in relation to the specific materials used. Indeed, such is the project's success that Conform™ tooling is currently being redesigned according to the findings and further trials are planned using Titanium and other high strength materials.

A Case PhD is also to be carried out on the back of these initial investigations, in conjunction with Imperial College London.

This project can be heralded as a major success for the whole concept of SPARK grants, which are awarded to companies who have exciting ideas that will help improve their industrial performance, through the increased use of technology, people transfer or training.



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