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comes to aviation research.

Deakin University metallurgist Thomas Dorin and his team have developed a technology that they believe will allow the millions of tonnes of aluminium alloys used in aircraft to be re-used in the industry, with potential savings in the billions.

While recycling of aluminium cans is common, the cost-effective recycling of the aluminium alloys used in aircraft is difficult due to alloying elements and the need for low levels of impurities.

Dr Dorin said the team had a proof of concept that showed its technology, developed at Deakin's Institute for Frontier Materials at Warn Ponds in Victoria, would enable aluminium alloys used in aircraft to be recycled.

"Our technology could lead to the recycling of around 500,000 tonnes of aircraft aluminium annually," he said. "It could save the airline industry — and others — millions as well as achieving major energy savings and reducing the world's greenhouse gas emissions."

Some impurities, such as iron and silicon, were added each time aluminium was reprocessed and could form coarse particles that affected the metal's ability to withstand corrosion as well as its mechanical properties, he said.

Recycling aviation aluminium had previously been "quite difficult and really expensive" because of the need to separate elements in the alloy.

The new technique avoids this by using the same alloys for the same applications and applies to thin sheets of aluminium used in wings and other parts of the aircraft structure. The aluminium is melted and poured directly on to a copper roller to avoid iron impurities that can be picked up in the conventional process.

"Second, with the use of this copper you get really rapid solidification and, when you do that, even if you've got impurities, then they are a lot smaller because they dissolve into the aluminium matrix," Dr Dorin said, adding that this reduced the impact on the properties of the metal.

He said two grants had helped establish the project by finding the prototype and allowing samples to be cast. "Now we know that it works, and we have another grant which runs for 2015 so I've got more experiments to do and try new compositions."

He said was also talking to aviation manufacturers and aluminium producers about the concept, but acknowledged that more work was needed over the long term.

"From a proof of concept to a production facility you have years and years of development ... and also, for a domain that is as sensitive as aviation, there are a lot of regulations ... and no one wants to take any risk using alloys made by a new process," he said.