

Rocky road for faster trains

Embargoed until 8.30am, Wednesday 16 May 2012

Anyone who has travelled on trains in Europe or Japan rocketing along in silence and comfort wonders why Australian train continue to trundle at 1940s speeds.

It's not the train or even the lines, but the rocky foundations (or ballast) on which the rails are laid, and results in strict speed limits for trains.

The problem is these fist-sized rocks move when trains pass over them. It's a grinding motion which causes the ballast to spread out and disintegrate. This makes the lines unstable and in severe examples can lead to derailments.

In NSW alone, maintaining the ballast is a \$15 million annual cost.

Khaja Syed from the University of Wollongong says that about ten years ago engineers identified a solution. This was to place a plastic mesh ('geogrid') underneath the rocks to hold the ballast in place.

"Now we are refining and improving this process," he says. "My work is testing the best place to place the mesh, and the best size of the holes in the mesh."

Putting the right type of plastic mesh reinforcement within the rocks, and in the right place, can dramatically increase railway safety and reduce costs.

"Currently, the average speed of freight trains in Australia is about 80 kilometres per hour. Normal rail track can't cater for speeds approaching 200 kilometres per hour, which Australia needs for high-speed, heavy freight trains," says Mr Syed.

There are many types of geogrids available, and each state has different requirements for the ballast used in their railways. "We need to know what the best geogrid is for each location and each type of ballast," says Mr Syed.

Previous research only took one measure of how much the ballast sideways moved under load, but Mr Syed developed an innovative apparatus to measure sideways spread through all layers of the ballast.

His research is supervised by Professor Buddhima Indraratna, an internationally renowned expert in rail track technology.

"By upgrading to high-speed freight trains, we can improve the efficiency of transport for sectors such as agriculture and mining," says Prof. Indraratna. "That also makes transport more resilient and cheaper in the future."

"Everywhere else in the world people talk about speeds exceeding 300 kilometres per hour when they talk about high-speed rail, but our current maximum speeds are just over 150 kilometres per hour."

Prof. Indraratna's team, of which Mr Syed is a part, are some of the only researchers in Australia looking at high-speed rail tracks instead of just super-charged engines or locomotives.

"We need this research," he says. "It's like having the fastest Porsche without the road to run it on."

Mr Syed is researching for the Cooperative Research Centre for Rail Innovation (Rail CRC) through the University of Wollongong.

He is taking part in the Showcasing Early Career Researchers conference session at the Cooperative Research Centres Association (CRCA) conference, [Collaborate | Innovate | 2012](#). Mr Syed will present his research and be eligible to win a prize of \$1,500 from the CRC Association at the Awards Dinner.

He will speak at Plenary Session 3 on **Wednesday 16 May 8:30–10:30am** following addresses by Senator The Hon. Chris Evans, Minister for Tertiary Education, Skills, Science and Research and Simon McKeon, 2011 Australian of the Year.

Get more information about the conference online: www.crca.asn.au/conference/
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