CAROLINE GOMES DE OLIVEIRA

PhD student, Doctoral Training Centre for Advanced METS

Development of an erosion model for the materials handling industry

This project, supervised by Professor Kenneth Williams, will investigate the lifespan of various liner materials that are applied in transfer chutes inside mining machinery. These liners are designed to protect the chute's structure while particulate materials pass through. The metallic plates form a layer between the constant stream of ore and the transfer chute but get degraded in the process.

Caroline is undertaking research into how these liner materials behave, and from that information will propose a method of predicting how they will last under different conditions before no longer functioning the way they need to.

Previously, the method for predicting the lifespan of transfer chutes was based on experience and lacked an empirical equation that could account for particle shape, particle size or flux. The development of the model will significantly help the mining industry in planning around the replacement of the lining of the chutes, resulting in minimal disturbance to production.

The method will also minimise the material and economic loss that can arise from the machinery stopping midway through a shift, which can cause workers to have to stay longer than accounted for.

"Our work here focuses on optimising the process while ensuring it is accessible and feasible in most settings."

- Caroline Gomes De Oliveira

ENGAGEMENT

Caroline is partnered with Metso Outotec, who has built innovative equipment for this project to enable more accurate erosion tests with large particles that are greater than 20mm.

Regular visits to the Metso Outotec facilities, meetings with the company's engineers, and technical support from the company regarding analysis, experimental planning, samples, and technical knowledge are all part of Caroline's engagement with Metso Outotec.

The Doctoral Training Centre (DTC) for Advanced METS has been a very positive experience for Caroline during her studies. Through the DTC, Caroline has been able to attend workshops focusing on effective engagement with industry, attend and present at conferences broadening her experience and knowledge of bulk solids and the resource sector, and engage in additional activities such as site visits and events providing further context to where her research may be applied.

"Metso Outotec aims to provide sustainable, responsible and value-added wear solutions for our customers' assets. Caroline's erosive wear research will help us select the most appropriate lining materials for our customers' materials handling equipment."

- Luke Muras,
Global Product Manager
RTD & Solutions Engineering
Chute Solutions
Metso Outotec Australia

THE UNIVERSITY OF NEWCASTLE AUSTRALIA

DTC Doctoral Training Centres

DOCTORAL TRAINING CENTRE

ADVANCED METS

The DTC for Advanced METS (Mining Equipment, Technology and Services) is aimed at delivering innovative and transformational technologies and developing skilled innovators of the future. As NIER's first DTC, the Centre continues to support innovation, optimisation, efficiency, productivity and sustainability.

Through the collaborative involvement of industry partners including Bengalla Mining Company, Jord International, Metso Outotec, the DTC remains committed to creating new knowledge and driving better solutions to challenges and opportunities shaping the sector.

By harnessing existing capacity and research excellence established through NIER, the DTC will contribute to the development and production of new ideas, technologies and products that will support the METS sector into the future.

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