# Reliability Inference with Extended Sequential Order Statistics' & 'Conveyor Belt Wear Forecasting

Tim Pesch and Ryan Leadbetter present their research in the Data Analytics for Resources and Environments (DARE) seminar series.

***Reliability Inference with Extended Sequential Order Statistics*** **by Tim Pesch**

In this presentation I will address the complexity of non-identical components in multi-component, load sharing systems. For most technical systems the assumption of heterogeneous components is reasonable since components are either of different type or vary in their functions within the system. While most reliability related work resorts to the assumption of homogeneous components, I aim to address the often more realistic assumption of heterogeneous components extending the model of so called 'Extended Sequential Order Statistics' by two novel inferential methods.

Firstly, the derivation of Maximum Likelihood Estimates (MLE's) of the underpinning model parameters, and secondly, the introduction of a likelihood ratio test which can decide on whether components can be assumed identical. Both methods are powerful tools in reliability contexts. The former increases our understanding of component behaviour, especially upon failure of other components. This knowledge empowers system operators to make better decisions regarding maintenance schedules and failure time prediction. The latter supports operators in their quest of identifying component equivalence.

Seminar published on DARE YouTube channel

***Conveyor Belt Wear Forecasting through a Bayesian Hierarchical Modeling Framework using Functional Data Analysis and Gamma Processes*** **by Ryan Leadbetter**

Reliability engineers make critical decisions about when and how to maintain conveyor belts, decisions that can significantly impact the production of the mine. The engineers use thickness measurements across the belt's width to justify these decisions. However, the current approaches to forecast the wear of the conveyor belts are naive and throw away valuable information about the special wear characteristics of the conveyor. We have developed a new method for forecasting belt wear that retains the wear profile's spatial structure and considers the wear rate's heterogeneity - caused by operation and ore body composition variations.

Seminar published on DARE YouTube channel.

When - 21 February 2023 at 1pm AWST

Join Zoom Meeting