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Preheater Cyclones

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[Next >](#)

Abstract

Fault prognosis in industrial plants is a complex problem, and time is an important factor for the resolution of this problem. The main indicator for the task of fault prognosis is the estimate of remaining useful life (RUL), which essentially depends on the predicted time to failure. This paper introduces a temporal neuro-fuzzy system (TNFS) for performing the fault prognosis task and exactly estimating the RUL of preheater cyclones in a cement plant. The main component of the TNFS is a set of temporal fuzzy rules that have been chosen for their ability to explain the behavior of the entire system, the components' degradation, and the RUL estimation. The benefit of introducing time in the structure of fuzzy rules is that a local

[< back](#)

task. More precisely, the paper emphasizes improving the performance of TNFSs for prediction. The RUL estimation process is broken down into four generic processes: building a predictive model, selecting the most critical parameters, training the TNFS, and predicting RUL through the generated temporal fuzzy rules. Finally, the performance of the proposed TNFS is evaluated using a real preheater cement cyclone dataset. The results show that our TNFS produces better results than classical neuro-fuzzy systems and neural networks.

Keywords: [Neuro-fuzzy systems](#) ▪ [temporal neuro-fuzzy systems](#) ▪ [preheater cement cyclones](#) ▪ [prognostics and health management](#) ▪ [remaining useful life](#) ▪ [Weibull distribution](#) ▪ [reliability](#)

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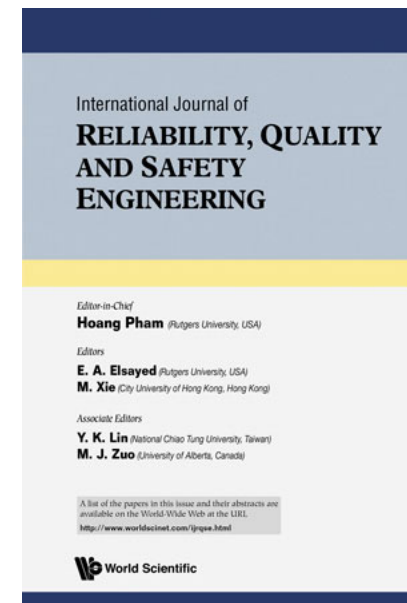
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