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An Analytic Hierarchy Process Model Approach to Selecting a Maintenance Strategy for a New Nuclear Power Plant

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ABSTRACT

Maintenance strategies are important for the reliability and safety of nuclear power plants. Cost competitiveness in the energy markets and closure of nuclear power plants highlighted the need to optimise maintenance strategies to reduce cost while preserving safety and reliability. This research proposes using the Analytic Hierarchy Process (AHP) decision model to determine the optimal maintenance strategy mix where nuclear safety, cost and reliability are considered as the primary criteria. Nuclear experts are used to conduct pairwise comparisons to select the preferred maintenance strategy for different Continents and WANO centres. The research concludes that nuclear experts prefer safety as the highest criteria and also prefer a maintenance strategy that have a split between the preventive maintenance (PM), predictive maintenance (PdM) and reliability centered maintenance (RCM) strategies, with PM as the highest ranked maintenance strategy followed by PdM and RCM. The study also concludes that the AHP model is an effective model to be used in the nuclear industry and is comparable with results from other industries.