A decision making model for maintenance strategy: A combined approach analytic hierarchy process (AHP) and fuzzy logic

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The poster aims to compare two tools for decision makers that intend to support decision for the selection of most appropriate maintenance strategy in oil and gas plants. The analytic hierarchy process (AHP) decision making model proposed based on case study that investigate implementation of an integrated condition based maintenance strategy for a plant in oil and gas industry. Moreover fuzzy set theory employed for reducing the vagueness associated with manager preferences elicited via pairwise comparisons. The oilfield developed by British Petroleum (BP) and was brought on stream in June 1990 with the production of 95000 barrels of stabilised crude oil. 670 tonnes of LPG and 16 million standard cubic feet of sales gas in which the associated gas is then fractionated, the methane and ethane are exported as sales gas directly into the grid, while the propane and butane are liquefied and transported by rail tanker. Since operations began, the traditional cost benefit analysis were considered to evaluate the appropriateness of condition based monitoring strategy for rotating equipments.

1. The original method for the selection of maintenance strategies for Italian oil refinery was given by (Bevilacqua and Braglia, 2000), but a crisp decision making method as the traditional AHP is not appropriate because many of the maintenance goals taken as criteria are non-monetary and difficult to be quantified.

2. Al-Nagari and Alyousef (2003), Sharma et al. (2005) assessed the most popular maintenance strategies using the fuzzy inference theory and fuzzy multiple criteria decision-making (MCDM) evaluation methodology. The application of the fuzzy theory for this problem is a good solution. However, only a few failure causes were considered as the criteria in their studies.

3. Mechefske and Wang (2003), proposed fuzzy methodology to evaluate and select the optimum maintenance strategy and condition monitoring technique which is based on qualitative verbal assessment inputs is more practical than the former, because many of the overall maintenance objectives of the organization are intangible. However, the method of Mechefske and Wang (2003) is very subjective to directly assess the importance of each maintenance goal and the capability of each strategy to achieve each maintenance goal.

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1. The proposed AHP decision making model for maintenance strategy:
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References


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