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# Promotion of maintenance and reliability of main feed pump in the ISOMAX unit of oil refinery

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**Scope:** It is estimated that pumps account for 7% of the total maintenance cost of a refinery, and pump failures which can cause accidents (fire, explosion), are responsible for 0.2 % of lost production. In order to prevent those accidents that result in unit shutdown, investigating pump failures and identifying the critical parts of the pump is a vital. The aim of the present study was to investigate failures of the main feed pump in the ISOMAX unit of an oil refinery by FMEA (Failure Modes & Effects Analysis) technique.

**METHOD:** After becoming familiar with the process of ISOMAX unit, the components of the main feed pump were listed from the technical drawings and the role of each component was identified through discussions with the members of maintenance group. The failure modes of each component were determined by studying the past 5 year's records and by obtaining the views of experienced responsible individuals. The failure rates, severity of all failures and their detection probability were determined as accurate as possible. From all published tables on the ranking of failure rates, severity and detection probability of failures, 3 new tables were designed. The FMEA work sheet was completed and the value of risk priority number (RPN) for all the identified failures were calculated.

**RESULTS:** Totally 45 modes of failures were identified for 27 items of pump, the calculated RPN of which were ranged from 16 to 192. Regarding the refinery's policy which was insisted on continuation of production without any shutdown, those failures whose consequences were pump trip, were considered as critical failures. They were belonged to 4 items with RPN values of 72, 80, 80, and 144. For preventing pump trip and resulting accidents, periodic detection of vibration was the main proposition. This can result in servicing the pump and replacing the item in time.

**Keywords:** Maintenance, Reliability, FMEA, ISOMAX unit, Feed pump, Oil refinery