Effects of On-Line Monitoring System on Total Productivity of Condition Monitoring Team in PDO

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Abstract

Productivity improvement is a major concern for management in oil and gas industries especially the ones who aim to be the best in the market. Petroleum Development Oman (PDO) is one of those companies and considered to be the biggest Exploration and Production Company in Oman that covers a wide area. Many departments in PDO started to look into the productivity issues. As an example, Condition Monitoring Team had some initiatives in improving their productivity due to increased workload. One such initiative was implementation of On-Line Monitoring System for few critical equipment which was expected to improve technician's and machine's productivity. This project investigates the implementation of on-line monitoring system in Petroleum Development Oman (PDO) and its effect on employee’s and machine’s productivity. The pilot project considered five compressors, which were used to compress gas in order to be used for gas injection. The new system was used to continuously monitor critical process data of 5 compressors and store them in common database which can be accessed by any PDO expert from any location in the company. The old off-line system uses same principles but the process data were collected manually by condition monitoring technicians and download it to an off-line system once every month. The study focused on the effects of the new system on employee and machine productivity by analyzing certain factors. Five main activities related to employee factors has been studied which are: (1) data collection time, (2) traveling time, (3) rout up and rout down time, (4) viewing and analysis time, and (5) work management time. Machine productivity was studied by monitoring (1) machine efficiency, (2) reliability, (3) availability and (4) utilization. The results showed that employee productivity has been improved after implementing On-Line Monitoring System by 97% for routine maintenance and 86% for diagnostic type of maintenance. Most of the improvement was from data collection activity which was 44% for routine maintenance and 39% for diagnostic maintenance. Other activities showed the following improvement for routine maintenance and diagnostic maintenance respectively: traveling activity 22% both, route up and rout down time 11% both, analysis activity 8% and 6%, work management activity 11% and 8%. Machine productivity analysis showed that efficiency could be improved up to 27% in case if it is lower than the design
efficiency and up to 7% for above design efficiency. The study concluded that there is no direct relation between On-Line Monitoring System and machines reliability, availability and utilization however its effect is indirect. An economic analysis has been carried out in this study considering most of the expected benefits. The results showed that potential savings of around 2 million US $ can be achieved. This expected saving is only for 5 machines-included in this study. The saving will definitely go up by considering some other critical machines. There are many other benefits expected from this system which are not covered in this study such as: (1) improving machines uptime, (2) reduced/minimize oil deferment as an outcome of increasing the machine uptime, (3) enhanced productivity with troubleshooting tasks and (4) increased safety for personnel and machines.