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CONCLUSIONS, LIMITATIONS OF THE STUDY AND SUGGESTIONS FOR FUTURE WORK

7.1 CONCLUSIONS

There have been attempts in this research work to deal with three primary aspects of developing a comprehensive methodology for the performance management of dump trucks. They are

- Defining a performance measure through modification of OEE and translating it for computing OEPI of the mining dump trucks using field data.
- Developing a structured and comprehensive methodology for benchmarking of performance.
- Application of defined performance measure and benchmark values to analyze the performance of dump truck system and suggest suitable countermeasures for improvement.

Based on the discussion presented in this thesis, both case study specific as well as general conclusions have been drawn from this research. The following conclusions have been drawn about the case study system

1) By and large, Group-B dump trucks perform 8.28 % – 14.32% more than Group-A dump trucks which is a useful information in decision making for future procurement.

2) Analysis of case study shows that the performance of a dump truck decreases with its age. Availability of Group-A dump trucks has reduced between 4.07% - 14.68% within the time period 2015-16 and it has further reduced to the tune of 4.67% - 11.55% in the period 2016 – 17 when these values are between 5.34% - 11.59% and 1.77% - 8.33 respectively for Group-B dump truck. Rate of decrease of availability for Group-B dump trucks is comparatively slower than Group-A.
3) It was found that, availability of dump trucks of Mine-I is 7.67% - 20.31% more but utilization is 24.85 % - 32.84% less than dump trucks of Mine-II on average. This reflects the difference of work culture of these organizations.
4) The benchmarked value 0.84, 0.80 and 0.50 of A, U and OEPI respectively can be taken as the target performance level of the case study system and comparing with the current performance level identify the loophole and lacunas in the system and help to develop effective corrective measures.

This analysis also helps to conclude a number of facts in general. Important findings are listed below

1) OEE concept can be modified as OEPI for measuring performance of dump truck through redefinition of time, capacity and environment losses on performances.
2) The current value of OEPI and its components echoes the dump truck's performance status. Round the clock monitoring the status of OEPI and its comparison with the benchmarked value helps to identify the problem areas that need immediate attention for maintaining the target performance level. Poor availability indicates issues with the dump truck and its maintenance while low utilization reflects management issues.

7.2 LIMITATIONS OF THE STUDY AND SUGGESTIONS FOR FUTURE RESEARCH WORK

This research assumes equal weight for each component of OEPI which may not be a realistic representation. The opinion-based data collection is time consuming and the result of capacity performance suffers from inaccuracy and biasedness.

During the progress of this study, some thought-provoking research areas have been identified. However, it was not possible to pursue all of these in this thesis. Some of these potential opportunities for conducting further research are presented below as suggestions for further investigation.

1. Analysing the performance of similar heavy earth moving equipment using the OEPI concept and studying the variation of performance of dump truck with its size, age, etc.
2. Inclusion of greenhouse gas (GHG) and fugitive dust emission with environmental factor as well as the socio-economic factor in the performance measurement.
3. Standardizing performance level of dump truck for the industry which involves identifying organizations that operates in the similar environment and work process to look at what are their past and present OEPI level. These organizations should agree to mutually and collaboratively exchange information, for benchmarking the performance of dump truck.