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A Robust Regression Approach for Excess/Shortage Spare Parts Cost Estimation

Sunday A. Oke [a,Ψ], , Desmond E. Ighravwe[b], and Gholahan Shyllon [c]

Department of Mechanical Engineering, University of Lagos, Lagos, Nigeria
[a,c] E-mail: sa_oke@yahoo.com
[b]E-mail: ighravwedesmond@gmail.com

[Ψ] - Corresponding Author

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Abstract: *Spare parts management has been an area of increasing interest to service engineers in the current decade due to its potentials of improving business performance in terms of profit improvement, downtime minimisation and improved service deliveries through direct and indirect means. The present investigation deals with the development of a predictive model for estimating the amounts of spare parts holding and the cost effects of poor spare parts holding in a system. The model effectively uses an integrated methodology of the penalty cost and the wear technique for the unconstrained optimisation of the excessive spares using big-bang big-crunch (BB-BC) algorithm and the data of a petroleum products off-loading service company from shipping vessels. The model is validated by comparing the results obtained using the in-sample analysis with an out-sample approach. The results obtained show that the proposed spare parts monitoring model has the potential of predicting with high accuracy when used for in-sample and out-sample predictions. The developed excess spare parts model predicts that spare parts exhibit non-linearity under interest and inflation considerations. It shows that it is infeasible to track spares under changes in monetary polices of a country and in evaluating the cost of excess/shortage of stockings of multi-items in spare parts inventories.*

Keywords: *Wear rate, maximum wear, robust regression, big-bang big-crunch, spare parts*