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Artificial Neural Network Approach for Maintenance Strategy of Machinery in Small and Medium Industries

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ABSTRACT

Maintenance is an essential function in the Small and Medium Industries (SMIs) as an attempt to operate machinery thus ensuring the continuity of production and create a satisfactory state of operations in accordance with the plan. By implementing the model of Decision Making Grid (DMG) as a Decision Support System (DSS), the best decision of maintenance strategy for SMIs machinery can be obtained based on the criteria of downtime and frequency of machine failure. However, maintenance strategy decisions derived from the DSS are usually still being directly implemented into the SMIs. The problems in poor maintenance continuity have resulted when the maintenance strategies are just being implemented. Occasionally, those problems also can even give greater losses when the implementation process of maintenance strategy takes a long time, so it can hamper the sustainability of the production process. To overcome the problem, the present study analyzes the Artificial Neural Network (ANN) approach to obtain DMG decisions that can be used in the long term or can be predicted for the future process. The data of machinery are gathered from one of SMI called PT. Semen Bosowa Maros in Indonesia. The model of ANN feed forward-back propagation is formed in approximately 100 pieces with different parameters such as the dimensions of the hidden layer, learning rate and maximum epoch. The best model is obtained by the accuracy equal to 99.98% when performed validation using the training data and 99.05% when using the testing data. The ANN approach is expected to improve the process of implementing maintenance strategies in SMIs to become more efficient and well-planned.

⁴**Keyword:** Small and Medium Industries (SMIs), Decision Making Grid (DMG),
¹Decision Support System (DSS), Artificial Neural Network (ANN).

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