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ESTIMATING DOWN TIME OF GLOVE DIPPING MACHINES OPERATION USING EXPONENTIAL AND WEIBULL DISTRIBUTIONS

(*Menganggar Masa Kegagalan Operasi Mesin Sarung Tangan Menggunakan Taburan Eksponen dan Weibull*)

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ABSTRACT

Reliability of any particular component or system is very important as it involves the whole stage of the product life-cycle. It is necessary for a factory to ensure that down time is managed proactively to ensure efficient product manufacturing process. It is common for many manufacturing plants to conduct preventive and corrective maintenance because long machine repair time will cause loss of productivity and revenue. In order to minimize repair time, both inventory and workforce preparation are crucial. This paper uses statistical methods to determine proper time slots to conduct preventive maintenance of a machine. The proposed method determines Mean Time to Failure (MTTF) via Exponential and Weibull distributions using time to failure data of two sets of similar machines from glove manufacturing production line. Results revealed that Weibull distribution offered better MTTF prediction performance compared to Exponential distribution. By pairwise comparison, these two methods do not present significant difference, and hence, both methods could serve as the benchmark in designing potential preventive maintenance strategy.

Keywords: exponential; MTTF; reliability; Weibull

ABSTRAK

Kebolehpercayaan komponen atau sistem tertentu adalah amat penting kerana ia melibatkan keseluruhan kitaran hayat produk. Pihak kilang perlu memastikan masa henti diurus secara proaktif untuk memastikan proses pengeluaran yang efisyen. Kebanyakan kilang tidak asing daripada menjalankan proses penyelenggaraan pencegahan dan pemulihan kerana tempoh membaiki mesin yang masa bakal menjejaskan produktiviti dan pendapatan syarikat. Persediaan inventori dan tenaga kerja adalah penting untuk meminimumkan masa pembaikan. Artikel ini menggunakan kaedah statistik untuk menentukan slot masa yang sesuai untuk melaksanakan menyelenggaraan mesin. Kaedah dicadangkan mengira Min Masa Kegagalan (MTTF) menggunakan taburan Eksponen dan Weibull mengguna pakai data masa kegagalan dua set mesin serupa daripada sebuah syarikat pembuat sarung tangan. Dapatan menunjukkan taburan Weibull memberikan ramalan MTTF yang lebih baik berbanding taburan Eksponen. Secara perbandingan berpasangan, kedua-dua kaedah ini tidak menunjukkan perbezaan ketara, dan kedua-dua kaedah boleh menjadi petanda aras dalam mereka bentuk strategi penyelenggaraan.

Kata kunci: eksponen; MTTF; kebolehpercayaan; Weibull

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