

ABSTRAK

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Judul Laporan Skripsi : Analisis Hasil Pengujian Karet Pada Mesin *DMA Analyzer* Dengan Metode *Design of Experiment* di Laboratorium Uji Karet
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Penelitian ini dilakukan di Laboratorium Uji Karet pada perusahaan manufaktur produsen ban menggunakan mesin *Dynamic Mechanical Analyzer* (DMA). Laboratorium Uji Karet memiliki ruang lingkup berupa pengujian bahan baku, produk setengah jadi, dan produk jadi. *DMA Analyzer* adalah mesin yang mengukur karakteristik material saat terdeformasi di bawah tekanan periodik. Terdapat fenomena variasi hasil pengujian yang melebihi batas koefisien variasi (%CV) yang dapat diterima, yaitu 2,5%. Untuk mengevaluasi hasil pengujian tersebut, dilakukan analisis terkait variabel yang mempengaruhi variasi data serta parameter yang dapat mengoptimalkan hasil pengujian mesin *DMA Analyzer*. Penelitian ini menggunakan pendekatan *Design of Experiment* (DOE) yang dikombinasikan dengan *Measurement System Analysis* (MSA). Sampel uji berupa 32 sampel karet matang. Pengumpulan data dilakukan berdasarkan rancangan DOE dan analisis data statistik menggunakan *software* Minitab. Dari eksperimen yang dilakukan, ditemukan bahwa variabel yang mempengaruhi hasil pengujian adalah: Tebal sampel: 2 mm, Lebar sampel: 6 mm, Suhu ruangan pengujian: 23°C, Kelembapan ruangan pengujian: 50%, dan Gaya kontak pada mesin *DMA Analyzer*: 1 N. MSA dilakukan untuk mengetahui pengaruh *operator* terhadap hasil pengujian mesin *DMA Analyzer*. Hasil menunjukkan nilai *P-Value* pada masing-masing respons lebih besar dari *alpha* 0,05, yang berarti variasi tidak signifikan dipengaruhi oleh *operator*. Kontribusi variasi untuk masing-masing respons lebih banyak dipengaruhi oleh *repeatability* dengan nilai: Respons 1: 74,53%, Respons 2: 77,27%, dan Respons 3: 89,01%.

Kata Kunci: Laboratorium, *DMA Analyzer*, *Design of Experiment*, *Measurement System Analysis*

ABSTRACT

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Title Internship Report : *Analysis of Rubber Testing Results Using DMA Analyzer with Design of Experiment Method in Rubber Testing Laboratory*
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This research was conducted in the Rubber Test Laboratory at a tire manufacturer manufacturing company using a Dynamic Mechanical Analyzer (DMA) machine. The Rubber Test Laboratory has a scope in the form of testing raw materials, semi-finished products, and finished products. DMA Analyzer is a machine that measures the characteristics of a material as it deforms under periodic pressure. There is a phenomenon of variation in test results that exceeds the acceptable limit of the coefficient of variation (%CV), which is 2.5%. To evaluate the test results, an analysis is carried out related to variables that affect data variations and parameters that can optimize the test results of the DMA Analyzer machine. This research uses a Design of Experiment (DOE) approach combined with Measurement System Analysis (MSA). The test samples were 32 samples of mature rubber. Data collection was carried out based on DOE design and statistical data analysis using Minitab software. From the experiments conducted, it was found that the variables that affect the test results are: Sample thickness: 2 mm, Sample width: 6 mm, Test room temperature: 23°C, Test room humidity: 50%, and Contact force on the DMA Analyzer machine: 1 N. MSA is carried out to determine the influence of the operator on the test results of the DMA Analyzer machine. Results show the P-Value value in each response is greater than alpha 0.05, meaning the variation is not significantly influenced by the operator. The contribution of variation to each response is more influenced by repeatability with values: Response 1: 74.53%, Response 2: 77.27%, and Response 3: 89.01%.

Keywords: *Laboratory, DMA Analyzer, Design of Experiment, Measurement System Analysis*