

ABSTRAK

Total Sulphur Analyzer (TS Analyzer) adalah salah satu mesin di laboratorium untuk menguji kandungan sulfur total yang terkandung dalam sampel batubara yang secara teknis, spesifikasi dan penggunaannya diatur dalam standar internasional. Selama tahun 2020, *downtime* alat-alat tersebut sangat tinggi sehingga menyebabkan efektivitas peralatan laboratorium menurun. Efektivitas yang rendah akan berdampak pada kerugian perusahaan. Efektivitas peralatan dan mesin ini sangat penting untuk dijaga agar perusahaan berhasil dalam proses bisnisnya. Penelitian ini bertujuan untuk mengukur efektivitas kinerja operasional mesin TS Analyzer di laboratorium secara keseluruhan, menganalisis faktor penyebab dan melakukan perbaikan. Penelitian ini menggunakan metode integrasi *Failure Mode and Effect Analysis (FMEA)* dan *Overall Equipment Effectiveness (OEE)*. Berdasarkan analisis penyebab masalah, rendahnya nilai OEE disebabkan oleh tingginya *breakdown loss*. Prioritas perbaikan dilakukan berdasarkan metode FMEA pada nilai RPN tertinggi, yaitu *Inner tube* dan *outer tube* cepat rusak dengan nilai RPN tertinggi sebesar 343, dilakukan perbaikan terhadap penyebab perubahan suhu terlalu cepat, spesifikasi gas O₂ tidak sesuai, dan cara *shutdown* alat belum sesuai. *Silicon carbon tube* yang cepat rusak dengan nilai RPN tertinggi 336 dilakukan perbaikan terhadap penyebab *overheating*, arus listrik tidak stabil, dan *skill* operator kurang memadai. Hasil penelitian menunjukkan bahwa setelah dilakukan perbaikan nilai *OEE* dari mesin *TS Analyzer* mengalami peningkatan dari 83.91 % menjadi 95.18% yang di tetapkan sebagai *baseline* KPI perusahaan

Kata Kunci: *coal laboratory, downtime, FMEA, OEE, six big losses, total sulfur analyzer*

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ABSTRACT

Total Sulphur Analyzer (TS Analyzer) is one of the machines in the laboratory to test the total sulfur content contained in coal samples that are technically, specifications and uses set in international standards. During 2020, downtime of such tools is so high that it causes the effectiveness of laboratory equipment to decrease. Low effectiveness will have an impact on the company's losses. The effectiveness of these equipment and machines is very important to maintain in order for the company to succeed in its business processes. The study aims to measure the effectiveness of the operational performance of TS Analyzer machines in the laboratory as a whole, analyze causal factors and make improvements. The study used the integration methods Failure Mode and Effect Analysis (FMEA) and Overall Equipment Effectiveness (OEE). Based on the analysis of the cause of the problem, the low OEE value is caused by the high breakdown loss. Priority repairs are carried out based on the FMEA method at the highest RPN value, namely Inner tube and outer tube quickly damaged with the highest RPN value of 343, repairs to the cause of temperature changes are too fast, O₂ gas specifications are not appropriate, and the way the tool shutdown is not appropriate. Silicon carbon tube that quickly damaged with the highest RPN value of 336 was made improvements to the cause of overheating, unstable electric current, and inadequate operator skills. The results showed that after improvement of the OEE value of the TS Analyzer machine increased from 83.91% to 95.18% which was set as the company's baseline KPI

Keywords: *coal laboratory, downtime, FMEA, OEE, six big losses, Total sulphur analyzer*

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