

ABSTRAK

Rampcheck sarana perkeretaapian merupakan inspeksi teknis untuk memastikan kelaikan lokomotif sebelum beroperasi. Saat ini proses rampcheck masih menggunakan *checksheet* manual berbasis kertas yang memiliki kelemahan seperti ketidakmampuan menentukan hasil kelaikan secara langsung, ketergantungan pada penilaian inspektur, serta sulitnya pencarian arsip data historis. Penelitian ini bertujuan merancang sistem pendukung keputusan berbasis aturan (*rule-based system*) untuk mengevaluasi parameter teknis rampcheck lokomotif secara objektif, cepat, dan konsisten.

Penelitian menggunakan metode R&D dengan pendekatan *mixed-method*. Data diperoleh melalui observasi, wawancara, dan studi regulasi (PM 14/2011, PM 153/2016, PM 24/2015, dan PD 16A). Analisis parameter teknis dipadukan dengan prinsip keilmuan Teknik Mesin (Hukum Pascal, Hukum Archard, dan Viskositas Vogel). Sistem dibangun dengan platform Google Antigravity berbasis PWA.

Hasil penelitian menunjukkan basis aturan berhasil dirumuskan untuk 30 item pemeriksaan. Pengujian sistem terhadap 10 data historis menghasilkan akurasi 100%, konsistensi 100%, dan efisiensi waktu 96,6% (dari 41,6 detik menjadi 1,4 detik). Sistem pendukung keputusan yang dirancang mampu meningkatkan objektivitas, kecepatan, dan konsistensi proses rampcheck lokomotif serta mendukung digitalisasi data yang terstruktur.

Kata Kunci: Rampcheck, Lokomotif, Sistem Pendukung Keputusan, *Rule-Based System*, Kelaikan Sarana Perkeretaapian.

ABSTRACT

Rampcheck of railway rollingstock is a technical inspection to ensure locomotive feasibility before operation. Currently, the rampcheck process still uses paper-based manual checksheets which have limitations such as inability to directly determine feasibility results, dependency on inspector judgment, and difficulty in retrieving historical data archives. This research aims to design a rule-based decision support system to evaluate locomotive rampcheck technical parameters objectively, quickly, and consistently.

The research employs R&D method with mixed-method approach. Data were obtained through observation, interviews, and regulation studies (PM 14/2011, PM 153/2016, PM 24/2015, and PD 16A). Technical parameter analysis was integrated with mechanical engineering principles (Pascal's Law, Archard's Law, and Vogel's Viscosity Equation). The system was developed using Google Antigravity platform with PWA architecture.

The results show that the rule base was successfully formulated for 30 inspection items. System testing on 10 historical data samples yielded 100% accuracy, 100% consistency, and 96.6% time efficiency (from 41.6 seconds to 1.4 seconds). The designed decision support system can improve objectivity, speed, and consistency of locomotive rampcheck process while supporting structured data digitalization.

Keywords: Rampcheck, Locomotive, Decision Support System, Rule-Based System, Railway Facility Feasibility.