

Evaluasi Kinerja Sistem Mobile Digital Video Recorder (MDVR) dalam Meningkatkan Keselamatan Berkendara di Tambang Batu Bara PT X Sumatera Selatan melalui Metode Human Factor Analysis and Classification System (HFACS)

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Abstrak

PT X telah menerapkan teknologi Mobile Digital Video Recorder (MDVR) untuk memantau aktivitas pada kabin pengemudi secara real-time. Namun, penerapan MDVR di PT X masih belum optimal karena masih ditemukan banyak kendala. Penelitian ini bertujuan untuk menganalisis dan mengevaluasi sejauh mana faktor manusia, sistem, teknologi, maupun lingkungan menjadi penghambat penerapan teknologi sistem MDVR menggunakan metode Human Factors Analysis and Classification System (HFACS) sehingga dapat merekomendasikan langkah evaluasi yang berkaitan sistem MDVR. Penelitian ini menggunakan desain studi kasus dengan pendekatan kualitatif deskriptif evaluatif. Pengumpulan data primer dilakukan melalui wawancara terstruktur kepada pihak manajemen, pengawas, dan operator kendaraan. Data sekunder didukung oleh rekapitulasi 134 data kecelakaan tahun 2025, analisis log alarm MDVR triwulan 4 tahun 2025, serta peninjauan dokumen draf regulasi internal perusahaan. Analisis dengan metode HFACS menunjukkan bahwa faktor laten pada tingkat Prakondisi Tindakan Tidak Aman (Preconditions for Unsafe Acts) menjadi kontributor penyebab insiden paling dominan (48%). Sistem MDVR sebagai barrier pencegahan kecelakaan belum berfungsi secara optimal akibat kendala teknis akurasi sensor (false alarm) yang tinggi serta lemahnya interaksi faktor manusia terhadap adanya perubahan teknologi yang diterapkan sehingga PT X disarankan untuk melakukan kalibrasi ulang threshold alarm, mengintegrasikan teknologi wearable sebagai validasi objektif kesiapan kerja, meningkatkan pemeliharaan fisik kabin kendaraan, serta menyusun Tata Cara Kerja MDVR yang terstandardisasi dan melibatkan pendekatan partisipatif dari seluruh mitra kerja.

PT X has implemented Mobile Digital Video Recorder (MDVR) technology to monitor activities in the driver's cabin in real time. However, the implementation of MDVR at PT X remains suboptimal due to several challenges. This study aims to analyze the effectiveness of using MDVR as a system designed to prevent accidents involving heavy equipment at a coal mining company in South Sumatra during the implementation of the MDVR system using the Human Factors Analysis and Classification System (HFACS) method, so that recommendations can be made for evaluating the MDVR system. This study employs a case study design with a descriptive-evaluative qualitative approach. Primary data collection was conducted through structured interviews with management, supervisors, and vehicle operators. Secondary data was supported by a compilation of 134 accident records from 2025, an analysis of MDVR alarm logs from the fourth quarter of 2025, and a review of draft internal company regulations. Analysis indicates that latent factors at the "Preconditions for Unsafe Acts" level were the most dominant contributors to the incidents (48%). The MDVR system, as an accident prevention barrier, has not functioned optimally due to technical constraints such as high sensor accuracy issues (false alarms) and weak human adaptation to implemented technological changes; therefore, PT X is advised to recalibrate alarm thresholds, integrate wearable technology as an objective validation of work readiness, improve

physical maintenance of vehicle cabins, and develop standardized MDVR operating procedures that incorporate a participatory approach involving all stakeholders.</div>