

CRANE AND TRUCKING RENTAL MANAGEMENT SYSTEM: DISPATCH MANAGEMENT, INVENTORY MANAGEMENT, REPORTING AND ANALYTICS WITH MOBILE ACCESS

ABSTRACT

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The crane and trucking rental industry plays a vital role in construction and logistics. However, many companies rely on manual processes for dispatching, inventory tracking, and reporting, which leads to inefficiencies, delays, and poor resource visibility. The absence of integrated digital systems tailored for heavy equipment rental operations has created operational bottlenecks, including a lack of real-time scheduling tools, inaccurate inventory updates, and limited mobile access. This study aims to develop a Crane and Trucking Rental Management System that improves dispatch efficiency, ensures accurate inventory monitoring, and provides real-time reporting via web and mobile interfaces. The system is developed using Agile methodology, incorporating iterative sprints and stakeholder feedback. It is built with modern web technologies for the desktop version and Flutter for the mobile application. Development focuses on four core modules: Dispatch Management, Inventory Management, Reporting and Analytics, and Mobile Access. Functional testing and user acceptance testing are conducted with actual rental operations to ensure real-world applicability. Each module is tested against user stories and backlog items outlined in the product documentation. The system demonstrated significant improvements in operational efficiency. Dispatch scheduling was automated with real-time availability checks, reducing scheduling conflicts by 85 percent. Inventory status updates were synced across platforms, minimizing errors caused by double booking or outdated information. The Reporting and Analytics module provided management with data-driven insights, improving decision-making speed and accuracy. Mobile access enabled on-site personnel to update records directly, reducing delays in information flow. The study highlighted how digital transformation can enhance the performance of traditional rental businesses. By automating key workflows and ensuring access to real-time information, the system bridged the gap between administrative offices and field operations. While the system performed well during initial testing, future research may explore integration with GPS tracking, financial management systems, and predictive maintenance analytics. Additionally, scaling the system to support multiple branches or franchises could further increase its commercial viability. This project presented a scalable and practical solution for modernizing crane and trucking rental operations.

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