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건설기계 동반성장을 위한 안전기반 구축



부하 거동에 따른 모바일 리프트 구조물의 안전성에 관한 연구

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A Study on the Safety of Mobile Lift Structure according to Load Behavior

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Key Words : Mobile Lift(모바일 리프트), Safety(안전성), Structural Analysis(구조 해석), Load Behavior(부하 거동)

ABSTRACT

Recently, the field-oriented and labor-intensive construction industry is transformed into off-site industrial production due to the emergence of a new modular construction method. The modular construction method has the effect of reducing construction schedule and labor costs, preventing field accidents and improving construction quality. Semiconductor and battery factories are being constructed using modular construction methods, but it is difficult to lift an elongated module with disproportionate weight because the ceiling crane is not installed. Reflecting the construction site conditions, mobile lift device that can generate large thrust with a compact drive system is being developed.

In this study, the structural safety of mobile lift device according to dynamic behavior is reviewed. The analysis conditions are set by reflecting the weight size, location of the load and lifting position, etc. The deformation and stress state of lift structures are confirmed by finite element analysis techniques in the various operating conditions.

후기

이 논문은 2022년도 정부(산업통상자원부)의 재원으로 한국산업기술평가관리원의 지원을 받아 수행된 연구임 (No.20018662, 무산·다중초정밀 동기제어가 가능한 최대 작업중량 5톤급 스마트 모바일 리프트 개발)

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홀로그램 HUD Proving Ground 트랙 실증시험 시나리오 개발

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Development of Field Test Scenario Using PG Track for Holographic HUD

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Key Words : Holographic HUD(홀로그래픽 HUD), Commercial Vehicle(상용차), Field test Scenario(실증 시나리오), Proving Ground(실차 시험장)

ABSTRACT

Head-up display(HUD) for vehicles is a device that improves safety by reducing the gaze dispersion of existing head-down displays (HDDs), and a number of commercial products are being released. In addition, it is progressing with technology that reproduces multiple information services such as driving information, risk information as holographic content while providing a wider viewing angle.

Accordingly, the research is underway to create an optimal evaluation environment and develop a test method in order to secure the reliability and safety of the holographic HUD applied to commercial vehicle to provide commercialization verification services for developed products. In this study, the validity of field test scenario for visualized information in holographic HUD is verified by identifying the limitations of track record information and the level of data instrumentation through experiments implemented in the road environment as a basic research stage. Field test scenario consists of three categories: evaluation of reproduction after target identification, evaluation of driving information display, and visibility evaluation. Items, methods and results of measurement to support its effectiveness are presented.

In the future, securing track records applying field test scenario for holographic HUD prototypes applied to commercial vehicles and the development of test methods for evaluation items such as safety, environment resistance, durability, and mounting properties will be carried out.

후기

이 논문은 2022년도 정부(과학기술정보통신부)의 재원으로 정보통신기획평가원의 지원을 받아 수행된 연구임 (No. 2022-0-00946, 상용차용 대화면 다기능 홀로그래픽 HUD 서비스 실증)

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모터그레이더 운용 안전성 검토를 위한 블레이드 작업하중 분석

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Blade Working Load Analysis for Motor Grader Operation Safety

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Key Words : Motor grader(모터그레이더), Simulation analysis(시뮬레이션 분석), Engine stall(엔진 스톱), Working load(작업 부하), Construction machinery for road pavement(도로 포장 건설기계)

ABSTRACT

The motor grader used in civil works is mainly used for flattening the road surface using blades when paving the road. In particular, the load on the blade is different depending on the amount of soil and soil condition, when an overload greater than the load that the motor grader can work is applied the stall phenomenon in which the engine stops suddenly occurs frequently. This phenomenon can cause structural damage to the construction machine or damage to key components such as hydraulic components, which can lead to a fatal defect in safety. In order to prevent this, a method that allows the operator of the motor grader to check the load generated on the blade during operation is required. This study tries to analyze the load generated on the blade during the flattening of the motor grader through simulation. A study was conducted to check the reaction force that occurs when pushing with the blade according to the amount of soil and to prevent the stall phenomenon by comparing it with the load on the cylinder and the output of the motor grader. In the future, the unmanned motor grader will perform the position control of the blade by itself so that it can work with an appropriate amount of soil and use it as basic data to secure safety.

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건설기계 제작결함조사 효과분석 연구를 통한 제도개선 방안 도출

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A study on the Improvement of the System Through the Analysis of the Effectiveness of the Construction Machinery Defect Investigation

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Key Words : Construction Machinery(건설기계), Defect(결함), Recall(시정조치), Approval(승인)

ABSTRACT

건설기계 제작결함조사 제도는 건설기계관리법 제20조의2에 따라 2013년부터 건설기계 27종을 대상으로 안전기준에 부적합하거나, 안전운행 또는 작업의 안전에 지장을 주는 등의 결함이 있는 경우, 건설기계의 제작조립·수입자가 결함사실을 소유자에게 통보하고 수리교환 등의 시정조치를 취하는 것을 말한다. 제도시행 이후, 제작결함으로 91건의 62,276대를 리콜하고 있으며, 39,781대(약 62.9%) 조치완료 하였다. 본 연구에서는 제작결함조사 제도의 기본개념, 추진체계, 추진방법 및 제도시행 이후부터 현재까지의 현황을 파악하여 비용-편익 분석을 수행하였다. 2015년부터 2024년의 비용편익(B/C) 분석결과, 리콜제도의 시행으로 인한 도로교통사고 및 건설업 산업지해 감소편익은 1,751.64억원, 제조사 및 교통안전공단 소요 비용은 956.26억원으로 추산되어, 건설기계 제작결함조사 제도는 소용비용 대비 1.83배의 사회경제적 편익이 발생하는 것으로 추정된다. 또한 기술개발 트렌드변화에 따른 제도적 개선 방안을 도출하기 위해 정책적 동향조사 및 이슈분석을 수행하고 향후, 제작결함조사 제도 개선방안을 도출하였다.

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건설기계 부품인증 시험에 관한 고찰

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A Study on the Part Certification Test of Construction Machinery

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Key Words : Construction machinery (건설기계), Parts certification (부품인증)

ABSTRACT

The purpose of this study is to introduce the test method stipulated in the 'Regulations on Construction Machine Parts Certification' among the construction machine parts certification systems and the method of proving the safety of items subject to part certification through test performance.

In addition, the improvement points of the test method and the needs for R&D were considered through tests on the parts certification target.

Although it is important to derive and promote a method of increasing participation in the component certification system, it can be seen from this study that continuous research and development of a test method to strengthen component safety is also necessary.

It is hoped that this study will be helpful to improve the safety of construction machines at domestic construction sites.

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