DRISI
Caltrans Division of Research,
Innovation and System Information

Research Notes

Maintenance

Evaluation of Heavy Equipment Simulator Systems

This research will evaluate heavy equipment simulators to determine if they can help with training and certifying Caltrans heavy equipment operators.

AUGUST 2021

Project Title:
Equipment Simulators

Task Number: 3833

Start Date: April 1, 2021

Completion Date: September 30, 2022

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WHAT IS THE NEED?

California Department of Transportation (Caltrans) needs to provide the best available training to its Maintenance personnel, particularly those operating heavy equipment. Equipment availability for training is often limited, especially in remote areas of the Districts. In addition, in the early stages of training, it may be inappropriate for trainees to operate actual heavy equipment. Caltrans would benefit from state-of-the-art heavy equipment simulators to support training efforts at the Maintenance Equipment Training Academy (META) and in the Districts.

WHAT ARE WE DOING?

This research would procure up to two heavy equipment simulators and evaluate the applicability and benefits of these simulators for Caltrans' training use. This will be accomplished by partnering Caltrans trainers at the META to develop a prototype training plan for the equipment operators. The challenges and successes of the effort will be documented by monitoring the training progress and obtaining feedback from trainer and operator surveys. The results will be compiled in a report to help Caltrans' business operations regarding how best to implement simulators for training purposes.

WHAT IS OUR GOAL?

The goal is to revamp Caltrans' training efforts and thereby improve staff skills at operating heavy equipment by obtaining one or two heavy equipment simulators. This equipment will be evaluated to determine the value and efficiency they bring to Caltrans' training efforts. The end products are a final report summarizing the effort that will be used in decision making and one or two equipment simulators that Caltrans can keep if desired.

WHAT IS THE BENEFIT?

It's anticipated that this research will lead to safer and more effective training, leading to safer maintenance operations. This research will also confirm whether heavy equipment simulators bring value and efficiency to the operator training programs. This will lead to reduced training costs and better/faster/safer outcomes in Maintenance operations as more staff are better trained to do their jobs correctly.

WHAT IS THE PROGRESS TO DATE?

The project started with the Kick-off meeting on May 5, 2021.

The work to date began with the review of simulators for heavy equipment suitable for operator training for procurement to satisfy the requirements of the Caltrans customer.

Literature research was started on the subject of virtual reality (VR) simulation training systems for a large variety of applications, as well as learning effectiveness of VR training.

Next steps will include discussion with the META trainers on real equipment. A survey of maintenance staff will be conducted to help develop the training and evaluation plans for Caltrans staff.

IMAGE

Image: Actual machine controls.
Floor plate features fully functional machine pedals.