



Caltrans Division of Research,
Innovation and System Information

Research



Results



Maintenance

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Project Title:
Worker Visibility

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Worker Visibility

This research project was to evaluate whether the new high visibility personal protective equipment (PPE) recently adopted for Caltrans workers is as effective as the previous Caltrans PPE

WHAT WAS THE NEED?

Caltrans has new high visibility personal protective equipment (PPE) available to its employees. This research compared the new PPE against the old PPE to show if the new PPE is comparable to the old PPE. Caltrans values the importance of safety. During reduced visibility during the day and night, it is extremely dangerous for onsite employees and workers without PPE. Reflective safety equipment is important because it assures the employees and workers are visible to others. Caltrans wants to provide protection to employees whenever the employees are out on the highways, roadways and any locations that may be a risk of harm.

WHAT WAS OUR GOAL?

The goal of this research was to evaluate the new and old PPE in night conditions.

WHAT DID WE DO?

To make comparisons and simulate night working conditions, the Division of Research, Innovation and System Information, (DRISI) requested help from Caltrans photography department to take photos of Caltrans Division of Maintenance employees at night. The Caltrans employees were provided with new orange-based PPE, old yellow-based PPE, and normal clothing. The employees stood at varying distances from the light balloon and vehicles. The research plan was to simulate conditions of a car approaching a work zone at night with headlights. The entire process was repeated at different distances (0, 10, 20, 50, 100, 150, 200, and 300 feet). The testing site was held at Caltrans's Sacramento Maintenance Equipment Training Academy (META) facility located at McClellan Park.



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WHAT WAS THE OUTCOME?

During the testing phase, the researchers came across multiple issues that were not considered during the planning phase. The test plan did not take into account the viewing angle. The test plan also did not have a standardized test subject size. Due to these unforeseen issues, the research was not able to conclude any significant difference between the two PPEs. The only confirmable result was that wearing retroreflective PPE resulted in better worker recognition than not wearing retroreflective PPE.

DRISI recommends further research on this subject. Some recommendations are:

1. At a minimum, have the camera placed at the driver's point of view.
2. Consider comparing multiple viewing angles.
3. Use same size mannequins to compare clothing retro reflectivity.
4. Test with multiple light sources at similar distances.
5. Use a light meter for better comparisons.

WHAT IS THE BENEFIT?

The research was unable to determine any significant difference between the orange-based and yellow-based PPEs. The conclusion is that the orange-based PPE is comparable to the yellow-based personal protective equipment. This brings reassurance that Caltrans employees are visible and protected while onsite in dark and seasonal weather conditions. The Caltrans color also helps identify who is the Caltrans employee while onsite.

IMAGE



Image 1: 25 Feet from Light Plant
Only Car Lights (left to right) Old PPE Rain Jacket
; New PPE Rain Jacket; Non-retroreflective
Maintenance Clothing; Old PPE Vest; and New PPE
Vest and Pants combo.