



Caltrans Division of Research,
Innovation and System Information

Research

Notes

Maintenance

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Project Title:
Hydrogen Fuel Cell Powered
Lighting Trailer Evaluation

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Solar Lighting Evaluation for Highway Applications

Evaluating the use of solar lighting trailers as a method of temporary lighting for highway work zones.

WHAT IS THE NEED?

Highway construction and maintenance are important not only for safe highway operations, but also for sustainable mobility and public stewardship. Performing such functions at night requires lighting systems that can provide the necessary illumination, avoid glare and also be environmentally friendly.

The present method of lighting highway work zones at night times involve use of lighting system powered by diesel generators that contribute to air pollution, vibration, and noise in the work environment.

WHAT ARE WE DOING?

This study is aimed at evaluating the use of solar lighting trailers as a method of temporary lighting for highway work zones. The scope of work involves evaluation of lighting illumination, its comparison with lighting standards, and a cost benefit analysis of the use of such alternative lighting technology. It will involve technical evaluation, computer simulation, and laboratory as well as field testing. The proposed effort would expand on the previous work of the AHMCT research center evaluating the effectiveness of using hydrogen based fuel cell type lighting systems in highway work zones.



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WHAT IS OUR GOAL?

The duration of the proposed research is 15 months and the results of this research can provide data and answers to the following research questions:

1. Can solar lighting be an alternative to existing method of lighting used in highway maintenance and construction in highway work zones?
2. How does the solar lighting systems compare technically to existing lighting systems used in highway work zones in terms of performance?
3. What are the costs benefits of using solar lighting in highway work zones?
4. What type of modifications would be necessary to make the commercially available solar lighting trailers more appropriate for Caltrans use in highway work zones?

WHAT IS THE BENEFIT?

The results of this research are expected to provide data and analysis on the following issues:

1. What are the commercially available solar lighting systems for use in highway work zones?
2. What are the design performance specifications of these systems?
3. How does the performance of an exemplar system match the existing lighting standards?
4. What design modifications would be needed for an exemplar system, such as the system by Wanco Inc., for it to become more effective for use in highway work zones (e.g. to address the issues related to glare, luminance, etc.)?

5. What are the cost and environmental benefits of using solar lighting LED systems in highway work zones?
6. How does a system, such as the one by Wanco Inc., perform in real highway work zone applications?
7. What would be a set of work order specification for potential Caltrans adaptation or consideration of such a system?

The data obtained on the above issues will then be synthesized to provide a set of recommendations for possible consideration of such technology by Caltrans as well as the development of a usage guideline for actual field operational use of such a system.

WHAT IS THE PROGRESS TO DATE?

Research is in the beginning stage.