



South Carolina  
Department of Transportation



U.S. Department  
of Transportation

**Federal Highway  
Administration**

## SUMMARY REPORT

Report No. FHWA-SC-04-08  
November 2004

South Carolina  
Department of Transportation  
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# Safety Considerations for Nighttime and Weekend Construction Activities

## SUMMARY

State Departments of Transportation throughout the U.S. are increasingly executing construction activities during nighttime and weekend hours to avoid traffic congestion and other difficulties that commonly arise during daytime execution of work. However, nighttime construction activity introduces unique and significant challenges that must be proactively addressed to create safe work zone environments.

The objectives of this research were to comprehensively identify safety issues specifically related to nighttime and weekend construction activities and to suggest execution strategies designed to mitigate these risks. The major components of this investigation included a study into the following key areas of concern;

- Lighting - addresses the overall lighting of the project area and how that lighting affects the worker's ability to see adequately in that environment. Lighting also addresses glare concerns which deal with producing adequate light for visibility when operating equipment, while not causing glare issues to workers or passing motorists.
- Signage and Signaling Devices - addresses the ever-changing signs and variable message boards that are used in the nighttime construction environment.
- Employees - addresses all aspects of employees and their well being. It addresses how well other workers and passing motorists can see workers during the nighttime hours, whether workers are wearing proper safety equipment, and if workers are paying attention to their surrounding.
- Traveling Equipment - addresses added difficulty of operating this type of machinery during nighttime hours and the manner in which employees are operating this equipment.
- Illumination and Reflectors - addresses how well the channeling devices such as cones, barricades, and reflectors show a clear traveling path. Illumination also addresses the visibility of barrier wall during night hours.
- Public Traffic - addresses how the traveling public responds to these nighttime work zones and what can be done to keep them alert throughout the work zone.

- Lane Closures - addresses how well lane closures are set up, taken down, and maintained throughout nighttime operations. This section also addresses sign issues for signs special to lane closures.
- Shoulder Conditions - addresses issues regarding the visibility of shoulders during nighttime hours in work zones. Such issues are maintaining drop-off that are not too steep and proper spacing of barrels to keep traffic off of closed shoulders.
- Channeling Devices - addresses how well channeling devices (Cones, Barricades, Retroreflective Tape, and Reflectors) lead motorists through the work zones and if these set ups confuse the motorist.
- Attenuators - addresses how well attenuators can be seen during night hours and whether they are set up properly to sustain an impact.

For each category listed above, this research identified specific safety related issues, and current best practices or proposed innovations, that can be applied in response. Issues related to quality, productivity, and cost of implementation were also addressed by category. To complete this task, the research methodology for this investigation included a detailed study of recently compiled state and national data regarding safety performance and overall trends, a literature review to identify current and proposed risk mitigation strategies, site visitations to construction sites within the state of South Carolina, and a national survey completed by 21 departments of transportation from throughout the United States.

It is clear from this study that nighttime construction poses unique and serious hazards that must be proactively addressed to insure satisfactory safety performance. A comprehensive approach to safety management is required for success. This research conclusively demonstrates that a piecemeal strategy is likely to be ineffective and that safety performance will not be significantly improved by applying one or two innovations or best practice techniques. Detailed guidance, and associated recommendations for each category listed above, is presented in this report. This report will assist DOTs in their efforts to improve safety performance by identifying the likely effectiveness of numerous practices, innovations, and execution strategies prior to implementation.

W. Edward Back and Lansford Bell conducted this research project at Clemson University.  
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