**Research Project Title:**
Methods to Reduce Traffic Speeds in High Pedestrian Areas

**Principal Investigator Information:**
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Anticipated Duration of Project (in months): Six months

Total Budget: $61,271

Budget Details:

Salaries:
- Faculty: $6,333
- Undergraduate Students: $5,280
- Other (Civil Service, Scientist, etc.): $19,266
- Fringe Benefits: $6,322

Equipment:
- Travel: $6,700

Subconsultants:
- Other: $1,500
- ISU Overhead, 44.5%: $18,869

Abstract:
The purpose of this project is to measure the impact of speed reduction strategies in high pedestrian areas. Using an expert advisory committee, promising strategies will be identified for evaluation. Experimental designs will be developed for each promising strategy and data will be collected at case study sites before and after the deployment of the most promising strategies. Data will be collected using mobile traffic data collection units which will apply machine vision to collect data. The results of the evaluation will be presented in a report along with recommendations for future deployment of strategies.

Research Objectives:
1. Examine effectiveness of speed reduction techniques at high pedestrian rural areas.
2. Validate driving simulator results—a research project conducted by the MNDOT, which utilized the human factor lab.
Summary of Previous Work: Include any background information pertinent to the research.
The Center for Transportation Research and Education (CTRE) at Iowa State University is currently conducting two research projects which involve investigating and field testing several speed reduction techniques at work zones. Many of the technologies and approaches being tested in our projects are similar to those proposed in the problem statement. In addition, we recently completed a survey of all state transportation departments to determine what strategies they have applied to reduce speeds. We are very familiar with the state of the art and the state of the practice of speed reduction strategies.

In addition, the problem statement mentions that one of the tasks will be to validate the results of tests in the U of M Human Factors Lab. This implies that field data collection will be required. CTRE and the Iowa DOT jointly own two data collection trailers that have collapsible pneumatic 30-foot booms with two video cameras. These units are used to collect videos of traffic which are analyzed using machine vision technology. The resulting data can then be analyzed to determine the impacts of speed reduction strategies. This equipment has been deployed throughout the state of Iowa to perform similar impact studies.

Dr. Ali Kamyab is the researcher in charge of CTRE’s current speed reduction studies. Dr. Gary Thomas, who has recently joined Iowa State University, will assist Dr. Kamyab. Before coming to Iowa State he was the traffic engineer for the city of Gilbert, Arizona (a suburb of Phoenix) for four years, which gave him real world experience with the implementation of traffic calming and speed reduction strategies and working with citizens and enforcement agencies.

Literature Search: Include a literature search overview and describe how this project relates to other similar research and development activities.
CTRE has conducted a literature review of speed reduction techniques. The focus of the review was on work zones but many of the techniques and strategies are the same ones being applied on roadways. For example, one of the strategies that is being applied on the North Shore is using pavement markings to allow the driver to feel like they are going faster than they actually are. This topic was covered in our literature review. We also found through our literature review that the police enforcement strategy has had a very positive impact at reducing speeds. It is, however, labor-intensive and can become costly with long-term use. Other speed reduction techniques have had some success at slowing motorists. However, none of the techniques individually are capable of reducing vehicle speeds to the desired level. The most effective speed reductions will probably involve
some combination of the available techniques.

In addition to the literature review, we conducted a survey of all state highway agencies and 38 of 62 have responded. In a very short time we will be compiling the results of this survey, which will provide us with a strong understanding of the state of the practice as well as the state of the art.

This research has also produced an awareness of statistical methods used to measure the impact of speed reduction. This, combined with our trailer mobile data collection units, provides us with a very effective means of measuring the impact of the application of speed reduction strategies.

**Expected Benefits and Users of this Research:** *What benefits are anticipated, why are they important, and how will they be measured?*

The proposed research will assist engineers in their decision-makings to select and implement appropriate speed-reduction treatments at problem areas. Reducing the speed of vehicles to safe levels improves the safety of pedestrian and motorists in the areas where speed has become a safety problem.

**Summary of Research Methodology:** *Provide an overview of the proposed research approach.*

CTRE will first work with the advisory committee to design a number of experiments to determine the effectiveness of candidate speed reduction strategies. Then, based on the candidate strategies selected, CTRE will develop before and after experiments. The experimental design will include a statistical analysis of the data requirements to ensure a statistically valid evaluation.

Once the design has been developed, CTRE will work with the appropriate public agencies to schedule data collection and the development of the speed reduction strategies to be evaluated (pavement markings, raised medians, signage, rumble strips, etc.). CTRE will then use its mobile traffic data collection units to collect videotapes of traffic at the study site before and after the application of the speed reduction strategy. The information from the videotapes will be reduced to provide data for analysis. Statistical analysis will be performed and evaluations will be conducted to determine if the strategies resulted in the desired speed reductions.

**Tasks:** *Describe the major tasks proposed that are needed to complete this research project.*

I. Form an Advisory Committee – An advisory committee comprised of interested Minnesota transportation professionals will be formed.

II. Conduct Literature Review – We will expand the literature review we have already conducted to include more recent findings and findings which are specific to high pedestrian areas.

III. Select Case Study Experiments – Under the advisory committee’s direction, experiments will be identified to test speed-reduction strategies.

IV. Develop Experimental Designs – Based on the experiments selected by the advisory committee, we will prepare experimental designs which will ensure that
ample data are collected to perform statistical analysis.

V. Schedule Data Collection and Development of the Application of Strategies with Local Agencies – CTRE will consult with the agency closest to the experiment to schedule on-site data collection and the timing of the application of the speed reduction strategy so that before and after data may be collected with a minimum of travel to and from the site.

VI. Collect Traffic Data – CTRE’s mobile traffic data recording units will be transported to case study sites in Minnesota for collecting before and after data.

VII. Analysis Data – Information on videotapes will be reduced and the data will be statistically analyzed to conduct an evaluation of each speed reduction strategy.

VIII. Document Report and Recommendations – A report will be prepared and edited by CTRE’s in-house editorial staff. All CTRE publications are professionally prepared for readability and visual appeal. The required number of copies will be printed for distribution by the Local Road Research Board.