

I. RESEARCH PROJECT TITLE

Establishing a Mobile Laboratory for Transportation Research and Education

II. OUTLINE OF THE PROPOSED IDEA

The need to replace or upgrade transportation infrastructure is typically based on the interpretation of data collected in the field. Often, the types of data that are available to decision makers are limited by the severe environment of the site (temperature, dust, moisture). Thus, although engineers and technicians currently have many sophisticated tools and devices that can give detailed information about the performance of the infrastructure, these are often not employed to their full extent due to the difficulty of dealing with site conditions and also because of the increased effort required to set up and take down test systems (data acquisition, etc).

Recognizing this limitation, Dr. Robert Peterman has been working to develop a mobile laboratory for use in transportation research for the past 5 years. During this time, he has been the principle investigator on numerous projects funded by KDOT and the USDOT (through the IBRC program), and has currently responsible for monitoring the long-term performance of a bridge in Cowley County, KS utilizing self-consolidating concrete (SCC).



Two years ago, Dr. Peterman, with the assistance of KDOT personnel, was able to obtain a mobile laboratory directly from the Federal Highway Administration (see Figures 1 and 2). The laboratory consists of a 1997 International Navistar Truck with only about 50,000 miles of prior use. The box portion is complete with a hydraulic lift-gate, heating and air conditioning, counter space, and also an onboard generator. The laboratory was specially built and painted for an FHWA

Demonstration Project at a cost of \$120,811. The FHWA project was funded for only a few years and then discontinued.

The purpose of this proposal is to request resources to customize the mobile laboratory specifically for transportation-related research and teaching activities, and to repaint the vehicle to proudly promote the University Transportation Center at Kansas State University.

III. WORK PLAN

The work plan will consist of the following portions.

- The vehicle will be re-inspected for mechanical soundness. Note, the vehicle was inspected prior to driving it to Kansas State University (from Washington, DC.) nearly 2 years ago and is believed to be in excellent operating condition.
- The vehicle will be customized to include a window and access panel installed in the box portion of the truck, and then custom painted to proudly display the names and logos of Kansas State University and the University Transportation Center. Dr. Peterman will get approval from Dr. Coon on painting scheme prior to authorizing customization.
- Dr. Peterman will study, practice, and take the Kansas Driver's test for a Commercial Driver's License (CDL) that is required to operate the vehicle.
- The laboratory will be equipped with interior furnishings and cabinets suitable for installation in vehicles. Note, current cabinets and counter space were specifically designed to house and support the equipment of the original FHWA Demonstration Project.

IV. FIRST YEAR BUDGET NEEDS

The funding needed for the four action items listed above, plus the annual license, registration, and insurance fees for the vehicle \$32,650 (\$25,548 plus overhead).

V. PROJECT BENEFITS

This initiative will provide a mobile laboratory for transportation-related research projects for years to come, and will establish a basis to attract new research funds in the area of field monitoring and investigation of transportation infrastructure. In addition, the vehicle will provide positive exposure to the KSU University Transportation Center and will be used to enhance current teaching activities and to attract future students to civil engineering. Dr. Peterman envisions that the mobile lab can also be effectively used in outreach activities with high school students, such as balsa bridge competitions.



VI. LONG-TERM PLAN FOR SUSTAINED FUNDING

Long-term funding for the mobile laboratory will be ensured by establishing a schedule of charges to be assessed to those research projects utilizing the mobile laboratory. Dr. Peterman will take the initiative to establish the schedule of charges based on University requirements.

VII. EXPERTISE OF THE RESEARCH TEAM

Dr. Peterman has expertise in the experimental evaluation of materials and structures, and has a proven track record of conducting practical research that results in savings to the sponsoring agency. In response to his recent report to KDOT titled "Evaluation of the Inverted Tee Shallow Bridge System for Use in Kansas," KDOT bridge engineer Stephen Burnett calculated that the projected triennial benefits resulting from Dr. Peterman's work on that project would be \$260,000.