SAFE-PASSAGE

Development and Demonstration of a Rural Weather Prediction Model and Motorist Communication System for Safe and Efficient Traffic Management/Infrastructure Maintenance

by

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3. INTRODUCTION

3.1. Background

The Federal Highway Administration (FHWA) and the American Association of State Highway and Transportation Officials (AASHTO) have advocated measures to enhance transportation safety for over 30 years (1,2). In particular, the need to minimize roadway hazards and warn motorists of unsafe conditions has been the focus of considerable research and discussion. According to the National Transportation Safety Board (NTSB), hazards associated with adverse weather conditions should be given a high priority in countermeasure selection and implementation (3).

Research conducted in the late 1970's concluded that Variable Message Signs (VMS) and Highway Advisory Radio (HAR) were effective technologies for providing timely advisory messages to travelers (4,5). Furthermore, the most recent federal transportation appropriations bill, the Transportation Enhancement Act (TEA-21), emphasized the potential safety applications of Intelligent Transportation System (ITS) technologies in rural areas. Many states, including Montana, initiated efforts to obtain timely and accurate weather information, and implemented communication systems to convey that information in real-time to motorists.

The SAFE-PASSAGE project described in this document, which was developed in response to the concerns described above, incorporates selected ITS technologies in the study design. The project was initiated as a cooperative effort between Western Transportation Institute, Montana State University-Bozeman and the Montana Department of Transportation (MDT). The Research and Special Programs Administration of the U.S. Department of Transportation through the Western Transportation Institute provided funding for the project**.** Four previous annual reports documented the planning, design, and implementation activities that occurred in 1999, 2000, 2001, and 2002 respectively (6,7,8,9). This document provides a brief summary of previous accomplishments, but focuses primarily on activities completed during the fifth year of the project, as well as documenting overall trends, findings, and recommendations.

3.2. Corridor Description

The SAFE-PASSAGE study corridor is a 30-mile section of Interstate 90 between Bozeman and Livingston, Montana. On a national scale, I-90 is a major east-west corridor between Chicago, Illinois and Seattle, Washington, and as such, represents a vital link in the commercial transportation infrastructure network. The designated study corridor also serves to connect two major north-south access highways (US 89 and US 191) to Yellowstone National Park. On a local level, there are a number of commuters who travel this route on a daily basis.

According to data provided by MDT, the study corridor handles over 100 million vehicle-miles of travel each year, with an Average Annual Daily Traffic (AADT) of approximately 10,000 vehicles (10). Traffic composition was determined over a five-year period to be 16 percent commercial vehicles and 3 percent recreational vehicles and buses, with private automobiles comprising the remaining 81 percent of the traffic stream.

An examination of accidents within the corridor over a five-year period (1994-1999) confirmed an overrepresentation of weather-related motor vehicle crashes. Roughly 70 percent of the crashes had weather conditions reported as a contributing factor by investigating law enforcement officers (11). Furthermore, a 1995 study sponsored by MDT cited weather as one

of the three largest contributors to truck accidents in the State and identified the Bozeman Pass section of I-90 as a prime candidate for safety improvement applications (12).

3.3. Project Goal and Objectives

To achieve the ultimate goal of the project, which is to improve motorist safety and incident management on I-90 between Bozeman and Livingston, the following three objectives were identified.

(1) to validate and implement a computer model to micro-forecast pavement temperatures and roadway conditions;
(2) to provide real-time motorist information through the implementation and effective operation of a roadway communication system, using VMS/HAR cellular phone mediums; and
(3) to establish a rural Traffic Management Center for reception, coordination, and dissemination of all relevant data between responsible agencies.

The extent to which project objectives were met was to be determined through subsequent effectiveness evaluations. Potential benefits would include a reduction in the number or severity of motor vehicle crashes within the corridor, more efficient roadway maintenance activities, and improved coordination of communication procedures and emergency response activities.

The ability to detect significant differences in these and other measures of effectiveness following the implementation of the SAFE-PASSAGE components would depend, in large part, on having sufficient data available for meaningful before/after comparisons. Qualitative evaluations, including anecdotal information from system users or motorists traveling through the corridor could be useful for providing preliminary assessments of project effectiveness.