

Identify Number MPC-288
Continuation, Year 23, 4th Year

Project Title: Utah Department of Transportation Traffic Operations
Center Operator Training (TOC)

University: University of Utah

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Description of Research Problem:

Trained operators monitor traffic through cameras, radio communications, and software alerts at the Utah Department of Transportation (UDOT) Traffic Operations Center (TOC). Their role is to transmit information to minimize the disruption and risk of incidents and recurrent congestion. The operators are recruited and trained by TOC personnel, 'on-the-job'. There are problems with this arrangement. UDOT wastes time and effort training 'on-the-job'. Operators spend a disproportionate time in training because the turnover is high. Training can be ad-hoc with inconsistent competences.

This proposal details a partnership between UDOT and the University of Utah Traffic Laboratory (UTL). The partnership will deliver a formalized training program whereby new recruits will be trained and certified in the Traffic Lab. The benefits to UDOT are:

- A structured training program, which will prepare new hires quickly for their work.
- A standardized training whereby hires are certified.
- A back-up pool of trained operators who can substitute in the event of temporary shortages of trained operators.

Research Objectives:

This project will supply intermediate and advanced training for those employed as "Operators" and other UDOT personnel.

Research Approach/Methods:

The research objectives will be met through execution of the following eight tasks:

1. Develop typical traffic and incident scenarios.

Four types of incident will be modeled, as tabulated below:

Incident	Examples	Clearance Time (hours)	Locations to be Simulated	Typical Occurrence
Moderate Crashes	block one or more lanes with personal injuries	one	10	Daily
Severe crashes	hazardous material spills, overturned oversized loads, and fire of flammable materials	2-6	5	Monthly
Emergency Incidents	minor or major earthquakes affecting bridge structures, plane crashes affecting a major highway, hazardous material spills requiring the evacuation of people, forest fires requiring the closure of a major highway*	24+	5	Rare *less rare
Major Snowstorms	Severe capacity restriction	2-8	5	Monthly

2. Develop "best" traffic management responses.

For each incident type, a set of "best" traffic management responses will be developed. The process will be served through:

- (a) An extensive Literature Review of the State-of-the-Practice which will set out a framework for defining responses. Technologies addressed will be: Traveler Information Systems (ATIS) such as 511 calls, Highway Advisory Radio, the CommuterLink Web site, Variable Message Signs (VMS).
- (b) A study of the characteristics of the local highway network, assessment of TOC message logs.

- (c) Identification of established UDOT policies and procedures, both formal and informal.
- (d) Report findings above to:
 - identify the principles that underpin message design
 - develop guidelines for message design.
 - critically assess information delivery systems
 - assess the Ramp Meter as a control mechanism
- (e) Modeling of alternate responses to evaluate and select those giving optimal results.

3. Provide classroom training for working with typical traffic and incident scenarios.

The Moderate Crash incident scenarios and best responses will be structured into formal class instruction as a continuation of the Boot Camp exercise. It will be delivered to trained operators, and refined in response to their learning.

Other items which can contribute to course content as background material:

- Traffic flow theory (volume-speed relationships, capacity, bottlenecks)
- Advanced procedures for managing traffic incidents
- Advanced procedures for managing special events
- Traffic control for work zone
- Traffic control for incidents
- Basics of MUTCD
- Ramp meter operation
- Traffic signal operation, timing, and capacity
- Traffic signal coordination
- Composition of variable message signs texts – current theory and research
- Advanced customer service skills
- ATMS technology (CCTV, fiber-optics, Ethernet, etc.)
- Highway Watch

4. Develop and plan simulation exercises for traffic and incident scenarios.

Once incident scenario and responses have been established, they will be converted into practical “hands on” exercises. While the foregoing suggests logical completion of each stage, the exercises will be developed in a more heuristic way with incremental development. A simple Moderate Crash will serve as a pilot exercise with a set of responses. Undergraduate students will “proof” the exercises to refine them into meaningful processes for UDOT operators.

The exercises will be established so that they “trigger” incidents which will need to be addressed by operators and other experienced UDOT personnel.

5. Facilitate simulation exercises and document results.

The last stage will be to refine the exercises and document them so that they can be readily repeated and refined. The role of the UTL will be to:

- Act as simulation controller
- Document actions by simulation players
- Develop method to score or rate actions by players
- Debrief and provide feedback

MPC Critical Issues Addressed by the Research:

Traffic Operations and Management;
Multimodal Policy and Investment Assessment;
Environmental Impacts of Infrastructure.
Longer-term traffic strategies.
Benefit-costs analysis of transportation network investments.

Contributions/Potential Applications of Research:

The benefits to the MPC are:

- Improved collaboration with the TOC enabling the Utah Traffic Lab (UTL) to be more in tune with the TOC’s capabilities, developments, and challenges.
- Better access to data to support UDOT sponsored research.
- A meaningful applied training opportunity for a steady flow of graduate students.

Potential Technology Transfer Benefits:

Trained Operators will be competent in 4 categories:

1. Basic traffic engineering
2. Policy & Procedures
3. TOC software
4. Scenario simulations

Time Duration:

July 1, 2010-June 30, 2011

Total Project Cost:

\$503,902

MPC Funds Requested:

\$228,500

Source of Matching Funds:

- 1) \$98,875 from Utah Department of Transportation
- 2) \$176,527 from University of Utah, Faculty Start-Up Funds

TRB Keywords:

Training, traffic monitoring, traffic measurement