



OREGON DEPARTMENT OF TRANSPORTATION

Research Unit
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SPR Quarterly Progress Report
April 1, 2009 through June 30, 2009

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1. Project

Work Zone Design and Operations Enhancements
SPR # 669

2. Key Dates

Start Date for ODOT: November 2007
Completion Date for ODOT: June 2009; extended to December 2009

3. Principal Investigator

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4. Progress

- Task 1: Project Initiation
 - Completed; see April 2008 interim report.
- Task 2: Literature Review
 - Completed; see April 2008 interim report. Publications and article databases are periodically being monitored during the course of the study to collect

newly published literature on the topic. Any new literature found is being incorporated into the research and will be included in the final report where applicable.

- Task 3: Survey ODOT Personnel and Consultants
 - Completed; see July 2008 interim report for preliminary results. Final results to be referenced when working on Tasks 6 and 7 (data analysis and development of guidelines for implementation) and included in final report.
- Task 4: Develop Sample of Study Projects
 - Completed; see March 2009 interim report.
- Task 5: Collect Project Data
 - The study end date has been extended to allow for obtaining more crash data on the case study projects. In the OTMS crash database, there is a lag time of approximately 5-6 months between when the crash occurs and when it is entered into the database. The extra time will allow for collecting more crash data on the currently on-going and recently completed case study projects. While waiting to collect more crash data, the researchers are continuing efforts to collect more data on the projects. The data collection efforts include: surveys of the main project participants, reviews of the traffic control plans, collecting the work zone tour scores, and reviews of inspection and Traffic Control Supervisor reports.
 - The researchers have worked with ODOT staff to collect data from the CAD/State Patrol database. The crashes from this database will be used to validate crashes recorded and obtained from the OTMS crash database and the TripCheck database. To meet the study timeline, queries of all three databases will be conducted or have been requested to collect crash data up to July 31, 2009. That date will allow sufficient time to run the database queries shortly after July 31, followed by review, organization, and analysis of the data by the researchers, and incorporation of the results into the draft final report by the end of September 2009.
 - The researchers have also worked on evaluating the complexity of the case study project work zones. Work zone complexity will be used as a comparison variable in the analysis. To evaluate complexity, a brief survey was conducted of ODOT personnel that related specific work zone elements to their impact on the complexity of the work zone. The survey responses were then used, along with reviews of the case study project TCPs, to assess the complexity of each work zone based on the magnitude of the element's impact and the frequency of the element on the project.
 - The researchers have met with ODOT personnel to collect and review Traffic Control Supervisor reports. The reports are reviewed to verify the presence of a crash (comparison to the crash databases noted above) and to determine if any element of the work zone or TCP contributed to the crash.
- Task 6: Analyze Data
 - As project data is being collected, the data is being reviewed. In depth analyses will be conducted in August-September once the data collection task is further along. The data will be analyzed to determine: the TCP features (both design and implementation) that were contributing factors to work zone

crashes; potential revisions to the TCP design and review process to improve safety; and the impacts of ODOT's TCP design practices on the quality and consistency of TCPs with respect to design standard compliance, staging methods, device usage, and drafting similarities.

- Additional Tasks:
 - A short survey was sent out to personnel at other state DOTs to ask about their TCP processes and the impact of different process features on the quality of TCP design and implementation. Responses were received from 11 states. The responses will be used as a comparison to Oregon's traffic control design process and performance.
 - Bid tabulation data for the case study projects were collected from the ODOT website. The bid tabulations show the amount of budget assigned to traffic control activities on each project. This value will be used in the determination of the complexity/size of the TCP and for possible comparison with crashes in the analysis.

5. **Problems**

- No problems affecting completion of the study are present at this point.

6. **Work Planned for Next Quarter**

- Task 5: Collect Project Data
 - Gather additional crash data from the on-going case study projects.
 - Continue to locate contact information, send out surveys to the case study participants, and receive survey responses while waiting to collect the crash data.
 - Finish the review and analysis of the inspection and TCS reports.
- Task 6: Analyze Data
 - Analyze the TCP documentation and work zone data.
- Task 7: Develop Guidelines for Implementation
 - Prepare draft of guidelines for implementation of the study results.
- Task 8: Prepare Draft and Final Reports
 - Prepare draft of final report for review by ODOT.
- Additional Tasks
 - Extending the study over the summer allows for participation on the ODOT summer work zone tours. One of the researchers will participate on the tours and collect more information about the case study projects visited. The following information will be collected:
 - A short survey of 1-2 workers on each project will be conducted to get the workers' point of view about the quality of the work zone and safety hazards present. This information will be included with that received from the surveys when comparing projects.
 - The work zone tour scores from this year will be added to the study data for those case study projects which were visited last year.

7. **Finances**
 SPR Project Summary

VENDOR	FY'08	FY'09	FY'10	FY11	TOTALS
ORIGINAL BUDGET	\$ 50,000	\$ 81,716	\$ -		\$ 131,716
REVISED BUDGET	\$ 15,770	\$ 92,446	\$ 23,500		\$ 131,716
EXPENDITURES - VENDOR	\$ 15,770	\$ 68,897	\$ -	\$ -	\$ 84,667
BALANCE	\$ -	\$ 23,549	\$ 23,500	\$ -	\$ 47,049
ODOT	FY'08	FY'09	FY'10	FY11	TOTALS
ORIGINAL BUDGET	\$ 2,500	\$ 5,000	\$ 2,000		\$ 9,500
REVISED BUDGET	\$ 5,234	\$ 16,312	\$ 2,000		\$ 23,546
EXPENDITURES - ODOT	\$ 5,234	\$ 16,312	\$ -	\$ -	\$ 21,546
BALANCE	\$ -	\$ -	\$ 2,000	\$ -	\$ 2,000
PROJECT	FY'08	FY'09	FY'10	FY11	TOTALS
ORIGINAL BUDGET	\$ 52,500	\$ 86,716	\$ 2,000	\$ -	\$ 141,216
REVISED BUDGET	\$ 21,004	\$ 108,758	\$ 25,500	\$ -	\$ 155,262
EXPENDITURES - PROJECT	\$ 21,004	\$ 85,209	\$ -		\$ 106,213
BALANCE	\$ -	\$ 23,549	\$ 25,500	\$ -	\$ 49,049