

Research Project Work Plan
for
TRUCK PARKING: AN EMERGING SAFETY HAZARD TO HIGHWAY
USERS

SPR 783

Submitted by

Sal Hernandez, PhD
Assistant Professor, School of Civil and Construction Engineering
Oregon State University
101 Kearney Hall
Corvallis, Oregon 97331

for

Oregon Department of Transportation
Research Unit
200 Hawthorne Ave. SE, Suite B-240
Salem, Oregon 97301-5192

June 2015

Revised: [Month Year]

**Research Project Work Plan
for
[PROJECT TITLE]**

1.0 Identification

1.1 Organizations Sponsoring Research

Oregon Department of Transportation (ODOT)
Research Section
555 13th Street NE
Salem, OR 97301 Phone: (503) 986-2700

(If federal funds are used)
Federal Highway Administration (FHWA)
Washington, D.C. 20590

1.2 Principal Investigator (ODOT requests only one per institution or firm)

Sal Hernandez, PhD
Assistant Professor, School of Civil and Construction Engineering
Oregon State University
101 Kearney Hall
Corvallis, OR 97331 Phone: 541-737-1757
Email: sal.hernandez@oregonstate.edu

1.3 Technical Advisory Committee (TAC) Members

Lyn Cornell, ODOT Research Coordinator, Chair, 503 986-2853
Gary Farnsworth, ODOT Reg 4 Area Manager, 541 388-6071
Amy Pfeiffer, ODOT Planning & Environmental Manager, 541 388-6052
Becky Knudson, ODOT Planning TPAU & Economics, 503 986-4113
Jess Brown, ODOT Motor Carrier Haz Materials Specialist, 503 378-6336
Roseann O'Laughlin, ODOT Planning, 503 986-3525
Dave Jostad, Sr VP May Trucking Co, 503 559-5182
Charlie Every, Every Trucking Co, 541 480-8440
Anthony Boesen, FHWA Operations Engineer, 503 316-2554

1.4 Special Friends of the Committee

Bob Bryant, ODOT Region 4 Manager, 541 388-6184
Greg DalPonte, ODOT Motor Carrier Administrator, 503 378-6351
Butch Hansen, ODOT SC Oregon Area Manager, 541 883-5778

1.5 Friends of the Committee

Joel McCarroll, Reg 4 Traffic Manager, 541 388-6189
Heather Richards, PCED, City of Redmond, 541 923-7756
Tyler Deke, Bend Metro Planning Organization, 541 693-2113
Brad Dehart, ODOT Reg 4 Transportation Engineer, 541 296-2215
Peter Russell, Deschutes County Planner, 541 383-6718
Chris Doty, Deschutes County, 541 322-7105
Robert Hardie, OOT Reg 4 Right of Way Agent, 541 388-6151
Jeff Hurd, City of Madras Public Works Director, 541 475-2344
Gary Thompson, Sherman Co Judge (Commissioner), 541 980-7199
Alan Unger, Deschutes Co (Commissioner), 541 388-6569
Ken Mullenex, City of LaPine City Council Member, 541 536-1432

1.6 Research Coordinator

Lyn Cornell, ODOT Research Coordinator, 503 986-2853

1.7 Project Champion

Bob Bryant, Region 4 Manager, 541 388-6184
Greg DalPonte, ODOT Motor Carrier Administrator, 503 378-6351

2.0 Problem Statement

It is nationally recognized that commercial motor vehicle operators often cannot find adequate and safe parking for rest purposes. This is especially true for Oregon, where high-use corridor rest areas are experiencing a heavy demand for truck parking, one that exceeds capacity. These rest areas are intended for short-term safety breaks, yet they are increasingly used for long-term parking. Private truck stops are also experiencing capacity shortfalls. The economic recovery and driver hour-of-service regulations have recently contributed to the rising demand. Winter weather conditions are another factor that adds to the demand of truck parking facilities. Recent studies performed by Pahukula and Hernandez (2014) and Islam and Hernandez (2013) have shown factors related to weather and fatigue increase the injury severity level potential of commercial motor vehicle involved crashes.

Because of the truck parking shortages and limits on stays in public rest areas (Oregon Administrative Rule 734-030-0010 allows a vehicle to remain in a rest area for up to 12 hours in a 24-hour period), commercial motor vehicle operators may be contributing to unsafe situations by driving without a needed short break and/or by parking on roadway access ramps, shoulders, at highway interchanges and on facilities running through cities and towns. Oregon law, ORS 811.550 prohibits parking on a throughway, yet enforcement of illegal truck parking has been low priority for Oregon State Police and other Oregon law enforcement officers. This problem is expected to become an increasing hazard as freight movement by truck is forecast to increase about 70% (tonnage) by year 2035.

Related studies have simply addressed the issue of commercial vehicle parking availability at rest areas by identifying capacity needs in an ad-hoc manner with no mechanism to assess the effectiveness of any new capacity investment. There is a clear need for a methodology that addresses the issue of insufficient commercial vehicle parking capacity and that also assess the effectiveness and safety impacts of any rest area capacity enhancements. Currently, there is an active ODOT solicitation of interest for a trucking parking facility at Biggs Junction (I-84 at US 97) that seeks creative and innovative ideas to address the problem through a proposed public/private partnership mechanism. Although Oregon could benefit greatly by having ODOT develop a long-range plan that identifies a strategy and locations for accommodating the demands for truck parking throughout the state, this project is limited to Biggs Junction at I-84 and the entire US 97 route through Oregon. The Oregon Freight Plan (OFP), the Oregon Freight Advisory committee, the Federal Highway Administration (FHWA) and the Federal Motor Carrier Safety Administration (FMCSA) have all identified the shortage of truck parking as a major issue that needs to be addressed

3.0 Objectives of the Study

The shortage of truck parking has been identified as an issue across the state of Oregon as indicated by the recent solicitation of interest by ODOT for a Biggs Junction truck parking facility public/private partnership opportunity. This research will focus on Biggs Junction at I-84 and the entire US 97 route through Oregon in order to contain project scope, but the methodology could be applied to other Oregon Freight Corridors. Therefore, to adequately assess commercial vehicle parking needs and analyze safety on high-use corridors in the State, the research objectives are:

1. Review and summarize what other states are doing to address the truck parking shortage and related safety implications
2. Identify data available and methods to measure the extent of the problem (e.g., identifying truck parking supply and demand)
3. Gather opinions of commercial motor vehicle operators and commercial truck stop operators with regards to parking shortages and parking location decisions
4. Estimate future demand for truck parking based on freight forecasts prepared in the OFP, identify priority locations where truck parking is an issue (e.g., rest stops, exit ramps, shoulder of the road) or likely to become an issue
5. Identify safety impacts of potential truck parking enhancements

3.1 Impacts

An inadequate supply of truck parking spaces can have negative consequences. For example, tired truck drivers may continue to operate their vehicles because they may not be able to find a place to park and rest or they may choose to park at unsafe locations—such as exit ramps, and shoulders of the road. With projected increases in truck vehicle travel in the State of Oregon, demand for truck parking spaces is expected to outstrip the available supply. Once identifying supply/demand of safe

truck parking, this research will provide ODOT with recommendations for potential solutions for the development of safe and economically viable truck parking, and other creative solutions, that also support local livability needs.

This study will also provide a platform for ODOT to identify public-private partnership opportunities. With the anticipated growth in truck movements, the shortages in parking spaces for trucks will be exacerbated unless public and private sectors respond to address this need.

4.0 Implementation

The results of this research will be immediately available for implementation. Central Oregon Freight Corridor highway enhancement activity planned by ODOT Region 4, central Oregon counties and cities, and the Central Oregon Area Commission on Transportation can use the results of this research to make informed decisions when looking for opportunities to improve highway performance and safety, meet local livability needs and support the local economy and the freight industry. This information will help decision makers prioritize projects, bundle projects, meet multiple needs more efficiently, and provide high returns on investment for safety projects.

5.0 Research Tasks

The work plan proposed by the OSU Research Team involves 11 tasks. The proposed time period to complete the project is 21 months.

Safety and Related Training

Prior to working in ODOT right-of-way (ROW), safety training of OSU Project Investigator (PI) and project staff will be completed. The ODOT Project Coordinator will be notified of safety training completion, via email, and the project team will not proceed with work until final approval by ODOT Project Coordinator is received. The Project Coordinator will assist with coordinating initial contact with appropriate ODOT District Manager (DM) for ROW work. Prior to going onsite the PI will notify the Project Coordinator and coordinate directly with the DM.

The following is a list of the tasks:

5.1 Expected tasks:

Task 1: TAC Meeting #1

Project kick off meeting. The objective of Task 1 is to review the scope and plan for the research to be conducted to make sure that the research team and TAC members clearly understand the expectations for the research project primarily in terms of project objectives and scope. This task will consist primarily of a kick-off meeting to be scheduled within the first month of the project. In addition, a background presentation

will be given and preliminary results of a literature review on other States state-of-the-practices regarding truck parking and related issues.

Moreover, any questions regarding project goals or any new developments that might have occurred between proposal submission and beginning the work will be discussed/clarified at this meeting. The meeting will be held at an ODOT facility. Selection of meeting location will attempt to minimize travel distance, and will include use of teleconferencing as needed.

Time Frame: 1 month

Responsible Party: PI, ODOT Research Coordinator, TAC

Deliverable: TAC meeting attendance, TAC meeting presentation, TAC Meeting Minutes. In addition, the research team will provide a *Technical Memorandum* covering all pertinent aspects of the kick-off meeting.

TAC Action: Review deliverable, provide feedback to PI, and participate in kick off meeting

Task 2: Collect, review and analyze current literature

This task will review the most recent and relevant literature on commercial motor vehicle parking. The literature review will analyze and synthesize information on the various statutes, Oregon Administrative Rules (OAR), safety policies, and related initiatives undertaken by local, state, and national governments. This will provide the research team with a list of policies and initiatives (e.g., public-private partnerships opportunities) that can be studied for possible recommendation.

Time Frame: 2 months

Responsible Party: PI (OSU)

Cost: \$ 11,711

Deliverable: The formal output of this task will be comprised of a comprehensive *Technical Memorandum* that documents the established state-of-the-art knowledge related to paradigms and lessons learned by state agencies, and other research activities. The results obtained through this task will provide significant input for Tasks 2 and 3.

TAC Action: Review document and provide feedback

Task 3: Perform agency surveys to determine current practices

The research team will develop and administer a stated preference survey to public transportation planning agencies (e.g., other state DOTs, MPO's, County level transportation planners, and local agencies) to determine and assess agency efforts with regard to commercial motor vehicle parking and related issues.

Time Frame: 2 months

Responsible Party: PI (OSU)

Cost: \$ 16,800

Deliverable: A technical memorandum will be provided by the research team that includes the summarized results of the survey, survey instrument, list of people/agencies

surveyed, survey methodology, and database with results. Overall, the technical memorandum will provide key information regarding the agencies surveyed.

TAC Action: Review deliverable and provide feedback

ODOT Action or Decision: Schedule TAC Meeting #2

Task 4: TAC Meeting #2

A TAC meeting will be scheduled with ODOT to present the preliminary results and findings from Tasks 3. In addition, the research team will present the plan for subsequent research activities and discuss specific action items with ODOT. To accomplish this task, the research team will contact ODOT in advanced to schedule the meeting. The research team will then present the results and findings from Task 2 and 3. Next, the research team will present and discuss Tasks 5 and 6. Any feedback will be noted and implemented into task(s).

Time Frame: 1 month

Responsible Party: PI, ODOT Research Coordinator, TAC

Deliverable: Draft outline of Task 5 & 6 and Tech memo (send 10 days prior to meeting), TAC meeting attendance, TAC meeting presentation, TAC Meeting Minutes. Feedback and/or recommendations from ODOT will be documented and incorporated in the development of the next tasks.

TAC Action: Review deliverables and provide feedback

Task 5: Perform commercial motor vehicle operator surveys

Research team will develop and administer a survey designed to gather information regarding how and why drivers choose their parking locations and identify driver behavioral response to parking shortages. The survey instrument will be reviewed by the TAC (this review will serve as a pilot) and any received comments and/or recommendations will be addressed and/or incorporated before the survey is conducted. The research team will then identify and compile a list of trucking companies (using a national database of owner operators), trucking forums, commercial truck stop operators and/or physical locations along study area (Biggs Jct at I-84 and all US 97). Next, the research team will conduct the surveys utilizing several stated preference methods. These methods consist of, but are not limited to, contacting respondents by phone, email or onsite surveys.

Time Frame: 5 months

Responsible Party: PI (OSU)

Cost: \$ 28,560

Deliverable: At the end of this task, a technical memorandum will be provided by the research team that includes the summarized results of the survey, survey instrument, list of people/agencies surveyed, survey methodology, and database with results. Overall, the technical memorandum will provide key information regarding the agencies surveyed.

TAC Action: Review deliverables and provide feedback

Task 6: Current Conditions Report

The research team will conduct an initial assessment of existing data related to truck parking and inventory the existing data. Existing data sources may include, but are not limited to, commercial motor vehicle citation data, truck traffic data, historical crash data, truck parking supply and demand, and data obtained from the Oregon Freight Plan, FHWA freight analysis framework (FAF3), and available data from the Oregon statewide freight model. In addition, data collected and/or identified from Task 1 through Task 5 will be synthesized for analysis. Next, the research team will conduct statistical analysis to calculate statistics that will reveal characteristics of the data and identify the key variables for the safety impact analysis in Task 9. The statistical analysis will consist of, but is not limited to, standard descriptive statistics (e.g., means, standard deviations, etc.) and hot spot analysis to uncover hazard clusters. For specific sites, either commercial motor vehicle citations or detailed police reports will be requested to better understand the circumstances of the citation and/or crashes around rest areas and to uncover any factors that may be contributing to the specific incident. This task will provide an inventory of data; shed light on supply and demand conditions, and safety conditions in the study area. Given the availability of data collected in this task, economic and livability factors will also be included.

Time Frame: 6 months

Responsible Party: PI

Cost: \$ 35,280

Deliverable: A Technical Memorandum describing current conditions..

TAC Action: Review draft and provide feedback

ODOT Action or Decision: Schedule TAC Meeting #3

Task 7: TAC Meeting #3

A TAC meeting will be scheduled to present the preliminary results and findings from Tasks 5, and 6. In addition, the research team will present the plan for subsequent research activities and discuss specific action items with ODOT. Next, the research team will present and discuss Tasks 8 and 9. Any feedback will be noted and implemented into task(s) as appropriate.

Time Frame: 1 month

Responsible Party: PI, ODOT Research Coordinator, TAC

Deliverable: Draft outline of Task 8 & 9, and Tech memo, TAC meeting attendance, TAC meeting presentation, TAC Meeting Minutes. Feedback and/or recommendations from ODOT will be documented and incorporated in the development of the next tasks.

TAC Action: Review documents and provide feedback

Task 8: Identify current demand and forecast demand

This task will develop a methodology that ODOT could implement to forecast future demand for truck parking. For the purpose of this study, the demand analysis will be based on analysis prepared in the OFP. The outcome of the analysis will be a list of recommended priority locations where truck parking is currently (e.g., rest stops, exit

ramps, shoulder of the road) or expected to be an issue. This analysis will be constrained to the study area as defined in Section 3.

Time Frame: 4 months

Responsible Party: PI

Cost: \$ 35,280

Deliverable: A Technical Memorandum consisting of future truck parking forecasts

TAC Action: Review and provide feedback

Task 9: Perform safety impact analysis and prepare draft final report

Utilizing the results from Task 6 and 8, this task will assess the safety impacts of potential truck parking enhancements. In addition to traditional assessment measures (e.g., capacity utilization, etc.) in this study we will also utilize the “Crash Harm” metric. Crash harm is defined in Knipling¹ as, “A quantitative measure of the combined human and material loss from traffic crashes based on economic valuation. Using crash “harm” as a metric, permits side-by-sided comparisons across different vehicle types, crash types, crash severity levels, and ways of assessing risk.

Time Frame: 5 months

Responsible Party: PI

Cost: \$ 33,600

Deliverable: A Technical Memorandum consisting of safety impacts of truck parking enhancements.

TAC Action: Review draft final report and provide feedback

ODOT Action or Decision: Schedule TAC Meeting #4

Task 10: TAC Meeting #4

The TAC meeting will include a review of the Draft Final Report. The TAC will offer advice on the content and clarity of these work products. The TAC will also advise on post research implementation.

Responsible Party: PI, ODOT Research Coordinator, TAC

Deliverable: TAC meeting attendance, TAC meeting Final Presentation, TAC Meeting Minutes

TAC Action: TAC review of Draft Final Report, and Draft Research Note. Advise ODOT Research Coordinator regarding any critical issues with the project’s research design. Advise ODOT Research Coordinator regarding any required final edits to the Draft Final Report, and Draft Research Note.

ODOT Action or Decision: Review TAC advice and comments, PI to update draft final report as appropriate.

Task 11: Final Research Report

¹ Knipling, R.R., (2009) *Safety for the Long Haul; Large Truck Crash Risk, Causation, & Prevention*. American Trucking Associations. ISBN 978-0-692-00073-1.

Prepare Final Report describing the findings of the study, and provide guidance to ODOT for resolving truck parking issues.

Time Frame: 3 months

Responsible Party: PI

Cost: \$ 6,769

Deliverable: Final Report

TAC Action: None

ODOT Action or Decision: Review. Provide formal acceptance of Final Report. Publish Final Report on ODOT's research website

6.0 Time Schedule

This section specifies the time line for the project, listing the task headings and showing monthly and/or quarterly time blocks in which each task will be accomplished. Also shown are interim and final deliverables.

Task (4 TAC's)	2015				2016				2017			
	FY--								FY--			
	Jul - Sep	Oct - Dec	Jan - Mar	Apr - Jun	Jul - Sep	Oct - Dec	Jan - Mar	Apr - Jun	Jul - Sep	Oct - Dec	Jan - Mar	Apr - Jun
1: TAC Meeting #1		T *										
2: Collect, review and analyze current literature			*									
3: Perform agency surveys to determine current practices			*									
4: TAC Meeting #2			T *									
5: Perform commercial motor vehicle operator survey				*								
6: Current conditions report					*							
7: TAC Meeting #3					T *							
8: Identify current demand and forecast demand						*						
9: Perform safety impact analysis and prepare draft final report								*				
10: TAC Meeting #4										T *		
11: Final Research Report										R	F	

*Deliverables

R - Draft report submitted for ODOT review.

F - Revised report submitted to ODOT for publication.

T – TAC meetings

7.0 Budget Estimate

An itemized budget for the project is included here showing expenditures for each task by fiscal year and in total.

Task	FY16	FY17	Total
1: TAC Meeting #1			
2: Collect, review and analyze current literature	\$11,711		\$11,711
3: Perform agency surveys to determine current practices	\$16,800		\$16,800
4: TAC Meeting #2			
5: Perform commercial motor vehicle operator survey	\$28,560		\$28,560
6: Current conditions report	\$35,280		\$35,280
7: TAC Meeting #3			
8: Identify current demand and forecast demand	\$17,640	\$17,640	\$35,280
9: Perform safety impact analysis		\$33,600	\$33,600
10: TAC Meeting #4			
11: Final Research Report		\$6,769	\$6,769
Total for tasks (Contract amount)	\$109,991	\$58,009	\$168,000
Support/management (ODOT completes)			
Total for ODOT (ODOT completes)			