

**Quarterly Progress Report to the
FEDERAL HIGHWAY ADMINISTRATION
(FHWA)**

**On the Project:
THE IMPACT OF WIDE-BASE TIRES ON PAVEMENT
DAMAGE
DTFH61-11-C-00025**

**For period
April 13th to June 30th 2011**

**From
University of Illinois at Urbana-Champaign
Illinois Center for Transportation**

**FEDERAL HIGHWAY ADMINISTRATION
QUARTERLY PROGRESS REPORT**

FHWA Project
Research Agent
Principal Investigator

DTFH61-11-C-00025 FY: 2011 Quarter:
Illinois Center for Transportation
Imad L. Al-Qadi

April-June

PHASE	RESEARCH TASK	2011											2012											2013											ESTIMATED % COMPLETION		
		A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D			
1	1.1. Comprehensive literature review and synthesis on past and current research	<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	<div><div></div></div>																																90
		20	60	90																																	
	1.2. Experimental plan and modeling framework			<div><div></div></div>																																50	
				50																																	
	1.3. Implementation and marketing plan		<div><div></div></div>																																	50	
		10	50																																		
	1.4. Phase I report			<div><div></div></div>																																60	
			60																																		
	1.5. Conference call with panel	<div><div></div></div>				<div><div></div></div>																														50	
		0	50																																		
	1.6. Presentations to relevant conferences and symposiums					<div><div></div></div>																														0	
2	2.1. Prepare of experimental equipment, test structures, and instrumentation				<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	<div><div></div></div>																											0	
	2.2. Conduct experiments, including material characterization and					<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	<div><div></div></div>																						0	
	2.3. Conduct modeling					<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	0	
	2.4. Develop of analysis tool													<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	<div><div></div></div>	0		
	2.5. Delivery of draft Phase II report and analysis tool																											<div><div></div></div>	<div><div></div></div>	<div><div></div></div>						0	
	2.6. Present to relevant conferences and symposiums								<div><div></div></div>				<div><div></div></div>				<div><div></div></div>				<div><div></div></div>			<div><div></div></div>		<div><div></div></div>			<div><div></div></div>		<div><div></div></div>			<div><div></div></div>			0
	2.7. Prepare article and technical papers							<div><div></div></div>				<div><div></div></div>		<div><div></div></div>		<div><div></div></div>			<div><div></div></div>			<div><div></div></div>		<div><div></div></div>		<div><div></div></div>		<div><div></div></div>		<div><div></div></div>		<div><div></div></div>		<div><div></div></div>		0	
	Estimated Progress (%)	1	3	7																															7		
	Planned Progress (%)	1	3	7	10	13	19	24	30	34	39	43	48	53	55	57	59	61	63	64	66	68	70	72	74	76	78	80	87	93	100	100	100	100	7		

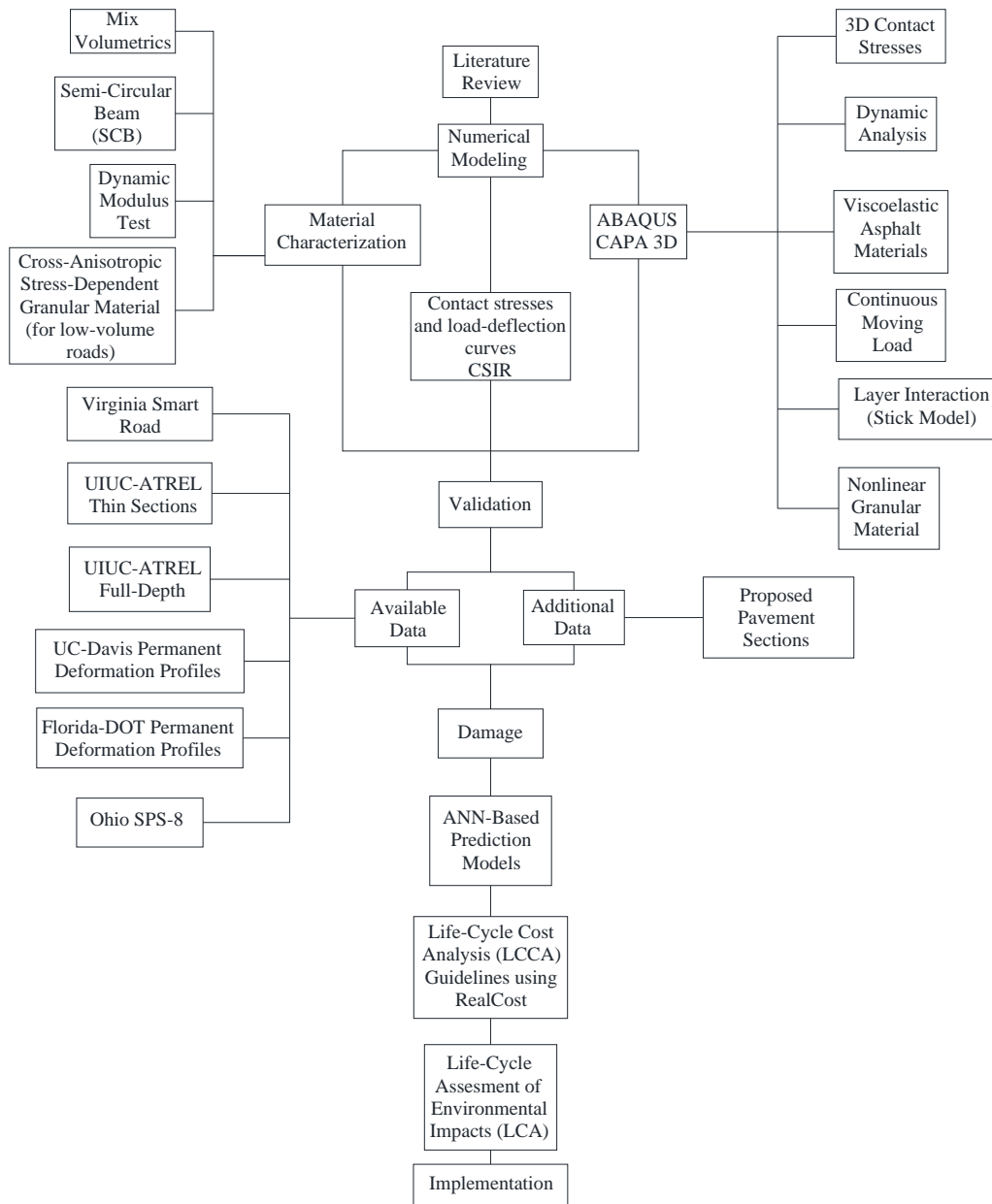
QUARTERLY PROGRESS REPORT

QUARTER 1

The Impact of Wide-Base Tires on Pavement Damage – A National Study

1. Work Performed

Work plan for this project is summarized as in chart 1.



During the first quarter, the following tasks have been accomplished:

- A comprehensive literature review has been performed. It includes the studies that have been done since the 1980s using accelerated pavement testing, numerical models, and sections subjected to real traffic. The literature review not only focuses on the impact of WBT on the pavement response and performance, but also on trucking operations (fuel economy, hauling capacity, tire cost and repair, ride and comfort, and safety) and environment (gas emission, recycling, and noise).

Two versions of the literature review have been prepared: the first one is a synthesis that summarizes the major points and conclusions of the referenced studies, and the second one provides detailed information of each study.

- Valuable information related to pavement response to wide-base tires utilizing accelerated pavement testing has been collected. Data from six various projects were obtained and are being checked for accuracy and suitability for this project:
 - Virginia Smart Road: Experimental readings from strain gauges and pressure cells from twelve heavily instrumented pavement sections at different depths and offsets.
 - UIUC-ATREL thin pavement sections: 3-in and 5-in pavement section on top of granular base (reinforced and unreinforced with geogrid). The instrumentation of the sections comprised pressure cells, LVDTs in three directions in granular layer, and strain gauges.
 - UIUC-ATREL full depth sections: The AC thickness of these sections varied between 6 and 16.5 in. Two transverse and one longitudinal strain gauge were installed under the AC layer.
 - Ohio SPS-8 Sections: Two instrumented pavement sections with AC thickness of 4 and 8. Strain gauges in the transverse and longitudinal directions were installed at the bottom of the AC and close to the surface. In addition, the sections were instrumented with strain rosettes close to the surface and at the bottom of the AC.
 - UC-Davis overlays: Permanent deformation profiles were measured at different number of load repetitions. Two types of overlays were tested.
 - Florida DOT: Strains on the pavement surface were measured at different offsets in both directions. The thickness of the AC layer was 5 in.

- Details about pavement structures to be built, instrumented, and tested at UIUC-ATREL, UC-Davis, and Florida DOT are being finalized.
- The parameters and factors that will be considered in the numerical modeling have been identified including dynamic analysis, three-dimensional contact stresses, continuous moving load, viscoelastic asphalt material, nonlinear granular materials for low volume roads, and friction between layers.
- Material characterization needed for the modeling have been identified.
- Types of tires to be tested have been identified. Michelin will provide four full sets of dual-tire assembly 11R22.5) and wide-base tires (455/55R22.5) to be used during the APT. Furthermore, other tire manufacturers will provide three-dimensional contact stress measurements that will be checked against the measured ones for variability.

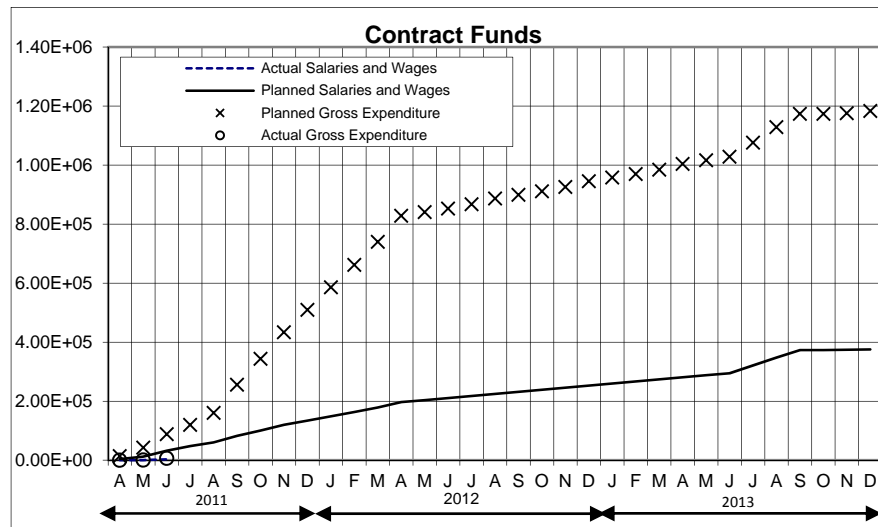
2. Work to be accomplished next report period

- Prepare and submit the phase I report to the panel.
- Organize a conference call with the panel in mid-August.
- Finalize Phase I Report where literature review, work plan, modeling framework, and details of the available data will be presented.

3. Problems encountered

No problems have been encountered in this quarter.

4. Current and cumulative expenditures



funds expended	0.5%	time expended, hrs	607.0
contract amount	\$1,190,456.00	starting date	April 13, 2011
expended this quarter	\$6,424.54	completion date	June 30, 2011
total expenditures to date	\$6,424.54		
balance	\$1,184,031.46		
salaries and wages estimated this month			\$3,184.2
salaries and wages spent this month			\$3,184.2
accumulated salaries and wages to date			\$3,184.21

5. Planned, actual, and cumulative percent of effort

