

**Survey on “Best Practices for Assessing Roadway Damages Caused by Flooding”**

**If you have any questions about this survey please contact Dr. Mingjiang Tao at [taomj@wpi.edu](mailto:taomj@wpi.edu) or 1-508-831-6487.**

**You may return the completed survey by email, ([taomj@wpi.edu](mailto:taomj@wpi.edu)), or fax (1-508-831-5808) or mail Department of Civil & Environmental Engineering, Kaven Hall 107, Worcester Polytechnic Institute, Attention: Dr. Mingjiang Tao, 100 Institute Rd, Worcester, MA 01609**

**Please return the survey by Friday, March 16, 2018.**

**The Louisiana Transportation Research Center greatly appreciates the time you have taken to complete this survey!**

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*This questionnaire survey is one part of the effort ongoing in the Louisiana Transportation Research Center’s (LTRC) Project No. 18-3P and is intended to gather information on how the Federal Highway Administration (FHWA), Federal Emergency Management Agency (FEMA), state departments of transportation agencies (STA), local public agencies (LPA) and/or Department of Public Works engineers typically conduct inspections on pavements that are damaged as a result of a flooding event. The data from this survey will be used to (1) advance the current knowledge and state of the art in the understanding of flood related damage to pavements and its assessment for both short and long terms; and (2) prepare rational and practical guidelines that will provide the knowledge and tools for assessing the short and long term impacts of flooded pavements, all of which will be documented in a research report that will be assessable to the public via LTRC’s website ([http://www.ltrc.lsu.edu/pubs\\_final\\_reports.html](http://www.ltrc.lsu.edu/pubs_final_reports.html)).*

**Please provide your contact information below:**

Name	
Title	
Agency	
Street Address	
City, State, Zip	
Email Address	

Phone Number	
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**Q1. Are you aware of any study(s) that has been conducted on submerged roads for estimation of structural strength and/or distresses?**

Yes, please proceed to the next 2 questions:

**1a** Please provide the source from which the project report or memo on the study(s) can be obtained.

**1b** Please provide the contact information (name, telephone number, email) of the person(s) who conducted the study. If more than one study was conducted, please provide contact information for each.

No

**Q2. Are you aware of any project(s) in your state where Federal Emergency Management Agency (FEMA) or any other organizations paid the state, local or county agencies funds to compensate for damage due to submergence of the road caused by flooding?**

Yes, please proceed to the next 2 questions:

**2a** Please provide the source from which the project report or memo on the study(s) can be obtained.

**2b** Please provide the contact information (name, telephone number, email) of the person who conducted the study. If more than one study was conducted, please provide contact information for each.

No

**Q3. Have you had any project(s) in your State or Local Government where FEMA or any other organizations denied eligibility for damage due to submergence of roadways caused by flooding?**

Yes, please proceed to the next 2 questions:

**3a Please provide the reason for the denial of eligibility and the results from appeals, if made. If this was tabulated in a memo or report, please provide a copy of the report.**

**3b Please provide the contact information (name, telephone number, email) of the person who conducted the study. If more than one study was conducted, please provide contact information for each.**

No

**Q4. How do the engineers and/or policy makers in your agency decide whether or not significant damage occurred to the submerged roadway? Check all that apply!**

- Visual inspection and use of photos or video recording
- Pavement surface evaluation and rating (PASERS)
- Performance of a quantitative pavement condition inspection following STA, ASTM, FHWA, or other approach (ARAN, etc.)
- Performance of a hydraulic analysis of paved or unpaved roads
- History of damage [FHWA Detailed Damage Inspection Report (DDIR) and/or any sort of damage survey] from past emergency events on these roads
- Use of non-destructive structural testing (e.g., ground-penetrating radar (GPR), step frequency GPR, spectral analysis surface wave, falling weight deflectometer (FWD), or other NDT equipment)
- Review of and comparison with your agencies pavement management database
- Review of and comparison with your agencies current pavement design standards
- Review of and comparison with your agencies projection of design-year traffic volumes
- Analysis considering future heavy load traffic volumes (emergency vehicles, construction vehicles, husbandry vehicles) on these roads, in anticipation of future events
- Other <please describe>

**Q5. How do the engineers and/or policy makers in your agency track the condition of your pavements and roadway embankments on a routine basis prior to a flooding event?**

Please specify method(s) below:

**Q5. What is the length of time that your agency restricts traffic after a flooding event?**

- Unknown
- 30 days
- 60 days
- 90 days
- 6 months
- 12 months
- Other (Please specify intervals) (If more than one, please specify each with brief details.)

**Q6. Does your agency classify a priority system of routes for any of the following?**

- Clearance of trees and other blocking debris for access back to affected area?
- Access by emergency vehicles after an event?
- Access by recovery vehicles (utilities, emergency vehicles etc.)
- Access for returning evacuees after an event?
- Primary and secondary haul routes for debris removal?
- Restoration of commerce and other routine functions?
- Other: Please describe below:

**Q7. Does your agency place restrictions on roadways after submergence based on existing load limits, predicted loading, or some other method? Please describe.**

- Yes: Please describe below:

- No:

**Q8. Were any geotechnical or remaining structural service life analyses on the roadways conducted by the STA or LPAs in any of your flooding events?**

Yes Please provide the contact information (name, telephone number, email) of the person who conducted the study. If more than one study was conducted, please provide contact information for each.

No

Other <please describe>

**Q9. If “Yes” on Question 8, can you please share any of the following information with our research team based on the last two submergence events?**

- If measurements were taken on the subgrade or base course saturation, prior to or after the submergence event, please provide them to us.
- If measurements were taken on the ground water table (GWT) depth, prior to or after the submergence event, please provide them to us.
- Any information on the type of analyses or tools used for hydraulic analyses (e.g., simulations under saturated or unsaturated conditions).
- Any information on the type of analyses or tools used for geotechnical or pavement analyses.
- Any information on special circumstances or surrounding conditions that enhanced or reduced drainage.

**Q10. Were engineering tools used to assess the technical and economic aspects of restoring the submerged road to its pre-submergence status?**

Yes: Please provide the contact information (name, telephone number, email) of the person who conducted the study. If more than one study was conducted, please provide contact information for each.

No

**Q10. Who made the repair decision(s) on the submerged roadways?**

**Check all that apply.**

- STA maintenance (in central or district office)
- STA research bureau
- STA pavements office (in central or district office)
- STA materials office (in central or district office)
- STA construction office (in central office or district office)
- STA design office (in central office or district office)
- STA safety office
- LPA public works or engineering office
- Consultants to the STA or LPA
- FHWA Division Office (Area, Pavement, or Material engineers)
- FHWA Federal Lands Division
- Uncertain
- Other <please describe>

**Q11. Does your agency have a system in place to assess post-submergence pavement damage caused by debris hauling or construction vehicles?**

- Yes: Please provide the contact information (name, telephone number, email) of the person who conducted the study. If more than one study was conducted, please provide contact information for each.

- No
- Conducted on a project-by-project basis rather than a system basis
- Other < please describe >

**Q12. Has your agency used their pavement management database as part of the system for assigning the level of pavement damage attributable to debris hauling or construction vehicles?**

Yes Please provide the contact information (name, telephone number, email) of the person who conducted the study. If more than one study was conducted, please provide contact information for each.

No

Other <please describe>

**Q13: Please provide any other relevant information that you believe may assist in this survey:**

**End of Survey**

*The research team greatly appreciates the time you have taken to complete this survey!*