

Tuesday, October 24, 2017, TxSTIC Meeting, Austin TX

Welcome and Introductory Remarks, National STIC Meeting Review, Member updates

Al Alonzi, FHWA Texas Division

Thanks to everyone. Grateful for consistent participation in culture of innovation.

Goal: Speed up the process.

News: \$100,000 of FHWA funding was approved for the TIM data STIC project.

National News: All 50 states have a STIC. This network is like a tree. It will accelerate innovation through collaboration.

TxSTIC Project Updates 2017

1. Accelerating Traffic Incident Management Data Collection – Jeff Kaufman, TTI

Everyone is invited to the TTI annual meeting in Houston, November 8.

<http://itstexas.org/2017%20Annual%20Meeting>

TIM data collection project a partnership between TTI and TxDOT. Goal to improve times – one minute of an accident is equal to four minutes of traffic problems.

Clearing an accident quickly and efficiently, depends on the level of training, quality of partnerships, and availability of resources.

All slides available here:

<http://txstic.org/Final%20Master%20Presentation%20STIC%2010.24.17.pdf>

Slide shows important timeline for accident and how data collection needs to improve. Actions are required. Decisions need to be made.

State and local led options/best practices/rural vs. metro. Research is broadly scoped and substantial.

TMC operations around the state are all very different. TxDOT and Toll Authorities have different motivations to clear accidents.

Looking to tie data sources together. Possibilities are being explored. Challenges are being faced. Starting in Houston.

Reporting and looking for areas of improvement: Dissecting elements of crash cleanup, dissecting elements of the crash itself, and dissecting elements of the map to cluster resources.

More research to come!

Q. from Chris Klaus: Incidents are being reported to apps like Waze, is there a plan to integrate this data?

A. NTTA is using Waze data. Houston and San Antonio are also looking at the benefits of working with them. There is good data there, but a lot of “noise” to filter through. Additionally, they suffer accuracy issues. The project is considering development of a new app to be more accurate.

Additional note from Andrew Wimsatt: Following the Florida DOT model, TxDOT is also looking to partner with Waze.

Q. from Al Alonzi: Is the research project looking at using drones for accident verification vs. the static cameras?

A. City of Arlington used drones as an experiment. Many issues about tethered vs. untethered and line of sight restrictions were raised but not resolved.

Drones are being used for 3-D modeling of incident reconstruction, however they are not accurate enough to be used as legal evidence at this time.

Follow up from Joe Adams: TxDOT Aviation Division has done significant research into drone usage and will be releasing the findings soon. They are looking to ID potential providers and be fully functional by Spring 2018.

Q. from Rocio Perez: Is the TIM data being used for prevention?

A. Data is being shared with people. The Sheriff’s offices are using the “hot spot” intel to address issues. Technology is improving, but it needs to be proliferated.

2. Road Weather Management – Weather-Savvy Roads – Kenneth Perrine, CTR

Project: Extreme weather (Freezing, Wild Fire, Flooding) in rural and urban areas impacts roads and people. Timeline August 2017 to January 2019.

Proposed solutions: 1. Data collection and data sharing during weather events needs to improve. Major challenges are too many sources, too different, not tailored. CTR is looking to create a Data Catalog. 2. Sensor network needs to be developed to understand the ice formation and atmospheric effect impact. 3. Stakeholder meetings are proving to successful networking events. They create awareness, improve data, communication, and ultimately preparedness for weather events.

Q. from Al Alonzi: Will this technology allow TxDOT to predict situations (ice)?

A. Yes.

Follow up note from Andrew Wimsatt: Similar study was done in the Fort Worth District 10 years ago by a man named Ken Fults. There is a good report about surface and friction issues.

Possibly: https://ctr.utexas.edu/wp-content/uploads/pubs/0_4834_2.pdf

Q. from Tucker Ferguson: With regard to the TIM timeline, the response was completely inadequate during Harvey. It was too hard to verify incidents and get that information uploaded (by hand). We suffered serious credibility issues with the public. We need to automate the process.

A. Data is important to getting good response times.

Q. from Jeff Kaufman: There was a Rice University study in the Hydrology Department that is recommended. They did a lot of work on the predictive process with their data.

A. Yes! Data fusion is the key, on the ground, in the air, sensors should be everywhere.

Q. from Rocio Perez: When is the next stakeholder meeting?

A. One has been planned for December 2017, but not scheduled. Everyone is invited.

Interjection from Al Alonzi: Go Astros. District Engineers from the Texas Coast went above and beyond to respond to the challenges of the recent extreme weather events. Their success was a result of good preplanning and collaboration. Congratulations on www.drivetexas.org and on what many are considering a gold standard in incident management. Well done.

3. Automated Traffic Signal Performance Measures – Sonya Badgley

This project is the implementation of an EDC. Essentially, the goal is to bring high resolution data analysis of automated traffic signals in six pilot locations to increase safety and reduce congestion.

They will be testing and reporting in the next few months.

Note from Henry Wickes, project participant – We have good resources and plans.

Q. from Brian Moen: is this a research or implementation project?

A. Implementation of Utah DOT software and a private vendor software in six locations.

TxSTIC Project Updates 2018

4. Validation of the PFC Underdrain to Remove Standing Water on Pavement Surface – Ted Cleveland, TTU (UTSA)

Permeable Friction Course Underdrains were created and tested in the lab. (The drains work great!) Results have been calculated. Diagrams have been proposed for future underdrain placement.

The Beaumont District has identified a site for the one year evaluation. Durability is still an unknown variable, but this could provide Houston with a real solution to their flooding problems.

Q. from Al Alonzi: Is the project looking at the maintenance costs for these drains?

A. No. There is suitable European research to answer that question. Durability and Constructability are the main issues.

Note from Andrew Wimsatt – PFC typically only lasts 7-10 years. Need to find something that lasts longer.

Q. from Chris Klaus: How was the site chosen?

A. Chose was made because it had both the rigid and flexible road materials seen in both rural and metro areas.

5. Data-Driven Safety Analysis (for Beaumont), Wade Odell, RTI

3 Elements of data- driven framework

1. ID the crash areas and existing prevention measures
2. ID correlation between types of crashes and road features
3. ID a means to integrate data into the project development process for both construction and maintenance. (And then bring this from Beaumont District to all the rest.)

Only two months into the project, but data is revealing a lot of potential for improvement. (Expected duration: Sept 2017 – Feb 2019)

Q. from Henry _____: Is there a cross application for construction zones?

A. Maybe. Pedestrian zones for sure.

Q. from Jeff Kaufman: Is the project variable able to exclude behavior factors?

A. We are trying, but it's not easy.

Infravation: Infrastructure-Innovation, FHWA – Kirk Fauver

Infravation is a transnational partnership program of 11 countries. The goal is to address challenges beyond typical infrastructure issues with innovative ideas. There are nine programs currently being funded. Alterpave, Biorepavation, ECLIPS, FastBridge, SeaCon, HealRoad, SHAPE, SEEBRIDGE, SureBridge. There is funding available for other innovative projects and demonstrations of these clever ideas in areas around Europe and the US. Follow them on Twitter @INFRAVATIONENP

Q. from Al Alonzi: How can the TxSTIC take advantage of Infravation funding?

A. AID funding is available for up to \$1M per project. STIC.ORG has the application, call for project list, etc. Additionally, seed money is available for smaller projects and federal money could possibly be leveraged.

Note from Wade Odell: www.Infravation.net is the site to visit if you don't want to go to Twitter.

Lunch Videos:

TxDOT - Future of Texas Transportation

<https://www.youtube.com/watch?v=w2rwrkIgKC0>

FHWA – The Power of the STIC

<https://www.youtube.com/watch?v=KTq6W11rjgo>

Transportation Research Board – White Paper Presentations

1. Laboratory Evaluation of an Attached Hydronic Loop Design for Geothermal Heated Bridge Decks – Mark Hurley, UTA (0-6872)

Research is like chess. Each move informs the next.

2 phases of the project. 1. April to August 2016 – feasibility study. 2. September 2016 – August 2018 – mock ups.

Problem with current de-icing technology is that the salt and chemical damage cars, cause potholes and corrosion, contaminate the environment and impact other hazardous maintenance nightmares – which all costs money.

Geothermal temperature 50feet below the surface is around 57degrees all across the globe. Project is to tap into this heat source with a hydronic loop on a pump and either imbed the loop into the concrete itself (on new construction) or to attach it to a pre-existing bridge (underneath, with geofom).

Accompanying slides from the presentation show the laboratory mock up. Next phase is the full service bridge test.

Q. from Andrew Wimsatt: TxDOT Bridge Division has done two similar projects in the last 40 years. Amarillo had a glycol tube bridge and Wichita Falls had an electric heated bridge. Have you incorporated this research?

A. by Dr. Xu from UTA – Amarillo was thoroughly researched. One major benefit of this project would be that the pump would only need to be turned on one day ahead of the pending storm, instead of the several days required in the previous effort.

2. Effect of Non-Contact Lap Splice on the Behavior of Drilled Shaft to Bridge Column Interface – Jamshaid Sawab, U of H (0-6914)

Problem: Design specifications for superstructure bridges are inadequate for some of the existing and new construction overpasses.

Specs exist for lap splice spacing for circular columns that connect to circular drill shafts. However, the problem is with rectangular columns connecting to circular drill shafts, especially when the drill shafts are undersized.

Models were created, tests were done. The further apart the lap splices were (0”- 4” – 6”) the more deterioration problems occurred. Flex cracks, shear cracks, splitting cracks all significantly worse the further apart the support (lap splice).

Q. from Al Alonzi – How many of these bridges currently exist with this problem?

A. Several.

Added from TxDOT Engineer Dr. Lin, who is collaborating on the project – The problem is with the current specifications not detailing the size of the drill shafts in Design-Build projects. Contractors are taking short cuts, sometimes making the contact distance between lap splices as much as 24 inches!

3. Model of Ridesourcing Demand Generation and Distribution. Patricia Lavieri, CTR, UT

Ridesourcing = Ridesharing = “it’s like Uber”

Large scale data about demand and demographics are not available because Uber and other private vendors do not wish to share. When Uber and Lyft left Austin in 2016, RideAustin moved into the market as a non-profit who offered to data share with the city.

Studies have been conducted on six months of this data. Dividing travel into weekend and weekday travel and trying to infer characteristics about who is traveling and why.

A new study is ramping up in the DFW area that will create a lot more data.

Q. from Chris Klaus: My team is running a four step model project in DFW and would like to share the information they have and that the DFW data reveals.

A. Thanks. The current survey is too biased right now. We would appreciate the help.

Q. from Al Alonzi: can your data set inform the issues we face about congestion and mobility? Are there any safety benefits?

A. Safety data is out there, but we don’t have access to it. Is it curtailing drunk driving? We don’t know. We can see that there is a trend of going downtown at night which suggests that people are using ridesharing as a designated driver, but that is not conclusive. We need an external data source. Regarding the congestion, the DFW project will be directly addressing this issue.

4. Communications and Radar-Supported Transportation Operations and Planning (CAR-STOP)
– Patricia Lavieri, CTR, UT (0-6877)

81% of all annual crashes can potentially be addressed by autonomous vehicles.

This project is about autonomous vehicles and their ability to do data collection in real time to negotiate their surroundings.

CW/CA (Collision Warning and Collision Avoidance) references all underlying software in autonomous vehicles. These software pieces are being improved, especially in terms of making the parts work/move together. (ex: Radar works okay, but it's better when partnered with DSRC.)

However, current CW/CA is inadequate. Need something new to address the SLAM (simultaneous localization and mapping) problem. This is also called “computer vision.” UT is working on it.

Q. from Rocio Perez: Which technology has the most promise?

A. Tesla is using cameras plus radar. Other groups are using Lidar exclusively. Redundancy is the key. All of it needs to be functioning together until something new emerges to supplant them.

5. WaveV2X Communication in 5G: Motivation and Research Challenges Addressed in CAR-STOP
– Robert Heath, CTR, UT (0-6877)

This project is about the challenges faced by autonomous car data sharing. The higher the bandwidth the higher the data rate. Current data rates are too low, so the car is unable to “see through” buildings, trucks, trees, etc. One solution is to have all the vehicles be able to data share.

Bandwidth is available above 57GHz (mmWave), radar is operating there already. UT is looking for ways to enable mmWave V2X Communication for vehicles. That is, trying to use the existing CW/CA software (DSRC, Cameras, Radar) with mmWave bandwidth. This could enable “machine learning” – similar to how Netflix knows what show you want to watch next.

New research group at UT partnering with major corporations (Honda, Toyota, etc.) – called UT SAVES – (Situation Aware Vehicular Engineering Systems.)

Q. from James Kuhr at UT SAVES – What do Honda and Toyota think about DSRC? Is it enough?

A. It's not enough. They want more, even though Japan rolled out DSRC tech 5 years ago. Toyota is looking for new ideas - Fifth Generation ideas (5G). DSRC is 1990's technology and only has maximum effectiveness when EVERYONE has it (so all the cars can talk to each other).

Q. from Al Alonzi: Has the FCC allocated the bandwidth for this technology?

A. Yes.

Q. from Henry Wickes: AT&T is looking at 5G as well?

A. Yes. AT&T in Austin has staged a roadway with towers set up for vendors to come and show off their new innovations. This test center will amplify visibility of the technology and hopefully enable the future of automated vehicles.

http://about.att.com/story/att_highlights_progress_in_5g_lab_trials_and_new_markets.html

Resilience in Transportation Planning, Kirk Fauver

(Note: “resilience” against weather issues.)

In 2014, funding was made available for pilot programs around the country. In Texas, they focused on coastal areas, erosion, and drought.

In 2017, there was a resilience workshop in Austin.

TxDOT made use of the AquaDam to successfully protect areas of I-10 during Hurricane Harvey. The additional use of drones during the storm had positive impact on response times and accurate resource planning.

MSAR (Mobile Solution for Assessment and Reporting) software was also implemented during Hurricane Harvey. This helped with data collection and sharing.

Thanks for coming.

TRV is coming up, January 7-11, 2018 in Washington, DC.

Next STIC Meeting is March 6, 2018.