



TRB ASC60: Truck and Bus Safety Committee

2021 Annual Committee Meeting

Tuesday January 12, 2021

2:00 PM – 5:00 PM Eastern

Via Zoom—link available through the interactive program

Full Committee Minutes

1. Welcome and Introductions: All

Bob Scopatz began the meeting by providing an overview of the agenda and by thanking Bernardo Kleiner for his technical support. Rather than opening the Zoom meeting with introductions, Bob asked for each participant to type in their name, affiliation, and email so that we might be able to gather our attendance. The meeting was well attended with over fifty participants.

2. TRB Staff (upon arrival): Bernardo Kleiner

Bernardo provided a synopsis of the past year, highlighting its difficulties, but also delivered encouraging news regarding the attendance for the centennial meeting and the positive experience that everyone has had so far. There were over 17,000 registrants for the annual meeting this year, with those numbers expected to increase after everything is finalized.

While papers were down overall this year, TRB still received over 4,000 for review, which was more than expected. TRB was concerned that the pandemic would have a more dramatic impact on the number of papers and reviews. Bernardo thanked the committee for their reviews and those leading the charge. There were some changes this year in the review process, Bernardo explained that every paper which was accepted for presentation would take part in the poster sessions. Due to the online platform, attendees are able to visit the posters anytime and interact with the authors. Moreover, all workshops and lecterns will be recorded and made available for thirty days afterwards.

All papers that were accepted for presentation were going to the poster sessions. There is some neat functionality with the posters. Attendees can visit the posters anytime they want and interact with the authors. The authors are expected to be available during those specific sessions, but the material is always available. This will help with time management. All the workshops and lecterns will be recorded and available for thirty days afterwards.

The theme for the 2022 TRB Annual Meeting is, “Innovating a more equitable, resilient, sustainable, and safe transportation system.”



3. TRB Section Chair (upon arrival): John Milton

John Milton, the TRB Section Chair, provided information regarding the strategic realignment and reorganization of TRB which effectively opened the door for increased collaboration between committees and subcommittees. John stressed that there are numerous overlapping research needs within the Safety and Operations group. Within the group, we would like to foster greater collaboration across committees and work on addressing unique “touchpoints” between safety and operations. There are many examples such as: 1) safe system approach, 2) traffic control devices, 3) speed management, 4) transportation system management operations, connected and automated vehicles and 6) other areas that touch on both safety and operations and where trade-offs are made by practitioners on a regular basis.

There are many knowledge gaps that research can address. There are new research opportunities and partnerships to explore regarding the nexus of safety and operations. John requested for the ACS60 committee to discuss potential opportunities/partnerships across all Safety and Operations committees. As a point of reference, the revised TRB structure for committees can be found here...

http://onlinepubs.trb.org/onlinepubs/dva/strategicalignment/TRB_NewVolunteerStructure.pdf

As a start, John asked ACS60 to review the committee list at the above link for Safety and Operations and do some “matchmaking” on potential areas of common interest with committees on within the Operations committees.

4. Mid-Year or Quarterly Meeting Discussion: Bob Scopatz

Bob discussed that some committees have decided to take advantage of technology in order to meet quarterly rather than just once or twice per year. He mentioned that with this technology, our committee could do so as well and that there would be a lot of benefit in doing so. We still plan on hosting an in person mid-year meeting when feasible. However, we plan to also hold two additional meetings around the spring and fall. These meetings would be shorter and virtual. The committee supported the idea.

5. 2021 Paper Review Summary and Discussion: Mouyid Islam

Mouyid Islam, Ph.D. from the University of South Florida, provided a summary report of this year’s past paper review. There were 21 total papers submitted, 13 for both presentation and publication, and 8 for presentation only. The committee conducted 85 reviews and decided to accept 16 papers for presentation and recommended 8 papers for publication in TRR. All numbers were slightly down from the previous year.

6. 2020 Deborah Freund Paper Award: Brenda Lantz, Jerry Krueger, and Scott Valentine

Evaluating the Effects of Connected Vehicle Weather and Work Zone Warnings on Truck Drivers’ Workload and Distraction Using Eye Glance Behavior

Omar Raddaoui and Mohamed M. Ahmed, Ph.D.



The Truck and Safety Committee congratulated Omar Raddaoui and Mohamed M. Ahmed for their excellent paper, who in return thanked the Committee for accepting their paper. The Deborah Freund ASC60 Paper Award is awarded each year to one of the papers accepted by the Committee, as well as by TRB for publication. The Award is named for a long-term, valuable member of the committee and good friend and colleague who passed away August 2014. Members and Friends of the Committee can learn more [here](#).

7. Committee Strategic Plan Final Update: Joel Ticatch & Bob Scopatz

Joel Ticatch, who was the lead for the Committee's Strategic Plan, announced that the document was finalized after last year's annual meeting and was formally submitted to TRB March 4, 2020. Several Committee Members contributed to the document over the course of a two-year period. The Plan was the committee's most ambitious strategic undertaking since *The Domain of Truck and Bus Safety Research* circular was published in 2007. The Strategic Plan was designed to provide future outlook, direction, and issues of the Committee and to redouble the Committee's focus on its core mission.

The Committee utilized the Strategic Plan to both fulfill the requirement for TRB's Triannual Plan and to showcase who the Committee is and what its aspirations are. The Plan was intended to be a living document, an action piece. Joel and Bob asked the Committee how it can implement these action items and key concepts? Joel and Bob plan to use the quarterly meetings to address these and other important questions. Each subcommittee has been tasked with executing their portion of the Strategic Plan and updating it as appropriate. The Plan also highlights the importance of research need statements and other approaches to research, such as sponsoring webinars and collaborating with other TRB committees and subcommittees.

Joel and Bob stressed the importance of creating a method to track the implementation of the Strategic Plan and called on the subcommittee chairs to help. However, there is room for more assistance. The Committee may even look for a chair or lead to head this project. The first item however on the agenda is to update the list of other committees and subcommittees that ASC60 can work with. The TRB reorganization was not complete when the Strategic Plan was finalized. Thus, the Committee will address this issue in the first quarterly meeting.

Finally, Joel and Bob discussed that there might need to be some modification to the plan in order to meeting TRB's soon to be released criteria.

8. Subcommittee Reports:

a. Carrier Safety Management: Sharon Newnam

Two topics were discussed at the previous meeting including (i) fatigue & driving and (ii) target earnings & safety. New research in the area of fatigue and driver safety was discussed. Sharon Newnam discussed a project funded in Australia that aims to develop two fatigue management project designed to (i) help drivers identify the triggers of fatigue and to generate strategies of avoiding situations that place them at risk of fatigue and (ii) develop the skills of supervisors in identifying situations in which drivers are at risk of fatigue and in managing these situations effectively. Dick Dunne discussed a NCHRP project



focused on “Successful Approaches for Facilitating Truck Parking Accommodation Along Major Freight Corridors”.

There were two presentations during the Carrier Safety Management Subcommittee. The first presentation was from Dr. Ross Iles, Senior Researcher from Monash University. Ross presented on the Driving Health Study: Snapshot of Australian professional driver health. The second presentation was from Mr. Jerome Carslake, Director of the National Road Safety Partnership Program (NRSP) in Australia. Jerome provided an overview of the NRSP, which is a collaborative network to support Australian businesses in developing a positive road safety culture.

b. Operator Health and Wellness: Karl Sieber

The Health and Wellness Subcommittee had three different presentations. Rob Malloy of NTSB presented the first presentation entitled “The NTSB Investigation of the Randolph, NH Crash between a Pickup Truck with Trailer and Group of Motorcycles.” The investigation found issues with the state, the motorcycle drivers, and the truck driver. Jeff Hickman of VTTI presented the second report entitled “Undiagnosed Obstructive Sleep Apnea in Commercial Motor Vehicle Drivers: Application of STOP-Bang.” The STOP-Bang (SB) OSA screening method includes both objective and subjective criteria. The study was designed to estimate the prevalence of potential OSA and to recalculate the OSA-related crash risk. Ultimately, the risk ratios did not change. Matt Parkinson from Pennsylvania State University presented the final report entitled “Bus Operator Workstation Design,” which was designed to measure and improve bus packaging to make them safer and more comfortable. Lastly, Karl Sieber gave an update on NIOSH/CDC’s COVID-19 vaccines program.

c. Data: Andrew Miller

- i. Two presentations from Jeff Loftus speaking Tech-Celerate Now, and one from Bill Banister and both are in the Liaison lightning round. Recognizing other ADAS data sources to answer some of our research needs statements. That was a difficult challenge. Some discussion of work zones and the upcoming Large Truck Crash Causal Factors Study.
- ii. ADAS discussion broken up across six different sections.
- iii. Data regarding truckers taking rural roads
- iv. Covid-19 effects relating to transportation

d. Technology: Abby Morgan

Dr. Darcy Bullock, Purdue University, presented “Vehicles Often Know More about our Roads than We Do,” which briefly summarized a study of 23 construction work zones covering 150 centerline miles of Indiana’s interstate roadway in the summer of 2019. The study examined hard-braking events over a 2-month period. The study helped Indiana develop a real time dashboard to monitor hard braking events to quickly identify emerging work zone locations. These efforts are being expanded in 2021.

Abby led the subcommittee in an interactive discussion covering new technologies and deployments, hot topics, research needs, automated truck enforcement, and potential future workshops. The discussion comprised the bulk of the meeting. Topics included standards of electrification, the



implementation of 5G, the limitations and safety concerns of ADAS, platooning and truck AV developments, etc.

9. Research Coordination/Needs Statements: Nicholas Kehoe

57 research needs statements across 11 factor areas. 24 actually have been formalized. No new research need statements or research needs in 2020. Set up a team to review research needs statements and update them. Obtain revisions for 5 research needs statements while 2 were able to archive, but there are still more to work on. Nicholas will circulate the revised research need statements in the coming weeks and asked for edits or suggestions and upload it on the website. Anyone can submit a research needs statement to Nicholas or to the committee. Anyone can submit a research needs statement and can do so online via <https://rns.trb.org>. Would like to have more research based on needs in the field, not on methods.

Nicholas.Kehoe@toxcel.com

10. Liaison Lightning Round (new feature, top 3 topics for each—summaries available for interested parties)

- a. FMCSA Research:
 - i. Johnathan Mueller, link to other studies <https://rosap.ntl.bts.gov/welcome>, <https://www.fmcsa.dot.gov/safety/analysis-research-technology>, <https://www.fmcsa.dot.gov/safety/data-and-statistics/2020-pocket-guide->
 1. Continuing military under-21 pilot program, still recruiting
 2. Reported on multi-year IDIQ –
 - ii. Bill Bannister,
 1. Analysis into work zone, pedestrian, single-vehicle crashes
 - iii. Jenny Guarino
 1. Large truck crash causal factors study, currently working with NHTSA will start collecting data, will be a 4-year study
 2. Complete the picture of crashes, linking current data sources to get a better understanding of truck and bus crashes. Merged MD database to MCMIS data, CT is the next. To locate high crash corridors.
- b. FMCSA Tech-Celerate Now (TCN) ADAS Program and Webinar: Jeff Loftus
 - i. Started a project a year ago, it is a two year program. Hired Noblis to operate the project. Includes ATA, ATRI, and OOIDA Foundation. The goal is to get proven technology out there to help market penetration to reduce crashes and fatalities.
- c. NHTSA: Alrik Svenson
 - i. NHTSA reports that were published this year
 - ii. Full written report of all the projects which will go to Bob
 - iii. DOT has been doing information on V2X in light of FCC's decision on GHz
 - iv. NHTSA AV TEST Initiative which was launched in mid-2020. Includes over 90 test deployments. The platform is for sharing data on ADAS test programs.



- d. NTSB: Rob Molloy
 - i. Crashes
 - 1. Limo crash
 - 2. Motorcycle crash in NH
 - a. Both companies lack any safety controls and lack of safety oversight.
 - b. Both crashes included falsifications of medicals
 - c. Both has drug use
 - ii. Research
 - 1. Electric vehicle report coming out tomorrow with difficulty putting out fires
 - 2. Move over laws, where CMVs hit
 - 3. Toxicology surveys with 6 other states.
 - 4. Possible workshop to show common issues.
- e. CVSA: Will Schaefer
 - i. Groups have asked for exemptions from HOS, CVSA has been opposing those
 - ii. Inspection data. Following developments with DataQ process and improve data
 - iii. Emerging technologies, platooning, ADS, electrical systems
- f. ATA: Dan Horvath
- g. OOIDA: Andrew King
 - i. HOS
 - ii. Truck Parking
 - iii. Covid-19 Impacts and Tech-Celerate Now
- h. ABA: Brandon Buchanan
- i. BTS: VIUS: Ryan Grube

11. Hot Topics (up to ½ hour each including discussion)

- a. Our sponsored webinar on **virtual driver training in the pandemic**: Pierro Hirsch & Deborah Quackenbush

With the pandemic, Deborah and Pierro hosted a webinar which incurred over 100 signed up with over 90 in attendance. TRB has the presentation and we hope to make it available to others. It showed how virtual driver training can be helpful for drivers. A driver simulation can really assess the skills of individuals. How can we test individuals and still maintain social distancing. The result was to do a pilot project to look at simulation for testing. One thing we have learned to this pandemic is that technology is not an enemy but should be embracing.

The experience of testing drivers on simulators is comparable to real trucks.

<http://www.trb.org/SafetyHumanFactors/Blurbs/181270.aspx>



b. Health Outcomes Associated with Occupational Exposures to Whole Body Vibration: Making a Business Case for Purchasing and Installing Protective Seats. Pete Johnson from University of Washington

The trucking industry occurs many injuries in terms of both numbers and rates. 3 to 4 times higher. Musculoskeletal issues are the number one claim. Whole body vibration is an objective major to measure the vibration across the seat and driver, which leads to several health issues including fatigue, vigilance lapses, and even crashes.

80 truck drivers, some got air some got active. Measured them across time to see the difference. Dark lines are active

12. Round Robin (all)

We normally go around the room, instead Bob invited everyone to type in their discussion topics or questions via the chat box. Peter VanDyne encouraged the committee to look at different vehicle types.

Dan shared a little on the data behind the covid-19 impacts on the trucking industry. Activity level dropped for most carriers. Vastly different experiences depending on carrier size.

13. Additional Business and Announcements

14. Adjourn



Attendance

First name	Last Name	Role	Company	Email Address
Robert	Scopatz	Chair	VHB	bscopatz@vhb.com
John	Milton	Section Chair	Washington State DOT	miltonj@wsdot.wa.gov
Andrew	Miller	Subcommittee Chair	Virginia Polytechnic Institute and State University (VTTI)	amiller@vtti.vt.edu
Abby	Morgan	Subcommittee Chair	Kittelson & Associates, Inc. (KAI)	amorgan@kittelson.com
Sharon	Newnam	Subcommittee Chair	Monash University	sharon.newnam@monash.edu
Karl	Sieber	Subcommittee Chair	CDC	wks1@cdc.gov
Charles	Vits	Subcommittee Chair	IMMI	chvits@gmail.com
Andrew	King	Secretary	OOIDA	Andrew_King@ooida.com
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Subcommittee Meeting Minutes

Carrier Safety Management Subcommittee, ACS60 (1)

Friday, January 8, 2021 | 2:00 PM- 3:30 PM

Sharon Newnam, Monash University, presiding

Via Zoom

The meeting commenced with introductions of the 19 attendees. The introductions were followed by a review of discussion from TRB20 meeting. Two topics were discussed at the previous meeting including (i) fatigue & driving and (ii) target earnings & safety. New research in the area of fatigue and driver safety was discussed. Sharon Newnam discussed a project funded in Australia that aims to develop two fatigue management project designed to (i) help drivers identify the triggers of fatigue and to generate strategies of avoiding situations that place them at risk of fatigue and (ii) develop the skills of supervisors in identifying situations in which drivers are at risk of fatigue and in managing these situations effectively. Dick Dunne discussed a NCHRP project focused on “Successful Approaches for Facilitating Truck Parking Accommodation Along Major Freight Corridors”. This project examines the roles and actions of transportation agencies, partners, and the public in applying successful strategies, developing emerging practices, and learning useful lessons to help address truck parking issues along major freight corridors within their jurisdictions. Dick also discussed upcoming research in driver distraction.

ACTION: Sharon Newnam and Dick Dunne to update the committee on these projects at TRB22

Presentation: Driving Health Study: Snapshot of Australian professional driver health

The first presentation was from Dr Ross Iles, Senior Researcher from Monash University. Ross presented on the Driving Health Study: Snapshot of Australian professional driver health. This presentation focused on; 1) An overview of the project; 2) An introduction to the most recent analysis of a national survey of the physical and mental health of Australian drivers; and 3) the findings from in depth interviews with drivers and their family members. The final phase of the project will examine interventions aimed to improve the health of the Australian driver workforce. The Driving Health project is a research collaboration between Monash University, Linfox, the Transport Workers Union and the Centre for Work Health and Safety.

Discussion: Questions were posed by Bob Scopatz, Dick Dunne and Ron Knipling. Bob asked Ross if “the high-volume users are actually taking the opioids themselves versus dealing drugs, perhaps even to other drivers?” Ross stated that this was unknown but other data suggested that the drivers were likely to be taking the opioids themselves given the suggestion the workforce is not well educated on the health effects of this medication. Dick Dunne asked if “obesity was a diagnosed health condition?” Ross stated that the data collected on obesity in the study was self-report; thus, it is unknown if obesity was a diagnosed health condition. Ron Knipling stated that he has written an ACS60 statement on this issue of “Why are Commercial Drivers so Unhealthy?” (see <https://rns.trb.org/>). This statement seeks to better understanding of the genesis of the problem. This statement focuses on both the environmental and constitutional apparent causes of the problem.



ACTION: Ron to send Ross the research needs statement and provide any comments or suggested changes.

Presentation: National Road Safety Partnership Program (NRSPP) in Australia

The second presentation was from Mr Jerome Carslake, Director of the National Road Safety Partnership Program (NRSPP) in Australia. Jerome provided an overview of the NRSPP, which is a collaborative network to support Australian businesses in developing a positive road safety culture. The presentation provided an overview of NRSPP activities including tools, evidence and networks used to empower businesses to not only improve road safety in their workplace, but outside of their workplace too. The NRSPP is hosted and delivered by Monash University Accident Research Centre (MUARC).

People are encouraged to visit the NRSPP website: nrspp.org.au

Discussion: Pete VanDyne provided US data on workplace injuries which is available to the public (see, <https://viewpoint.libertymutualgroup.com/article/2020-workplace-safety-index-the-top-10-causes-of-disabling-injuries/>). In the presentation, Jerome discussed 'Grey Fleet' projects. Pete clarified that Grey Fleet is called 'non-owned auto in the US' and welcomed follow up discussion in this area. Jerome also discussed a project in transport suicides. Ron mentioned that he wrote a research statement on this issue and welcomed feedback from Jerome.

ACTION: Ron to send Jerome the research needs statement and provide any comment or suggested changes.

Truck and Bus Operator Health and Wellness Subcommittee, ACS60 (3)

Monday, January 11, 2021 | 12:00 PM- 1:30 PM

William Sieber, Center for Disease Control and Prevention (CDC), presiding

Via Zoom

Presentations:

Rob Molloy: The NTSB Investigation of the Randolph, NH Crash between a Pickup Truck with Trailer and Group of Motorcycles

Rob presented on an NTSB investigation of a driver distraction case with fatalities. He reviewed the driver's history of substance abuse and potential fatigue issues. The CMV was a pickup truck converted to have a "sleeper berth" that was not well designed. The driver had arrests for possession and Operating under Influence. He lied on his medical check for substance abuse and received no treatment. The company hired him without a background check or driver license check. He was suspended in Connecticut and his state of residence was notified. There was no license revocation in Massachusetts. He was due to receive a suspension in about 1.5 weeks but the queue was never checked. The item was not resolved. Massachusetts failed to review over 10,000 paper notices of suspension from other States. They stopped processing those in 2013. They have since addressed the problem with new processes and assigned staff. Other neighboring states have similar problems and were given NTSB recommendations for sending and receiving notices of suspension. The motorcyclists in the crash were impaired by alcohol. Recommended lowering the per set BAC limit to .05.



Ron Knipling asked if the pickup truck operator was a commercial driver. He said that there are some drivers who do not hold a CDL but are commercial drivers. Rob said that this driver did have a CDL but the job didn't require it.

Karl Sieber asked if the crash would have been listed by FMCSA's system on drug use? Because it was a vehicle that doesn't require a CDL it is unlikely that the crash would have been included on this new list.

Jeff Hickman: Undiagnosed Obstructive Sleep Apnea in Commercial Motor Vehicle

Drivers: Application of STOP-Bang

Jeff presented on undiagnosed obstructive sleep apnea (OSA). Jeff started by defining OSA and its impact on fatigue and crash risk. OSA is correlated with other health risks as well. Treatment is effective in also lowering crash risk. He presented the variety of treatments available. Prevalence is difficult to estimate but may be roughly 30% of all commercial drivers. Jeff presented on the variety of OSA screening methods. The preference is for objective measures versus self-reports. The STOP-Bang (SB) has a mix of objective and subjective criteria. It is useful because the objective measures might catch OSA even if the driver is not forthcoming on the subjective questions. The study was designed to estimate prevalence of potential OSA and recalculate the OSA-related crash risk. The baseline diagnosis prevalence is presumed to be too low (7.2%) given the prevalence of correlated medical conditions. The study included 981 diagnosed and 879 potential diagnosable with OSA. Classified participants at low-risk, intermediate-, or high-risk with separate buckets for diagnosed/untreated; diagnosed/treated, and undiagnosed. They estimated prevalence by reallocating people into the potentially OSA group based on STOP BANG. Then, they replicated the Commercial Driver Safety Risk Factors analysis. Normalized by age quartiles and treatment/diagnosis. Outcome variables include reportable crashes, motor carrier-based crash records (all and preventable), and moving violations. Calculated risk ratios. Ultimately, the risk ratios didn't change; however, the regroupings mean that there is a much larger percentage of drivers likely OSA sufferers, just not yet diagnosed.

George Park asked how might STOP Bang analysis comply or differ from something that might occur in a sleep clinic? STOP bang analysis may be used as a screening tool for OSA, which might be confirmed in a sleep clinic.

Matt Parkinson: Bus Operator Workstation Design

Matt is doing research on usability and variability among users. Matt critiqued currently used tools for measuring accommodation – looking at single components of a design at a time. This issue has a long history in design and human factors research. UMTRI developed the Cascading Posture Prediction Model based on extremely adjustable seating and controls. By applying CPPM, they can determine what percentage of drivers, in which situations, are not accommodated by a specific design. They digitized designs and checked what percentage of drivers were accommodated and then came up with new designs that accommodated a greater percentage of drivers. The differences are striking, especially for women— increases in percentage accommodated from the mid-thirties to roughly 90 percent.

Karl Sieber: Update on NIOSH Transportation Research



Karl presented on the CDC's COVID-19 Vaccines and Program. The Advisory Committee on Immunization Practices (ACIP). The recommendations are available online at the CDC website. Specifically for transportation workers, there are some in Phase 1b for Public Transit and USPS. Phase 1c brings in Transportation and Logistics workers. At NIOSH/CDC they have been working to gather input on strategies to support vaccine uptake among transportation workers. They are interested in hearing about knowledge, requirements, industry practices, barriers, and best ways to communicate with workers.

Deborah Quackenbush asked why individuals under 75, say between 60 and 75 that are at risk (say diabetes, et c) are not being vaccinated sooner. Karl replied that these are ACIP recommendations ([Evidence Table for COVID-19 Vaccines Allocation in Phases 1b and 1c of the Vaccination Program \(cdc.gov\)](#)). Many in this age group still work or care for others.

Discussion and Other Comments

Ron Knipling asked for an update on the NIOSH evaluation of the North American Fatigue Management Program? Jeff Hickman said that they are waiting for OMB review.

Stephan Parker (TRB) asked the group to submit to the cooperative research programs. There are new panels forming if you are interested: they are for 1) TCRP Project F-29, Mental Health, Wellness, and Resilience for Transit System Workers. And 2) TCRP Project F-30, Ensuring the Health and Safety of Transportation System Operators and Others in the Transportation Workforce. Nominations are due February 8.

Peter Johnson talked about research on fatigue and reaction time on a psychomotor vigilance task. He invited people to reach out to him if they'd like more information.

[Truck and Bus Data Subcommittee, ACS60 \(4\)](#)

Tuesday, January 12, 2021 | 10:00 AM- 11:30 AM

Bob Scopatz presiding for Andrew Miller, Virginia Polytechnic Institute and State University
Via Zoom

[Truck and Bus Technology Subcommittee, ACS60 \(6\)](#)

Tuesday, January 12, 2021 | 12:00 PM- 1:30 PM

Abby Morgan, Kittelson & Associates, Inc. (KAI), presiding
Via Zoom

Presentation: **“Vehicles Often Know More about our Roads than We Do”** – presentation by **Dr. Darcy Bullock**, Purdue University (*abstract attached*)

- Pre-recorded slides and narration “Big Data Applications for Managing U.S. Roadways On-Demand Webinar: Wejo & Purdue University”: <https://youtu.be/vwpG13VxzAA?t=492>
- Correlating Hard-Braking Activity with Crash Occurrences on Interstate Construction Projects in Indiana <https://link.springer.com/article/10.1007/s42421-020-00024-x>



- I-35 Hard Braking: <https://youtu.be/Yr9f26XIfAU>
- Hard-braking Event Dataset for I-35, TX: <https://doi.org/10.4231/N1FM-2D67>
- Hard-braking Events on Indiana Interstates: <https://youtu.be/lqxNNbI4Svq>
- Hard-braking Event Dataset for Interstate Routes in Indiana: <https://doi.org/10.4231/GK80-XG71>

Interactive Discussion:

New Technologies & Deployments:

- Standards for Electrification (Asset side and Grid side)
- Availability of charging stations vs. gas stations
- Automated buses are now in development for deployment (like Connecticut DOT working with Robotic Research) and Port Authority of New York and New Jersey considering platooning buses.
- Buses: Recent development of “crowding” information for transit fleets using automated passenger count (APC) and automated vehicle locator (AVL) systems.
- 5G

Hot Topics:

- Data exchange from automated trucks to enforcement personnel (*details on next page*)
- Social supports for people who lose the relatively well-paid driving jobs as autonomy takes hold
- How does in-cab notification not become a distracted driving issue?
- Passive fatigue
- If a truck is in “autonomous driving mode” does that count against a driver’s Hours of Operation limit
- How do we get equal application with the innovations that maybe the fleets can employ, but the owner and operator cannot afford?
- Mandatory versus voluntary guidelines in context of Advanced Driver Assist System (ADAS) development and deployment.
- Long haul trucks that get weight approved when they leave a port – why do they have to stop at weight stations?

Research Needs:

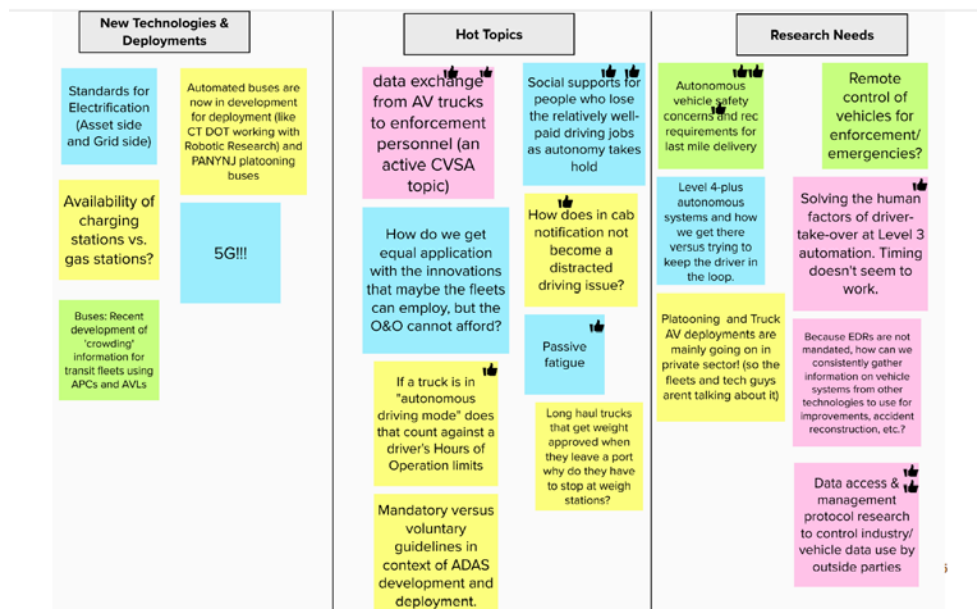
- Autonomous vehicle safety concerns and recommended requirements for last-mile delivery (how do AVs access the curb; what happens if an AV cannot access the curb and needs to double-park in a travel lane)
- Data and access management protocol research to control industry/vehicle data use by outside parties
- Solving the human factors of driver-take-over at SAE Level 3 automation. Timing doesn’t seem to work.
 - Discussion: not aware of any truck or bus player bringing Level 3 AV to the market.
- SAE Level 4+ autonomous systems and how we get there versus trying to keep the driver in the loop.



- Remote control of vehicles for enforcement / emergencies
- Platooning and Truck AV deployments are mainly going on in the private sector – how do we expand the discussion to include the fleets and technical staff?
- Because event data recorders (EDRs) are not mandated, how can we consistently gather information on vehicle systems from other technologies to use for improvements, accident reconstruction, etc.?
- How do we prepare the assets and grid for vehicle electrification (specifically for truck and bus electrification)

Automated Truck Enforcement:

Will Schaefer notes that the Commercial Vehicle Safety Alliance’s (CVSA) Enforcement and Industry Modernization (EIM) committee is tasked with following emerging/latest technologies that impact roadside enforcement inspections (e.g., electrification, aerodynamics, communications, camera monitoring systems, electronic screening/identification/inspections, ADAS, ADS, inspection tools, etc.). The EIM committee in September 2018 appointed a working group, principally members of enforcement to consider how best to inspect trucks equipped with ADS. The CVSA Automated CMV Working Group identified several options depending on level of driving automation and adopted two recommendations, one for ADAS (SAE J3016 Levels 1-3 automation) and the second for ADS (SAE J3016 Levels 4&5 automation). CVSA has publicly posted a working document that outlines its recommendations (<https://www.cvsa.org/wp-content/uploads/CVSA-FMCSA-ADS-Report.pdf>) and our group continues to consider how the concepts could potentially be implemented. Eventual implementation would require broad support among industry and public sector, including possible rulemakings or industry standards. CVSA is working to share information and coordinate with relevant organizations (e.g., SAE International, Transportation Research Board, Technology and Maintenance Council and others). For more information, visit EIM committee page <https://www.cvsa.org/committees/enforcement-and-industry-modernization-committee/> or contact Will Schaefer (301-830-6154 williams@cvsa.org).





Presentation to TRB Technology Subcommittee on Truck and Bus Safety (ACS60(5))

“Vehicles Often Know More about our Roads than We Do”

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Well over 500 billion records a month are generated by connected vehicles in the United states. Within the State of Indiana, over 11 billion vehicle trajectories and 6.5 million hard braking events are monitored each month. The State of Indiana is using these data to monitor interstate slow downs (1), occurrence of hard braking events greater than 0.27g (2) (3), and traffic signal performance (4).

This presentation will briefly summarize a study of 23 construction work zones that covered approximately 150 centerline miles of Indiana interstate roadway in the summer of 2019. The study examined 196,215 hard-braking events over a 2-month period in the summer of 2019 and 3132 crashes over the same 2-month period in 2018 and 2019 for the 23 interstate work zones. The study found there was approximately 1 crash/mile for every 147 hard-braking events in and around a construction site. The R₂ was approximately 0.85. As a result of this study, Indiana developed real time dashboards in 2020 to monitor hard braking events on Indiana Interstates to quickly identify emerging work zone locations that show relatively large number of hard-braking events for further evaluation. <https://youtu.be/lqxNNbl4Svg>. These real-time monitoring efforts are being expanded in 2021 and ratio of hard braking events to crashes will be updated as the connected vehicle penetration increases.

Fatal Back of Queue Crash Scene in Indiana on I-65 on September 12, 2019 (5).

1. 2021 TRB Annual Meeting Paper: 21-01649
2. 2021 TRB Annual Meeting Paper: 21-01539
3. <http://doi.org/10.1007/s42421-020-00024-x>
4. 2021 TRB Annual Meeting Paper: 21-01472
5. <https://www.iiconline.com/story/news/local/lafayette/2019/09/12/fatal-crash-closes-southbound-65-south-lafayette/2299932001/>