



2017 BREAKOUT SESSIONS

location	Topic / Suggested Title	CATEGORY	Potential Speaker(s)	Description
1	Delmar Loop Trolley Update	Multimodal	Tim Nittler – CH2M Chris Poehler – Loop Trolley	As the Loop Trolley nears opening day, the consultant team will discuss design and construction issues and lessons learned concerning the Historic Loop Trolley system as constructed between the History Museum in Forest Park and the Delmar Loop.
2	Kansas City Streetcar: Where do we go from here?	Multi-Modal	Christopher Kinzel - HDR; Jason Waldron- City of Kansas City, MO.	Kansas City's Downtown Streetcar line opened in May 2016, and is already a documented success, with 1,000,000 riders in the first five months of operation. In the last few years, several system expansions have already been studied - some have been abandoned, some are stalled, and some are just beginning to be looked at. As the region realizes that streetcar is a viable transportation mode, what is the best way to move forward, and the best end state? This presentation will examine the various ways in which those questions have been considered.
3	Urban Rehabilitation Corridor Models	Design/Construction	Mark Schnesk, Seiler Design Solutions, LLC	<p>Road reconstruction is often considered one of the most difficult type of road design to perform. The designer is faced with providing a completed design that both meets the required design standards, but is also integrated with the irregularities of existing conditions. Each cross section of the road often requires an individual design in regards to cross slopes, pavement irregularities, and many other variables.</p> <p>In this session, we will demonstrate some of the built in subassemblies used for rehabilitation and reconstruction and outline some specific design scenarios. You will learn a few recommended procedures and techniques to help finalize the design.</p>
4	The First LPA Design Build Project in Missouri	Design/Construction	Ms. Jackie White, City of Grandview; Todd Thalmann, TranSystems	We would provide an overview of the project, why we went Design Build, the challenges faced and lessons learned.
5	Complete Streets - Transforming Communities and State Highways	Multimodal	Sabin Yanez CFS	For many communities around Missouri, Main Street is a state highway. As communities are becoming desire to become more multimodal, they are looking to transform their "Main Streets" into corridors that enhance the quality of life for their citizens. This presentation focuses on the approach of bringing two communities, Branson and Parkville, together with MoDOT to create a new vision for transportation on their Main Streets.
6	I-35 Integrated Corridor Management Project	Safety / Traffic	Jennifer L. Russell, EISE Garver	The Use Case presents a single user's point of view from trip origin to destination, considering decision factors, resources available, and choices made. The selected Use Case was considered in three scenarios for four conditions for a total of twelve operational views. The scenarios are Current (2016), Future (2030), and ICM. Each of the scenarios was evaluated in four conditions: Typical Commute; Unplanned Incident; Planned Construction along I-35; and One Time Event that causes major predictable delays along I-35. Table 3 outlines the Use Case operational conditions. The single Use Case, evaluated in the various scenarios and conditions, provides a solid basis of comparison and evaluation of the transportation network from the user's perspective. The insight gained during the Current and Future Use Case development resulted in the ICM strategies recommended and highlighted techniques that are most likely to have a positive benefit for users when implemented.
7	The St. Louis Regional Freightway's Freight Needs and Development Plan	Economic Development/Funding	Sara Clark Barb Frost Mary Lamie:East-West Gateway	This presentation will review the process followed by the Regional Freightway in preparing its needs analysis, describe the stakeholder engagement process and preview the priorities that the Regional Freightway will support in 2017. Founded in 2014 as an enterprise of Bi-State Development, the St. Louis Regional Freightway further enhances the St. Louis region's standing as a premier international freight hub. The Freightway coordinates regional freight development efforts, tightly connecting the private and public sectors while advocating the region's greatest freight and site selection strengths. The St. Louis Regional Freightway Alliance is comprised of three committees: the Development Committee, Marketing Committee and Policy Committee. These committees assist the Freightway Executive Director with making the St. Louis region a premier freight center in the Midwest through job and economic growth. In 2016, the Freight Development Committee prepared its first Freight Development Project List. In an effort to continue its advocacy responsibilities, the Regional Freightway is preparing its 2017 Freight Needs and Development Plan by collecting, documenting and prioritizing regional freight needs, projects, and transformation initiatives. This work will build on the 2016 accomplishments and set a course for positioning the region to support freight needs through advocacy for project implementation.

8	The Right Blend of Key Ingredients for Optimizing Investment Decisions: Risk, Asset and Performance Management	New Technology/Research	Mara Campbell CH2M	Regardless if a transportation agency is focused on system expansion or maintaining what they have, it must consider how an integrated approach and discipline to deploy strategy while also anticipating and managing opportunities and risks -- will improve its ability to achieve strategic objectives. This session will provide participants with a framework to understand how a blend of risk, asset and performance management is the best way to optimize investments within a transportation agency. Today transportation agencies are faced with an increasingly complex network of assets and demands. Therefore, it has never been more important to align fully integrated strategy execution with risk, asset and performance management. This type of enterprise wide thinking helps to establish and maintain alignment in asset strategy, performance management processes and risk management capabilities in a changing operating environment. It places risk, asset and performance management in a broader, more strategic context.
9	Every Day Counts 4 (EDC4) Overview: Traffic Signal Performance Measures	Design/Construction	Rick Denney-FHWA	Learn how easy it is to start collecting meaningful performance information about your traffic signal system. The presentation from FHWA will help you identify operational objectives, and then set up and use automated performance measurements to help you know how well your signals are attaining those objectives, what changes you might make so that your signals work better, and how to demonstrate the effectiveness of your program.
10	Design Build and Beyond - Rogersville Project Freeway	Design/Construction	James Shaw - RS&H speaker	Rogersville Project Freeway converted US 60 from a full access highway to an access controlled freeway through Rogersville, Mo. The scope included the construction of two new interchanges, three new structures, CD roads, intersection and pedestrian treatments, as well as rejuvenating the local roadway network. Unique aspects of the project included ROW acquisition as a part of the Design Build process as well as outreach programs for the Logan-Rogersville High School and Missouri State University. The project was a progressive D-B awarded to the Ozark Region Road Constructors team (Radmacher Brothers Excavating Company, RS&H, CFS Engineers, HG Consult, Trekk Design Group, and Palmerton &Parish).
11	Ohio River Bridges DB Project - Bridge A026-2 - Curved Steel Box Girder	Bridge/Structures	Ben Erschen, P.E., S.E.-Jacobs	Bridge A026-2 is a single span (132') curved steel box girder structure that is an approach ramp to the new Abraham Lincoln Cable Stayed bridge in Louisville, Ky and was constructed as part of the Ohio River Bridges Design Build Project. This 30 minute presentation will discuss the advantages and disadvantages of horizontally curved steel box girders and several important design issues for this structure type. In addition, the presentation will discuss the design modeling for the bridge with 2D design software and 3D finite element modeling. Finally, the presentation will include a review of required details for steel box girders and construction photos from the topic structure.
12	Grand Boulevard Bridge Emergency Replacement	Bridges/Structures	Cory Imhoff, Brian Zeiger - HDR	In the first week of May of 2016, the existing Grand Boulevard Bridge over I-670 in Kansas City was closed to traffic due to dramatic cracking of the existing voided slab bridge caused by an unknown overweight load. This bridge is located immediately adjacent to the Power and Light Entertainment District and the Sprint Center Arena in downtown Kansas City. HDR was selected by MoDOT to perform this work on an emergency services contract. HDR worked closely with MoDOT and Kansas City, Missouri staff to implement architectural improvements, a bike lane, improved sidewalks with benches, architectural fencing, and improved lighting. The existing voided slab bridge was replaced with adjacent box girder spans supported on bents with drilled shaft foundations. HDR was notified of our selection for these emergency services in early May 2016, contracts were executed in less than a week and plans were submitted on schedule for a special letting on August 9, 2016. The new bridge was in place and opened to traffic on December 1, 2016. It took just over 6 months in total to design, demolish and rebuild this critical link in the downtown network!
13	Threatened and Endangered Species Assessment	Environmental	Bree McMurray	Workshop for LPA sponsors and consultants: procedures, considerations, and documentation for submission of T&E impact assessment for federally funded transportation projects.
14	Electronic Request for Environmental Services (RES) is Now Available for External Users	Environmental	Richard Moore, MoDOT Environmental Compliance Manager	Every MoDOT project on the STIP requires environmental clearances and NEPA documentation. This is done by submitting RESs at project milestones to inform MoDOT environmental specialist about project specifics so they can obtain clearances and permits required to receive FHWA funding. The RES became available for consultants to use on Nov. 1, 2016. It is anticipated that MoDOT will use consultants more in the future to complete and submit RESs. This presentation will discuss required field and desktop work to provide MoDOT with project information; explain the required registration process to use the RES, and; how to complete and submit the form.
15	the I-270 North Environmental Assessment	Environmental	Buddy Desai-CH2M	The first NEPA study in MO to identify the Preferred Alternative in terms of performance measures allowing MoDOT greater flexibility in design build delivery

16	Polyurethane Foam Injection for Roadway and Bridge Maintenance	New Technology/Research	Don Deardorff, PE- Foundation Supportworks, Inc.	Polyurethane foam is used to create a variety of products from weather stripping to automobile parts. In recent years, the technology has been optimized for use in geotechnical and structural applications, including void filling, sealing utilities, pipeline erosion prevention, subgrade improvement, slab stabilization and slab lifting. A common application is releveling approach slabs to remove the “bump before the bridge.” This presentation focuses on how polyurethane foam injection is used for stabilizing and lifting concrete. Learn the benefits of polyurethane foam injection, typical applications, design considerations, and installation steps and equipment.
17	Helical Piles and Tiebacks for Road and Bridge (Re)Construction	Bridge/Structures	Don Deardorff, PE- Foundation Supportworks, Inc.	Helical piles have been used as a deep foundation option dating back nearly 200 years and have enjoyed a resurgence in awareness and popularity in recent decades. In bridge and roadway construction/reconstruction projects, helical tiebacks are often used in the construction of temporary and permanent retaining structures. Helical piles are being used more and more as deep foundations supporting bridge approach slabs. The presentation begins with a brief overview of basic terminology, appropriate uses of different pile types, and descriptions of system components. Project photos will be presented to show typical applications. We will cover the basics of how helical pile capacity is determined and how that capacity is verified during installation. Capacities can be further verified through full-scale load testing.
18	BRO (Bridge off-system) / Local Public Agency Program	Bridge/Structures	Darin R. Hamelink, PE - SW Area Engineer	Case Study: Pile Protection System--Henry County Bridge Rehab, Montrose Lake. 320' long bridge with 40 piles. A step by step guide on how these piles were preserved using a pile wrapping system that has many advantages over traditional reinforced concrete encapsulation.
19	“Optimizing the value of soil compaction testing quality assurance and control using stochastic life cycle cost, comparative and statistical analysis”	Environmental	Kevin McLain – Chief Geotechnical Engineer MoDOT	“The nuclear density gauge has been the standard soil compaction acceptance method for the Missouri Department of Transportation (MoDOT) for several decades. However, the cost of licensing, security, transport protocol and training imposed by the federal government have caused MoDot to question whether it remains a cost effective testing technology.. Nuclear density testing's rapidity and accuracy has been crucial in enabling MoDOT inspectors to keep contractor grading processes on schedule. But, in the last two years MoDOT's Quality Management program has shifted the bulk of testing requirements to the contractor, reducing the need for MoDOT inspection on grading projects. As a result,, MoDOT is investigating compaction testing alternatives to the nuclear density gauge which can provide the necessary results at a lower life cycle cost.”
20	Johnson County Road Design Standards	Safety / Traffic	Howard Lubliner, Ph.D., P.E.	Updating the Johnson County, KS (Kansas City metropolitan area) road design standards was both challenging and complex. The project team worked to ensure the most important design elements aligned with the County's principal values —safety, budget, access and stormwater capacity. To achieve this, the project team relied on state-of-the-art practices combined with sound, long-term decision making to develop performance based road design standards. The process evaluated existing county practices, developed similar performance corridors to provide design consistency and utilized safety performance models that optimized typical sections based on benefit-cost analysis. Additionally, the cross sections were established to account for future maintenance activity, so the long-term safety performance of the roadway would be maintained throughout the full lifecycle of the roadway. Lastly, the Highway Safety Manual (HSM) was used to develop a set of optimized typical sections for each paved corridor in the County. Easy-to-reference tools based on HSM principles are added to each section to allow designers to make informed modifications during the design phase.While performance-based design standards have been theoretically considered in national research circles, this innovative application of the performance based principles is one of the first to use this specific design methodology to develop new road standards at the municipal, county, or state level.
21	The New and Improved Highway Capacity Manual: Weird Intersections, Reliability, Multimodalism, and ITS	Safety / Traffic	Christopher Kinzel - HDR	This presentation is an overview of the recently released 6th Edition of the HCM. It's a book about more than just cars and the people who drive them. It's about the fundamental ways our surface transportation system works (all modes), how its pieces fit together, and what those things mean to those of us building our country's transportation infrastructure. It's a tool to analyze system performance – the thing we should all be planning and designing for. The presenter is a member of TRB's Committee on Highway Capacity and Quality of Service, the body responsible for overseeing the development and production of the HCM.

22	Corrosion Evaluation of Epoxy-Coated Rebar Decks along the US-18 and IA-9 Corridors	Bridge/Structures	Siva Venugopalan - Siva Corrosion Services, Inc.	<p>Corrosion evaluation of 18 bridge decks in northern Iowa along US -18 and IA-9. All of the decks contained Epoxy-Coated Rebar (ECR) at varying levels of deterioration. The goal of this project was to determine the remaining life of the bridge decks and to recommend repair/preservation strategies to extend their lives. SCS used a network level methodology in order to cost effectively evaluate all the bridges. Six bridges were selected for in-depth service life analysis. For the service life bridges, SCS collected rebar cover data, concrete damage quantities, and cores for chloride content and petrographic analysis. Nine chloride samples were collected along the depth of each chloride core to determine the profile through the deck. Chloride, cover, and damage data were used in service life model to project future concrete damage. SCS identified appropriate preservation strategies for each service life bridge. For non-service life bridges, limited chloride cores were taken to develop a chloride profile. A network level analysis was performed with chloride and cover data. We developed a preservation schedule based on current deterioration and chloride profiles. SCS was able to develop a methodology for the Iowa DOT to make preservation/budgeting decisions for ECR decks along this corridor.</p>
23	“Designing concrete mix/concrete structures for a 100-year life”	Bridge/Structures	Siva Venugopalan - Siva Corrosion Services, Inc.	<p>If a concrete structure is designed for 75 years but the property of concrete leads to significant deterioration in 40 or 50 years, the life of the structure is significantly reduced and the overall cost of the structure increases for a small reduction in service life. If the life of the structure (designed for 75 years) increased to 100 or 150 years, the annualized cost of the structure significantly reduces thus allowing more funding for other projects.</p> <p>We design and test concrete for strength to make sure that the structure will have adequate strength once the concrete sets. We also test for air to make sure that the concrete mix will have sufficient capacity to resist freeze thaw damage. We also require testing of aggregates to make sure that concrete suppliers are not using reactive aggregates that will lead to premature deterioration of structures. These are important concrete properties that will have a significant effect on the ability of the structure to carry design loads for the design period. Structure longevity also relies on concrete's ability to resist chloride penetration from deicing salt or marine environment. This is measured by a test called “non-steady state chloride migration tests at 28 days from cast date. The data from this test provides information to prevent the use of chloride permeable concrete that will not provide the design life.</p>
24	Low Cost, High Returns Micro-surfacing Existing Pavements (Pavement Preservation)	Safety / Traffic	Brett Gaither-Byrne & Jones Construction Asphalt-Concrete-Sports-Microsurfacing 314-568-7610	<p>\$1.00 dollar spent today, preserving your pavements, will save you \$4.00 down the road. Learn how Micro-surfacing can add years to your pavements and keep all your roads in great condition. There are other benefits too: Micro-surfacing can keep your pavement joints together, without the cost and hassle of milling and paving. It is often used to fill ruts and restore friction to your surface. Micro-surface is a low cost pavement preservation technique that will keep you and the motorists happy.</p>
25	Creative Solutions for Green Streets and Public Space	Safety / Traffic	Jim Schuessler, FASLA LEED AP ENV SP, CFS Engineers	<p>Streets are being re-conceptualized as the most important public space in many urban areas, both big and small. The role of streets has devolved from ancient times when streets were essential to public life, to the present day where most streets are focused on automobile usage and the conveyance of stormwater to nearby water bodies as fast as codes allow. They need to be considered a vital part of the public realm that prioritizes pedestrians, public space, transit choices, and landscaping as a way to create socially vibrant livable cities. Green streets have promoted the movement away from low-performance, vehicle-dominated public space to living systems to manage stormwater runoff as a resource, as well as offers other ecological and social benefits.</p>
26	Implementation and Integration of 3D Geologic Subsurface Modeling in the Highway Design Process	Design/Construction	John Szturo (HNTB)	<p>KDOT implementation of 3D subsurface modeling. A bit of a change from standard procedures that currently first develop highway line and grade followed by performing subsurface explorations at prescribed intervals. This rarely allows for changes due to poor earth materials or geohazards since right of way is usually predetermined. The 3D idea uses the concept of drilling at optimal locations to define the geology and subsurface materials prior to setting line and grade. This method also incorporates any existing boring information into the geologic model. Once the model is constructed, it can be used to optimize horizontal and vertical geometry of the roadway. Detailed, focused and a more economic investigation program can then be carried out during final design.</p>
27	Scanning The Stan Musial Bridge with the Trimble Sx10	Bridge/Structures	Pat Stack and Kelly Harris, PLS	<p>Case Study was recently complete for MODOT. We will review the technology and tools used for MoDOT to evaluate the use of new technology as compared to older technology to monitor the bridge annually for any anomalies to the bridge cabling, etc. We will show the hardware and software data used and information collected.</p>

28	FHWA Underwater Substructure Bridge Investigations	Design/Construction	Jason Sander, P.E. Program Manager- Terracon	Terracon Consultants has a strong practice for subsurface investigations out of their Cincinnati office. They routinely perform these investigations for DOTs around the country and performed the underwater substructure inspection for the Hurricane Deck Bridge in 2011 for MoDOT.
29	Traffic Modeling for the US 169/I-70 North Loop, Planning & Environmental Linkages (PEL) Study	Design/Construction	Paul Plotus-Wilson&Co	At the completion of the PEL study downtown Kansas City will have a full range of transportation models, including a dynamic traffic assignment (DTA), giving engineers and planners a deeper, more reliable understanding of transportation needs and benefits of future projects. DTA is an intermediate-scale simulation model that fits into the City's traffic model toolbox between area wide travel demand model (EMME) and micro simulation model (VISSIM). The DTA can replicate real world traffic situations, including long vehicle queues and spillbacks, and the driver behaviors resulting from the situations.
30	Rehabilitation of the EADS Bridge	Design/Construction	Allen Smith-TranSystems	The EADS bridge is a historical bridge over the Mississippi River which carries both cars and trains daily. He would give an historical overview of the bridge, the multi year and multi phased rehab project's challenges and how they were overcome by the design and construction firms.
31	Automated Vehicles / Connected Vehicles	New Technology/Research	Mara Campbell-CH2M	The field of autonomous vehicle (AV) and connected vehicle (CV) technology is advancing rapidly. While it may be a few years before fully self-driving cars are used by the general public, technological advancements are speeding along the automated and connected technology continuum toward this destination. Vehicles with AV/CV technologies promise to have significant benefits for society, including dramatic decreases in car crashes, injuries and deaths, increased mobility for disabled Americans and underserved communities, increased road efficiency and capacity, reduced carbon emissions, and better utilization of parking and lands. This session will provide participants with an overview of what AV/CV is, the history and policy of AV/CV, the benefits and disadvantages of it as well as the path moving forward.
32	The View from the Driver(less) Seat – How the Connected and Autonomous Vehicles Future is Affecting Today's Transportation Planning and Communication	New Technology/Research	Bob Bennett, City of Kansas City, MO, Office of Innovation, Martin Rivarola, MARC Assistant Transportation Director, Kip Strauss, HNTB Senior Project Manager	The prospect of future emerging technologies including connected and autonomous vehicles increasingly prompts agencies and stakeholders to question whether significant new facilities and improvements needed now will become a white elephant tomorrow. This imposes new demands on planners and engineers who must adequately investigate and communicate an area's short-, mid- and long-term needs and investments within their agencies and to their stakeholders. Experiences drawn from Kansas City's USDOT Smart City Challenge Grant, the regions Long-Range Transportation Plan and HNTB projects nationally, especially the I-30 PEL & NEPA in Little Rock, provide important lessons learned for how to demonstrate and communicate how planners are balancing real needs with the potential impacts of these emerging technologies.
33	But I Want a Wall Too..	Safety / Traffic	Tawn Nugent, John Fitzpatrick	Review when a traffic noise analysis is required and general overview of the evaluation process. Also discuss the related roadway design issues when mitigation is required.
34	Merchants Bridge Design-Build	Bridges/Structures	Kevin Kriete, Lyndsie Janbakhsh - HDR	Merchants Bridge, a double track bridge owned and operated by Terminal Railroad Association of St. Louis, is one of only three rail bridges crossing the Mississippi River in St. Louis. HDR partnered with the St. Louis Bridge Construction Company for the Design/Build of the Merchants Bridge West Approach Reconstruction. The design includes encapsulating the existing bridge structure in a lightweight cellular concrete embankment retained by MSE wall panels and a foundation system consisting of a geogrid reinforced rock mat used to transfer the embankment load to a series of auger-cast piles. This is only the second use of this approach and the first for replacing an existing structure. The LCC embankment resulted in significant cost savings and it limited track closure time to days instead of weeks.
35	Structures of California High Speed Rail	Bridge/Structures	Michael Cronin, PE, SE -Jacobs	Overview of the California high speed rail project and specific bridge design issues for Construction Package 2-3. The project features a rail line with a 250 mph design speed and is located between Fresno and Bakersfield in Central California. It is currently under design as a design/build contract with Dragados-Flatiron JV.
36	Corrosion Evaluation of Two Reinforced Concrete Bridges in Salem & Roanoke, VA	Bridge/Structures	Siva Venugopalan - Siva Corrosion Services, Inc.	Significant corrosion and concrete damage were observed on the reinforced concrete substructures of two bridges built in the 1960's. The Owner wanted a cost-effective preservation action to extend the service lives of these two bridges. SCS performed a corrosion evaluation of each substructure to determine viable repair options for rehabilitation. SCS performed delamination, cover, carbonation, and general corrosion damage survey on all piers and abutments. Cores were also collected for chloride content and petrographic analysis. Corrosion data from the field and lab was used in NCHRP 558 service life software to project future damage. When the future damage was excessive, repair and corrosion mitigation options were identified to address present and future damage over the next 50 years. The life cycle cost of each option was calculated and compared to select the most cost-effective options for each element. Thus, the Owner was able to select preservation option that effectively address long-term corrosion issues and fit within their budgetary and schedule constraints.

37	Smart Cities and Beyond: Imagining the Future	New Technology/Research	Ben Pierce, Bernie Arseneau - HDR	The presentation will focus on the new wave of Smart City initiatives taking place across the country and in Missouri and how cities and states should be planning for their future smart city now. Included will be a discussion of impactful future technologies, the state of Connected and Autonomous Vehicles, and what we should be doing with our roadways to transition from current vehicles to autonomous vehicles. The presenters are nationally recognized in this field and work closely with federal agencies as well as local agencies on advanced technology planning and policy.
38	Sustainability - Not just a buzzword anymore. What it means for transportation projects.	Environmental	Jennifer Schwaller - HDR	This presentation will offer an "Envision 101", providing the basics of what Envision is, where it applies, and why we should use it for transportation projects. The presentation will also include two project case studies - one for the Kansas City Streetcar which earned a Platinum verification, the first for any transit project; as well as high-profile highway project in South Carolina that is currently in the planning phase. The presenter is a Senior Environmental Planner at HDR, who lead the Envision verification efforts for the Kansas City Streetcar project and is integral to the Envision verification effort on the high-profile highway project in South Carolina.
39	Work Zone Stochastic Capacity: Case Study of I-44 in St. Louis	Safety / Traffic	Jalil Kianfar-St.Louis University	Work zone capacity is a key parameter in the planning of construction and maintenance activities on freeway networks. Transportation agencies across the United States use various definitions of capacity to calculate work zone capacity from field data. Regardless of the definition or method used to estimate work zone capacity, the various studies comprising the existing literature have reached a similar assumption that work zone capacity is a deterministic value. However, the research on freeway capacity has illustrated that capacity is not a deterministic parameter and traffic breakdown could occur at various traffic volumes; thus, freeway capacity is a stochastic parameter. This paper investigates the stochastic capacity at work zones. A two-step framework for developing distributions of the probability of breakdowns at work zones is presented. A clustering-based method to identify breakdowns in work zones and classify traffic data is presented. Parametric and nonparametric methods are used to develop distributions of the probability of breakdowns at work zones. The suggested method is applied to data from a smart work zone in St. Louis, Missouri. Empirical cumulative distribution functions are used to calculate the probability of breakdowns at different flow rates, such as the maximum sustained flow rate, the prequeue flow rate, and the queue discharge flow rate.
40	Therapy for Projects	Design/Construction	Jennifer L. Russell, EISE Garver	This presentation describes the development and application of a Project Health Evaluator tool, based on 11 common psychological conditions. The tool consists of a set of 110 symptoms; the evaluation is based on observations the evaluator selects as being applicable to the project. Then at the click of a button, an assessment of the health of the project is provided, together with a set of recommended actions to help the project recover.
41	Transload Facility Study	Economic Development / Funding	Jennifer Schwaller - HDR	This presentation will provide a case study of KDOT's Transload Facility Study, which sought to capitalize on Kansas' multimodal freight transportation network to make a positive impact on the local economy, as well as to provide improved access to regional, national, and global multimodal transportation networks. Specifically, the project identified economic growth opportunities that were dependent on efficient and cost effective freight transportation that could be realized through the development of a transload facility. How can this be applied in Missouri?
42	Hillsboro Road Safety Improvement Study for St. Louis County	Safety / Traffic	James Ritter-CH2M	St. Louis County DOT's Hillsboro Road Safety Improvement Study analyzed the existing safety conditions and evaluated potential safety improvements for a 1.6 mile stretch of Hillsboro Road in south St. Louis County. Recent construction of multiple subdivisions resulted in heavy traffic volumes on Hillsboro Road, a two-lane roadway with a narrow rural cross section traversing many hills and sharp curves. The safety analysis included a road safety audit and existing conditions analysis, HSM-based safety analysis, identification and evaluation of safety strategies and potential safety improvements, and community engagement. The final product outlined specific short-term and long-term safety improvements for the roadway.
43	A Case Study Comparison of SRH-2D and HEC-RAS Two dimensional Hydraulic Models for Highway Encroachments and Bridges	Bridge/Structures	Mark Hammonds-Garver	To provide hydraulic design data for a proposed bridge, two-dimensional (2D) hydraulic models of the Pearl River floodplain were developed using SMS/SRH-2D and HEC-RAS version 5.0 software. The study area is hydraulically complex, with a wide floodplain, a sinuous river channel, an abandoned railroad embankment, and numerous main channel and relief bridges, making this an ideal location for 2D hydraulic modeling. The SRH-2D and HEC-RAS models were compared in terms of ease of use, run times, water surface elevations, velocities, and flow distributions (especially through the bridges). This presentation will briefly describe the model development and results comparison, and will present lessons learned in 2D bridge modeling using these two software packages.

44	USGS Flood Inundation Mapping	Emergency Response	Paul Rydlund - USGS	<p>Floods are the leading cause of natural-disaster losses in the United States. More than 75 percent of declared Federal disasters are related to floods, and annual flood losses average almost \$8 billion with over 90 fatalities per year. Although the amount of fatalities has declined due to improved early warning systems, economic losses have continued to rise with increased urbanization in flood-hazard areas. The USGS Flood Inundation Mapping (FIM) Program helps communities protect lives and property by providing tools and information to help them understand their local flood risks and make cost-effective mitigation decisions. The two primary functions of the FIM program are (1) Partner with local communities to assist with the development and validation of flood inundation map libraries and (2) Provide online access to flood inundation maps along with real-time streamflow data, flood forecasts, and potential loss estimates. As a result of December flooding in 2015, the USGS Missouri Water Science Center has engaged in a variety of partnerships in the lower Meramec River to provide online access to local flood inundation map libraries linked directly to USGS streamgages and associated river forecasts administered by the National Weather Service (NWS).</p>
45	Implementation on Safety Research	Safety / Traffic	Howard Lubliner, PhD, PE - SKW	<p>DOT's and other infrastructure owners are increasingly looking to utilize quantitative safety analyses to make better informed project and programmatic decisions. Though relatively new, the field of quantitative safety analysis is growing rapidly not only in its implementation but also in the expanding body of knowledge provided by state and national research efforts. This presentation will present best practices in quantitative safety analysis from around the country along with an understanding of the fundamental theoretical issues that drive and limit the available crash prediction models. Additionally, the new elements that can be anticipated in the pending 2nd Edition of the Highway Safety Manual will be discussed.</p>
46	Completion of the I-70 Columbia Bridges	Design/Construction	Tim Broyles (Parsons Transp. Group) Dennis Heckman (MoDOT)	<p>The Columbia I-70 Bridges design-build project consisted of replacing six deficient bridges on I-70 with five new bridges in Columbia, Missouri for MoDOT. Three of those bridges were slid into their permanent position. Expanded scope also included designing a “Dog Bone” roundabout at Route 763/Range Line Street and dual lane roundabouts on the north and south sides of I-70 at the Business Loop 70 Interchange. All construction work was performed with access to all four lanes of I-70 open to 80,000+ vehicles per day and completed in less than 14 months. As the major interstate corridor across Missouri, it was critical to manage the design and construction effectively to maximize budget, traffic movement and public safety. To answer these challenges, the following innovative solutions were deployed:</p> <ul style="list-style-type: none">• Utilization of Accelerated Bridge Construction (ABC) techniques to slide in final bridges at three of the five I-70 bridge locations over cross streets.• Innovative intersection design that increased public safety while maximizing the construction budget. <p>This project is an outstanding example of a small infrastructure/transportation design-build project that packs a major punch.</p>
47	Preserving Bridge Decks in Missouri with Fast Track Hydrodemolition and Latex Modified Concrete	Bridge/Structures	Patrick Martens, P.E. - Bridge Preservation and Inspection Services	<p>Presentation will look at how the use of fast track hydrodemolition and latex modified concrete has evolved over the last 20 years in Missouri and is now an important tool in preserving bridge decks.</p>