

Standing Committee on Emergency Evacuations (ABR30)
Mike Robinson, Ph.D., Chair

Emergency Evacuations: Building Resilience through Efficient Response

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The Transportation Research Board (TRB) Standing Committee on Emergency Evacuations Committee (ABR30) seeks to increase the understanding of the technological, operational, and human dimensions of evacuations during emergencies and disasters. Committee interests address both vehicle-borne and pedestrian evacuations of all types, from rapid building exits to mega-regional, multiple day mass evacuations. Contributions are made to all phases of evacuations, from planning and advance preparations through the evacuation itself and finally, to the return of residents.

BACKGROUND

The ABR30 Committee was created in January of 2001 as a Subcommittee under the TRB A3B01 the Committee on Traffic Safety Management. The unanimous vote of approval from the Safety Committee came after a yearlong grassroot effort by Dr. Brian Wolshon, then an assistant professor at Louisiana State University, to recruit members and bring the problems, needs, and research opportunities in the field of evacuation to the attention of TRB, its members, and transportation agencies throughout the United States. This effort was also supported by key senior TRB members that included A3B01 Chair, Dr. Leanna Depue, and TRB staff member Dr. Rick Pain.

Dr. Wolshon's interest in the topic of evacuation came about after Hurricanes George in 1998 and Floyd in 1999 when transportation-related issues associated with their evacuations revealed the potential for such failures to put thousands, if not millions of people at risk. Two things were clear at that time. The first, was that the transportation community, though the most knowledgeable and best able to plan and manage transportation resources for evacuations were largely unaware of the roles that they could play. The second was that emergency management and response agencies, those charged with leading preparedness planning for such events, were largely unaware of the capabilities that existed within the transportation field. This made it clear to Dr. Wolshon that an entirely new field of transportation research was needed to address these issues where none had ever existed before.

Within a year of its approval the Subcommittee held its first formal meeting in 2002, at the 81th TRB Annual Meeting. This meeting included representatives from academia, government agencies, and private companies who brought a wide and diverse set of expertise, experiences, and perspectives to launch the first forum for identifying research needs, undertaking research, creating new knowledge, and disseminating findings to the practitioner and research communities.

The initial research focus of the new Subcommittee was limited to evacuation traffic operations and simulation modeling; particularly for hurricane mass evacuations in the southern United States. However, it quickly became tragically apparent that the research needs of

evacuation went far beyond what were imagined in 1999 and 2000. Within a matter of months of the Subcommittee's formation, the United States was confronted with the terrorist attacks of September 11th. This was followed by a series of historically devastating hurricanes along the Gulf Coast. Later, it as wildfires in California, the volcanos in Hawaii, then a list of countless wars, natural, manmade, and technological disasters throughout the world - all of which involved mass evacuations and exiles that also revealed the limited knowledge that existed to carry them out safely, efficiently and effectively.

Almost immediately, the roll and goals of the Subcommittee began to change. It was clear the Subcommittee was needed to provide leadership and a forum for the sharing of data and experiences, not just to evolve and improve practice, but also to stimulate new ideas related to all aspects of emergency evacuation. These partnerships rapidly began collaborations across research and practice disciplines that spanned the world and created new tools, techniques, and ideas to address the vast array of complex issues associated with safe, efficient, and effective emergency evacuation planning and operations. Through the shared energy and dedication to purpose of its members, the recognition of and interest in issues of evacuation grew enormously over the next decade. Transportation and emergency management agencies at all levels of government tasked with emergency preparedness supported and actively participated in the Subcommittee. At the federal level, agencies like the U.S. Departments of Defense (DOD), Transportation (USDOT), Department of Homeland Security (DHS), Nuclear Regulatory Commission (USNRC), and National Institute of Standards and Technology (NIST), along with several of the national laboratories.

The impact of the Committee was evident from and its beginning and has continued to grow stronger every year since. Not only has the work of Committee evolved research, its members have directly and significantly transformed evacuation practice. This translation of knowledge to practice is evident in:

- updated hurricane evacuation plans across the country;
- the way nuclear power plant emergencies are analyzed, planned, and managed;
- planning for carless and special needs evacuees;
- the techniques to model the generation and routing of evacuation travel; and
- the tools used to simulate evacuation traffic processes among many others.

The dissemination of the work of the Committee can be seen in published works at all levels of scholarly and practice-oriented works, including:

- Scores of TRB papers and presentations;
- Books, such as
 - *Creating Resilient a Transportation System: Policy, Planning and Implementation*, 2019, and
 - *Large-Scale Evacuation: The Analysis, Modeling, and Management of Emergency Relocation from Hazardous Areas*, 2018;
- Book Chapters (ITE), such as
 - "Traffic Management During Planned and Unplanned Emergency Events" in the *ITE Traffic Engineering Handbook*, 2016,

- “Planning and Management of Transportation Systems for Evacuation” in the *Handbook of Emergency Response: A Human Factors and Systems Engineering Approach*, 2013,
- “The Role of OR in Emergency Evacuation from Hazmat Incidents,” in the *Handbook of Operations Research and Management Sciences Models in Hazardous Materials Transportation*, 2013, and
- “Contraflow for Evacuation Traffic Management,” in the *Encyclopedia of Geographical Information Science*, 2008; and
- NCHRP Reports, such as
 - *A Guide to Regional Transportation Planning for Disasters, Emergencies, and Significant Events*, 2014,
 - *A Transportation Guide for All-Hazards Emergency Evacuation*, 2013,
 - *Transportation’s Role in Emergency Evacuation and Reentry*, 2009, and
 - *Convertible Lanes and Roadways*, 2004.

In 2012, based on the recognition of a continued overwhelming and growing interest in evacuation research - worldwide, TRB granted the Subcommittee Task Force status with the expectation that it could one day soon progress to become a Standing Committee. The newly created TRB ANB80T, *Task Force on Emergency Evacuation*, expanded its reach to include members from across the globe and extend its research work in policy, planning, multimodal evacuations; the needs of carless and low mobility evacuees; as well as post-event reentry and recovery. The Subcommittee and Task Force were instrumental in creating the National Evacuation Conference a biennial event hosted in 2010, 2012, 2014, and 2016 in New Orleans. It intended as a venue to disseminate research findings to the user community and for these practitioners to share successes, failures, and their areas of research need. This conference also resulted in the publication of dozens of research papers in seven journal special issues, including:

- Special Issue on “Evacuation and Sheltering: Modelling, Management and Policy to Promote Resilience,” *International Journal of Disaster Risk Reduction*, 2018,
- Special Issue on “Catastrophic Event Management,” *International Journal of Transportation*, 2016,
- Special Issue on “Planning, Modeling, and Evaluating Transportation Systems for Emergency Evacuations” *Journal of Emergency Management*, 2015,
- Special Issue on “Interdisciplinary and Multimodal Nature of Evacuations: Nexus of Research and Practice,” *ASCE Natural Hazards Review*, 2015,
- Special Issue on “Emerging Developments in Evacuation Methods, Planning, and Analysis” *International Journal of Mass Emergencies*, 2013,
- “Emergency Evacuation Modeling” of the *Journal of Transportation Safety and Security*, 2011, and
- Special Issue on “Emergency Transportation Preparedness, Management, and Response in Urban Planning and Development,” *ASCE Journal of Urban Planning and Development*, 2008.

CURRENT COMMITTEE, SCOPE, AND LEADERSHIP

In 2015, the Task Force was elevated to the Standing Committee on Emergency Evacuations (ABR30) within the newly created TRB Transportation Systems Resilience Section (ABR00).

After nearly 20 years of its formation and leadership through the TRB committee structure, Dr. Wolshon stepped down as Committee Chair in 2018. As one of his last significant actions as chair, he helped to shepherd the formation of TRB ABR30(1), the Joint Subcommittee on Emergency Responders. This group led by Dr. Scott Parr of Embry-Riddle Aeronautical University seeks to “promote interdisciplinary collaboration, research, and innovation for emergency response and responders within transportation and to encourage technology transfer and dissemination of knowledge to enhance transportation safety, efficiency, equity, and resiliency for all users.”

The new Chair, Dr. Mike Robinson of Old Dominion University, quickly identified a dynamic leadership team eager to guide the committee to new levels of influence. Dr. Pamela Murray-Tuite (Clemson University) was named Committee Vice Chair, Dr. Arif Sadri (Florida International University) was formally assigned as Communications Coordinator, and Mr. Mike Wallace (Fehr and Peers) stepped up as Committee Research Coordinator. These rapidly infused new ideas and energy, evidenced by initial plans for new subcommittees, calls for papers, and exceptional participation from young professionals.

Among the first tasks of the new Committee leadership was to revise the Committee’s core mission and goals as part of the 2018 update to the ABR30 Triennial Strategic Plan. Changes formalized the Committee’s interest in not only the response phase (the evacuation), but also preparation, mitigation, and recovery; all modes; and all causes, including evacuations from planned special events, not exclusively disasters. At the TRB Annual Meeting 2019, members identified mass refugee migrations and evacuations as an under-studied area of concern and encouraged related research and reports. ABR30 will continue to foster increased understanding of the technological, operational, and human dimensions of evacuation during emergencies and disasters and provide a forum to identify research needs, encourage and facilitate individual and joint research efforts, and share knowledge on evacuations.

RECENT ACTIVITIES

ABR30 conducted its first mid-year meeting on July 23, 2018 in Washington, D.C., followed by a second meeting in conjunction with the Transportation Resilience Innovations Summit and Exchange (RISE) conference in Denver on October 9. During the 98th TRB Annual Meeting, ABR30 led three lectern sessions on *Evacuation Decision Making and Behavior*, *Improving Emergency Response with Multimodal Evacuations*, and *Emergency Response: Why Is Data a Roadblock?* along with two poster sessions on *Pedestrian and Facility Evacuations* and *Emergency Response, Evacuation Theory, and Modeling*. ABR30 also co-sponsored several lectern sessions and workshops partnering with the resilience section and other committees. The *Joint Subcommittee for Emergency Responders* (ABR30(1)) has been approved and held its first meeting in Washington, D.C., on July 23-24, 2018. Co-sponsoring committees currently include –the Standing Committee on Traffic Law Enforcement (ANB40), –the Standing Committee on Transportation Safety Management (ANB10), and the Standing Committee on Regional Transportation Systems Management and Operations (AHB10). ABR30(1) also organized a workshop on *Emergency: Saving Our Responders* during the TRB Annual Meeting 2019 to introduce and discuss the needs of a resilient emergency responder community.

FUTURE OUTLOOK

More than half of those actively participating in the Emergency Evacuation Committee are young professionals. In recognition of this exciting demographic, and in order to best take advantage of new ideas and innovations, ABR30 is creating a new subcommittee led by and

devoted to young professionals. Success must still be proven, but committee members are confident that this initiative will provide great benefits in the years to come.

The work completed through ABR30 is critical to a broader push for more resilient communities around the country. Efforts will promote a more complete understanding of disaster events and provide for increased integration of related planning, policy, construction, and operations. ABR30 will support and disseminate the results of research and experience from actual events to enhance the effectiveness and efficiency of operations and increase life safety and convenience or comfort of those who are involved in an evacuation. The Committee will also promote the exchange of information and practices of professionals working in the field to stimulate research based on needs that will forward the understanding and practice within transportation. The web presence of ABR30 activities and updates can be found here: <https://sites.google.com/site/trbabr30evacuations>

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