AASHTO WATER COUNCIL
Baton Rouge, Louisiana, April 23rd, 2019

Research Opportunities
STRATEGIC PLAN
COUNCIL ON WATER TRANSPORTATION

Goal: Identify and promote research and develop educational resources to support water transportation

- **Strategy**: identify water research priorities to help member agencies develop and implement effective multimodal transportation solutions

- **Implementation Actions**:
  - *Identify research gaps in water transportation*
  - *Work with other AASHTO councils and committees to develop and implement effective multimodal research*
provide scientific advice to the government and to "investigate, examine, experiment, and report upon any subject of science"
The National Academies

National Academy of Sciences 1863
- Behavioral & Social Sciences & Education
- Earth & Life Studies
- Engineering & Physical Sciences
- Gulf Research Program

National Academy of Engineering 1964
- Health and Medicine

National Academy of Medicine 1970
- Policy & Global Affairs
- Transportation Research Board

Private, Nonprofit Institution
RESEARCH GRANTS

NAS GULF RESEARCH PROGRAM- Available Grants

• Healthy Ecosystems Grants-Advancing Understanding of Coastal Ecosystem Function and Dynamics in the Coupled Natural-Human System of the U.S. Gulf Coast

• Understanding Gulf Ocean Systems- Fostering Innovation to Improve Understanding and Prediction of the Gulf of Mexico Loop Current System
RESEARCH GRANTS

GULF RESEARCH PROGRAM

• Safer Offshore Energy Systems-Advancing Safety Culture in the Offshore Oil and Gas Industry

• Thriving Communities Grants 5 - Request for Applications (CLOSED)
  – Enhancing Coastal Community Resilience and Well-being in the Gulf of Mexico Region
OTHER NAS RESEARCH

DIVISION OF EARTH AND LIFE STUDIES-
Ocean Studies Board, Board of Earth Sciences and Resources

• Studies Underway-
  – Interventions to Increase the Resilience of Coral Reefs
  – Long-term Coastal Zone Dynamics: Interactions and Feedbacks between Natural and Human Processes and their Implications for the U.S. Coastline
Transportation Research Board

- Technical Activities (annual meeting)
- Policy Studies (TRB Special Reports)
- Cooperative Research Programs
Policy Studies
MARINE BOARD STUDIES UNDERWAY
TRB POLICY STUDIES

• Review of U.S. Coast Guard Vessel Stability Regulations
• Review and Update of Bureau of Safety and Environmental Enforcement Offshore Oil and Gas Operations Inspection Program
• Update of National Naval Responsibility for Naval Engineering
Technical Activities
TRB MARINE GROUP & FREIGHT SYSTEMS
GROUP COMMITTEES

- Freight Transportation Economics and Regulation
- Freight Transportation Planning and Logistics
- International Trade and Transportation
- Urban Freight Transportation
- Agricultural Transportation
- Military Transportation
- Transportation of Hazardous Materials
- Intermodal Freight Transport
- Intermodal Freight Terminal Design and Operations
- Truck Size and Weight
- Trucking Industry Research

- Ports and Channels
- Inland Water Transportation
- Marine Environment
- Marine Safety and Human Factors
- Ferry Transportation
MARINE BOARD
CURRENT AREAS OF INTEREST FOR RESEARCH

• Autonomous Ships, Vehicles, and Shipping
• Building and Fostering a Strong Safety Culture
• Challenges in Arctic Operations
• Cyber in the Marine Transportation System
• The Future of Navigation
• Human and Intellectual Capital
• Improving Resiliency in the Marine Transportation System
  • (includes Sea-Level Rise and Extreme Weather Impacts on Coastal, Port and Waterways Infrastructure)
• Offshore Wind Energy Implications for Maritime
• Towards Zero Emissions Shipping Operations/ Future of Vessel Energy and Propulsion
TRB MARINE BOARD

Member Agencies

- American Bureau of Shipping
- National Fish and Wildlife
- Center for Offshore Safety
- Shipping
- Maersk
- Jacobsen Pilot Service
- Trident Maritime Systems
- American Bureau of Shipping
- National Fish and Wildlife
- Center for Offshore Safety
- Shipping
- Maersk
- Jacobsen Pilot Service
- Trident Maritime Systems
- University
- USACE
- USCG
- MARAD
- NOAA
- ONR
- NAVSEA
2019 TRB ANNUAL MEETING SESSIONS

- Game-changing Technologies for Multi-modal Freight Corridor Management: North America, Europe and Asian Initiatives
- Impacts of New Technological and Economic Trends in Transportation and Land Use Activity
- Making Autonomous Freight Vehicles Work in the Cities of the Future
- Digitalization in Ports
- International Trade and Transportation Implications of the United States-Mexico-Canada Agreement (USMCA)
- Impacts of Changes in Trade Policies on Agriculture and Food Transportation
- Inland Waterway Transportation Challenges and Path Forward
- Using Modeling to Analyze Vessel Safety Risk in Waterways
- Big Data Applications in Maritime
Cooperative Research Programs
Transportation Research Board

- Technical Activities (annual meeting)
- Policy Studies (TRB Special Reports)
- Cooperative Research Programs
  - Highways
  - Transit
  - Airports
  - Behavioral Traffic Safety
<table>
<thead>
<tr>
<th>Program</th>
<th>Funded Years</th>
<th>Annual Budget</th>
<th>Partners</th>
</tr>
</thead>
<tbody>
<tr>
<td>NCHRP (Highways)</td>
<td>1962-</td>
<td>$40M</td>
<td>FHWA, AASHTO</td>
</tr>
<tr>
<td>TCRP (Transit)</td>
<td>1992-</td>
<td>$5M</td>
<td>FTA, APTA</td>
</tr>
<tr>
<td>ACRP (Airports)</td>
<td>2004-</td>
<td>$15M</td>
<td>FAA, ACI</td>
</tr>
<tr>
<td>BTSCRP (Behavioral Traffic Safety)</td>
<td>2017</td>
<td>$2.5</td>
<td>GHSA</td>
</tr>
</tbody>
</table>
Unfunded Programs

<table>
<thead>
<tr>
<th>Program</th>
<th>Funded Years</th>
<th>Annual Budget</th>
<th>Partners</th>
</tr>
</thead>
<tbody>
<tr>
<td>NCFRP (Freight)</td>
<td>2006-2012</td>
<td>$3.75M</td>
<td>OST/R</td>
</tr>
<tr>
<td>HMCRRP (Hazardous Materials)</td>
<td>2006-2012</td>
<td>$1.25M</td>
<td>PHMSA</td>
</tr>
<tr>
<td>NCRRP (Rail)</td>
<td>2010</td>
<td>$5M</td>
<td>FRA</td>
</tr>
</tbody>
</table>
Applied Research

• Guides and Specifications
• New or improved models/tools
• New or improved operations and services
• New or improved testing/evaluation techniques
• Fact finding (white papers)
• Software products for others
NCHRP Problem Submittals/Selections

• Submitted by:
  – State Departments of Transportation
  – AASHTO councils & committees
  – Federal Highway Administration

• Selected by the AASHTO Special Committee on Research & Innovation (R&I)

• Approved by AASHTO Board of Directors (requires 2/3rd vote on each problem)
FY 2020 NCHRP SUBMITTED PROBLEM STATEMENTS

114 New Problem Statements
($46.13 M)

77 from AASHTO Committees
($31.11 M)

34 from Member Departments
($14.02 M)

3 from FHWA
($1 M)

13 Continuations
($10.06 M)

127 Problem Statements
($56.19 M)
FY 2020 NCHRP Research Needs

- Guidebook on Integrating Freight Movement into 21st Century Communities’ Land Use, Design, and Transportation Systems
TRB COOPERATIVE RESEARCH PROGRAMS
NCFRP 50
Improving Freight Transportation Resilience in Response to Supply Chain Disruptions
SUPPLY CHAIN SCENARIOS

1. Pipeline - Infrastructure closure/failure due to a weather event or pipeline rupture - Gulf Coast to East Coast

2. Marine Terminal/Harbor - Infrastructure closure/failure due to cyber terrorism - Exports of agricultural products from San Joaquin Valley, CA

3. Port/Rail - Failure due to labor activity or pandemic - Imported consumer electronics from Southern California to Illinois

4. Roads/Bridges/Airports - Infrastructure closure/failure due to geological event - PNW exports of computer chips

5. Inland waterway/Locks - Infrastructure closure/failure due to accidents (locks) or low water levels - Mississippi River barged grains from the Midwest to New Orleans

6. ......etc.....
Logistical Strategies

Conditions and Solutions for Supply Chain Disruption Scenarios

• Pre-disruption
• During Disruption
• Post Disruption
Logistical Strategies Pre-Disruption

Condition

1. Pre-established plans can be difficult to execute
2. Equipment may be unavailable when required
3. Contract negotiation can be time consuming
4. Isolated entities can struggle to handle capacity after a disruption

Solution

1. Host drills, practice sessions, and debriefings
2. Stage and position equipment ahead of time
3. Negotiate contracts ahead of time
4. Partner with similar facilities that can help divert cargo
## Logistical Strategies During Disruption

<table>
<thead>
<tr>
<th>Condition</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Capacity on evacuation routes is limited</td>
<td>1. Increase capacity to enhance access into affected areas</td>
</tr>
<tr>
<td>2. Manual re-routing is difficult</td>
<td>2. Encourage the use of common applications to re-route trucks</td>
</tr>
<tr>
<td>3. Isolated carriers can be adversely affected by disruptions</td>
<td>3. Create partnerships among carriers in the same market</td>
</tr>
<tr>
<td>4. Disruptions affect delivery time</td>
<td>4. Dispatch trucks early if there is a known road disruption</td>
</tr>
</tbody>
</table>
# Logistical Strategies Post Disruption

<table>
<thead>
<tr>
<th>Condition</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Power may be unavailable following a disruption</td>
<td>1. Keep generators on hand to provide back up power</td>
</tr>
<tr>
<td>2. Damage due to a disruption needs to be quantified</td>
<td>2. Dispatch teams to assess damage</td>
</tr>
<tr>
<td>3. Disruption recovery requires a series of repairs</td>
<td>3. Prioritize repairs that save lives</td>
</tr>
<tr>
<td>4. Disruptions cause congestion</td>
<td>4. Add extra capacity to clear out congestion, assets and schedule permitting</td>
</tr>
</tbody>
</table>
A Year of NCHRP

Problem Statements Due Nov 1

Program Approval

Proposal Process

Research Phase Begins

Evaluation

Program Formulation

Panel Formulation

Agency Selection
NCHRP 20-123 Support for AASHTO Committees & Councils

- Support for advancing and implementing the vision, mission, and strategic goals
- $1.5 million allocation
MEETING RESEARCH NEEDS

- National Academies of Sciences, Engineering, and Medicine Grants
- Model: FHWA Pooled Fund Program
- Peer Exchange
- Conferences
- TRB
  - Policy Studies
  - Cooperative Research Program, NCHRP
  - Special Project-Committee Support Project
Research Conferences of Interest

**Marine Transportation System Research and Development Conference, Transforming the Marine Transportation System through Multimodal Freight Analytics.** (2018)

The conference considered potential research to address issues associated with transforming the marine transportation system (MTS) and explored opportunities to harness robust multimodal freight transportation data and analytics. Sessions at the conference focused on multimodal freight operations, planning, and policy; challenges associated with the corresponding analytics; and using these analytics for strategic MTS planning. The following publication summarizes the presentations and discussions from the workshop. [Conference Proceedings on the Web: Transforming the Marine Transportation System Through Multimodal Freight Analytics](#)
Implementing a Freight Fluidity Performance Measurement System workshop
September 5-6, 2018 in Washington, DC.
Research Conferences of Interest

Innovations in Freight Data Workshop
April 9-10, 2019 in Irvine, California.
The 2019 workshop will build from the 2017 workshop and bring together freight data users and decision makers to learn and share the latest applications of emerging freight data sources, development of value-added features, integration of data sets, and other innovations.

17th Biennial National Harbor Safety Committee Conference
The conference focuses on promising practices, innovation, and technology to address critical safety and security issues related to waterways management.