International Bridge Forum:

Bridges 2020: Management for Long Term Bridge Performance

NCHRP Leveraging Resources for Better Transportation

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Outlines

- National Cooperative Highway Research Program (NCHRP)
- NCHRP Bridge Research Areas
- NCHRP Project 20-83 Series Long-range Strategic Issues

National Cooperative Highway Research Program

- NCHRP was created in 1962 as a means to conduct research in acute problem areas that affect highway planning, design, construction, operation, and maintenance nationwide
- State Departments of Transportations (DOTs) leverage their funds through NCHRP to work on problems common to many states
- Keys to NCHRP Success
  - Guided by NCHRP Panels
  - Managed by the Transportation Research Board (TRB)
  - Sponsored by AASHTO and its member departments (i.e., individual State Departments of Transportation)
  - Assisted by FHWA

NCHRP Bridge Research Areas

- Design and Specifications
- Safety and Security
- Construction
- New Materials
- Inspection
- Maintenance and Repair & Strengthening
- Testing and Instrumentation
- Asset Management and Performance Measures

Design and Specifications

Project	Title	Funds
12-83	Calibration of LRFD Concrete Bridge Design Specifications for Serviceability	$500K
12-84	Guidelines for the LRFD and Rating of Riveted, Bolted, and Welded Gusset-Plate Connections for Steel Bridges	$1M
12-33	**Development of a Comprehensive Bridge Specification and Commentary-LRFD**	**$1.4M**
24-34	Risk-Based Approach to Bridge Scour Prediction	$500K

Safety and Security

Project	Title	Funds
12-86	Bridge System Safety and Redundancy	$500K
12-85	Highway Bridge Fire Hazard Assessment	$350K
12-72	Blast-Resistant Highway Bridges: Design and Detailing Guidelines	$950K

Construction

Project	Title	Funds
12-79	Guidelines for Analysis and Construction Engineering of Curved and Skewed Steel Girder Bridges	$600K
12-74	Development of a Precast Bent Cap System for Seismic Regions	$600K
10-71	Evaluation of CIP Reinforced Joints for Full-Depth Precast Concrete Bridge Decks	$650K

New Materials

Project	Title	Funds
18-15	High-Performance/High-Strength Lightweight Concrete for Bridge Girders and Decks	$750K
18-12	Self-Consolidating Concrete for Precast, Prestressed Concrete Bridge Elements *Completed—Published as NCHRP Report 628*	$450K
12-77	Structural Design with High-Strength Reinforcement	$600K

Inspection

Project	Title	Funds
12-82	Developing Reliability-Based Bridge Inspection Practices	$400K
20-07/ Task 252	Guidelines for Implementing Quality Control and Quality Assurance for Bridge Inspection	$75K
10-64	Field Inspection of In-Service FRP Bridge Decks *Completed—Published as NCHRP Report 564*	$300K

Maintenance, and Repair & Strengthening

Project	Title	Funds
18-14	Evaluation and Repair Procedures for Precast/ Prestressed Concrete Girders with Longitudinal Cracking in the Web	$300K
14-15	Developing a National Database System for Maintenance Actions on Highway Bridges	$427K
10-73	Guide Specification for the Design of Externally Bonded FRP Systems for Repair and Strengthening of Concrete Bridge Elements	$450K

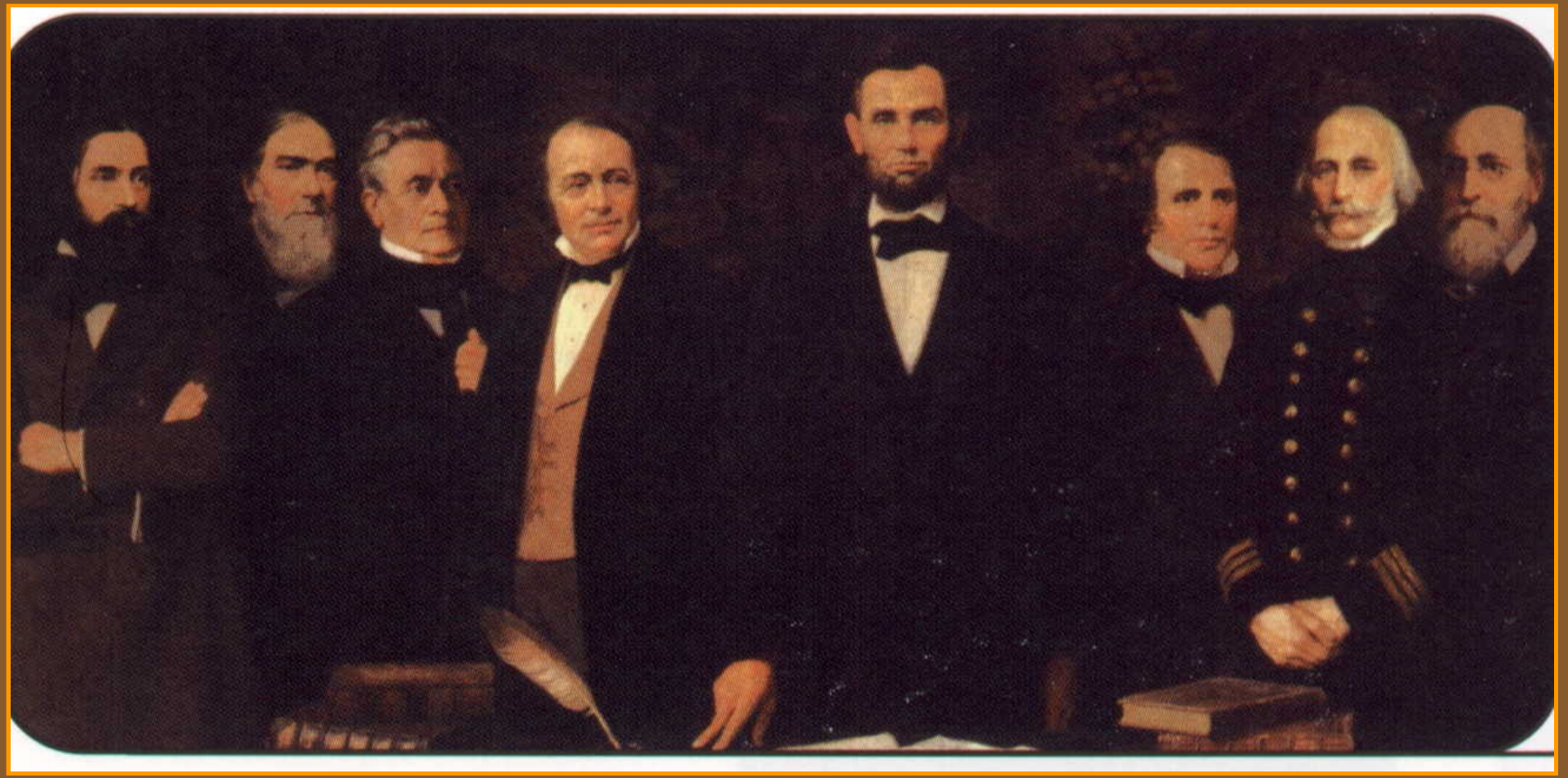
Testing and Instrumentation

Project	Title	Funds
21-07	Development of Portable Scour Monitoring Equipment *Completed—Published as NCHRP Report 515*	$300K
21-03	Instrumentation for Measuring Scour at Bridge Piers and Abutments *Completed—Published as NCHRP Reports 396, 397A, and 397B*	$916K

Asset Management and Performance Measures

Project	Title	Funds
20-24 (37)E	Measuring Performance Among State DOTs -- Bridge Conditions	$75K
12-69	Multiple-Objective Optimization for Bridge Management Systems	$350K
Synthesis 20-05/Topic 37-07	Bridge Management Systems for Transportation Agency Decision-Making *Completed—Published as NCHRP* Synthesis 397	$300K

National Academy of Sciences 1863



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NCHRP Project 20-83 Series
Long-range Strategic Issues

Program Goal No. 1: Anticipate the future issues so that ***we are better prepared*** to meet new and emerging challenges.

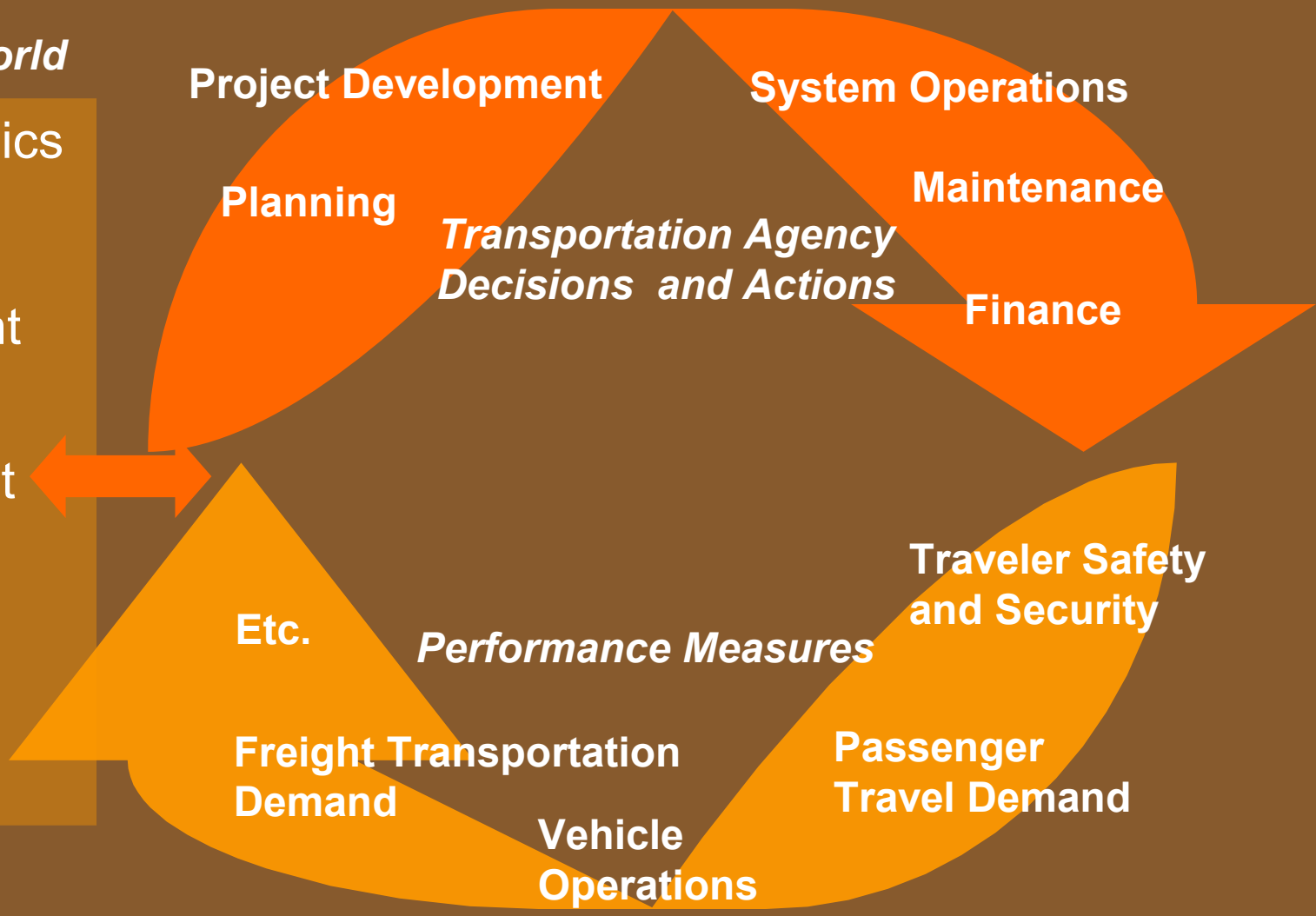
NCHRP Project 20-83 Series
Long-range Strategic Issues

Program Goal No. 2: Explore visions of what the future should look like, so that ***we can help shape the future*** through our decision making.

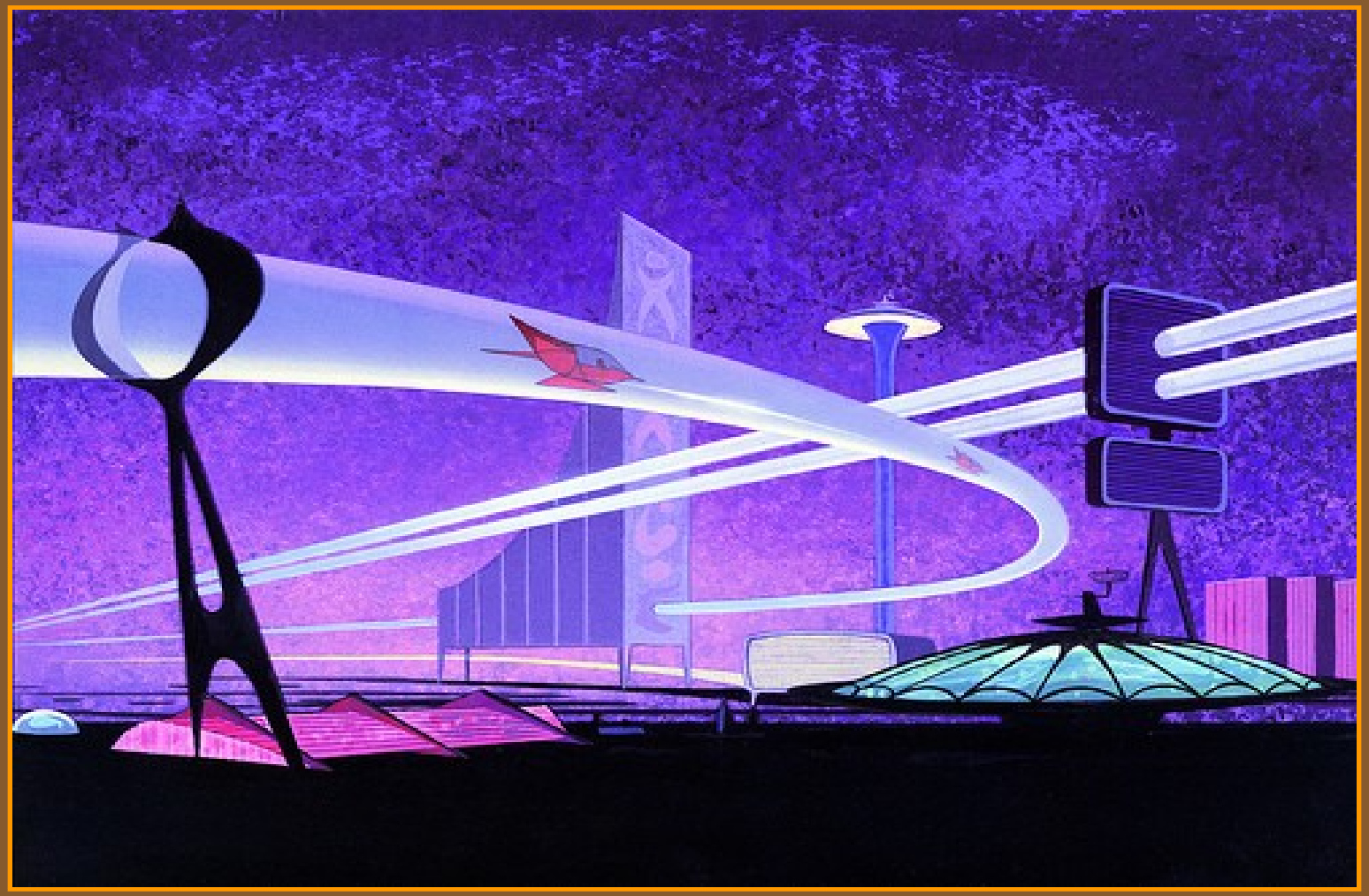
Challenges Facing The Transportation Industry

Major Forces Affecting the World

- Demographics
- Economics
- Environment and Energy
- Government and Politics
- Societal Factors
- Technology



“The only thing we know about the future is that it will be different.” *Peter Drucker*



NCHRP Project 20-83(03) FY 09
Long-Range Strategic Issues Affecting Preservation, Maintenance, and Renewal of Highway Infrastructure

Objective:
Develop guidance for transportation stakeholders on emerging materials, tools, approaches, and technologies that could be used to deal with long-range (30 to 50 years) highway infrastructure maintenance, preservation, and renewal needs and ensure satisfactory system condition and performance.

Phases:
Phase I – Scenarios and Impacts
Phase II – Vision Development
Phase III – Guidance and Communication

PHASE I – Scenarios and Impacts

- Identify the factors and future trends that could influence infrastructure maintenance, preservation, and renewal
- Assess the likelihood and impact of various scenarios on future needs

Factors Influencing Transportation

- Technology and innovations (e.g., high-performance materials, construction equipment and methods, and monitoring systems)
- Environment (e.g., global warming and sustainability)
- System performance (e.g., accelerated deterioration and accountability)
- Safety and security
- Finance and budget (e.g., global economy, contracting methods, and costs)

Factors Influencing Transportation

- Human resources (e.g., education and training)
- Coordination (e.g., among transportation modes and related industries);
- Regulations and policies (e.g., environmental regulation and changing role of governmental identities)
- Demographics (e.g., population and urban/rural differences)
- Customer expectations
- Traffic (e.g., loading and volume)

PHASE II – Vision Development

- Identify and examine potential of new materials, tools, approaches, and technologies for meeting future needs for maintaining, preserving, and renewing the highway infrastructure
- Develop a vision for a future, sustainable highway infrastructure
- Discuss potential barriers to the identified materials, tools, approaches, and technologies

PHASE III – Guidance and Communication

- Develop guidance for transportation stakeholders on the use of potential materials, tools, approaches, and technologies for enhancing system maintenance, preservation, and renewal consistent with the described vision
- Develop communication packages to convey the vision, objective, and products of this research to current and future transportation stakeholders
- Identify future research efforts that are required to expand the findings of this project and to serve as a guide for further research opportunities

Research Project Products

http://www.trb.org/NCHRP/Public/NCHRP.aspx

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