2006

RD&T Program Overview 2006

RD&T Program Overview

Pipeline and Hazardous Materials Safety Administration

PHMSA FY2006 RD&T Program Review Meeting
May 9, 2006

PHMSA Mission

Has public responsibility for safe and secure movement of hazardous materials to industry and consumers by all transportation modes, including highway, rail, air, water, and the nation's pipelines.

PHMSA Supports DOT Goals

DOT Strategic Goal	Pipeline	HAZMAT
Safety	X	X
Mobility		
Global Connectivity		X
Environmental Stewardship	X	X
Security		X

RD&T Overview

Pipeline Safety RD&T Program Mission:

To sponsor research and development projects focused on providing near-term solutions that will improve the safety, reduce environmental impact, and enhance the reliability of the Nation's pipeline transportation system.

Hazardous Materials Safety RD&T Program Mission:

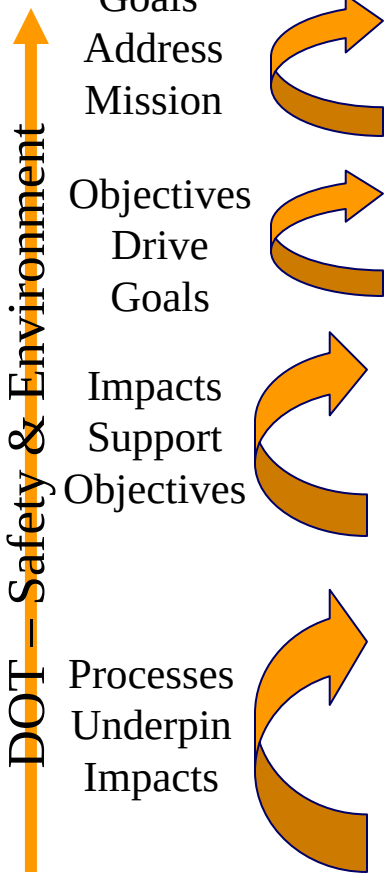
To conduct technical and analytical studies, evaluations, and testing that provide the foundation for hazardous materials transportation regulations, enforcement, and emergency response.

PHMSA RD&T Program Appropriations

Budget Category	FY-2006 Thousands of Dollars (Enacted)	FY-2007 Thousands of Dollars (Proposed)
Damage Prevention & Leak Detection	$3,716	$3,794
Enhanced Operations & Controls	$1,891	$1,931
Improved Materials Performance	$2,090	$2,133
Mapping & Information Systems	$1,210	$1,235
Pipeline Safety Totals:	**$8,907**	**$9,093**
Research and Analysis	$638	$651
Research and Development	$1,829	$2,093
Cooperative Research (Hwy Trust Fund)	$883	$906
HAZMAT Safety Totals:	**$3,350**	**$3,650**
PHMSA Totals:	**$12,257**	**$12,743**

Pipeline Safety RD&T

Pipeline Safety RD&T Hierarchy



Pipeline Safety RD&T Mission	To sponsor research and development projects focused on providing near-term solutions that will improve the safety, reduce environmental impact, and enhance the reliability of the Nation's pipeline transportation system.					
Research Program Goals	*"To drive improvements in"* • Pipeline Damage Prevention and Leak Detection • Pipeline Operations, Controls, and Monitoring • Material Performance and Other Pipeline Safety Improvements					
Research Program Objectives	Fostering Development of New Technologies		Strengthening Regulatory Requirements and Consensus Standards		Promoting Knowledge for Decision Makers	
Desired Impact Performance Measures	Number of projects contributing to objectives	47	Number of projects contributing to objectives	51	Number of projects contributing to objectives	52
	Number of projects demonstrating new technologies	18	Number of projects contributing to new or revised industry standards	42	Number of final reports publicly available	13
	Number of projects filing for U.S. Patents	7	Number of projects addressing PHMSA regulations	5	Number of conference papers presented	10
Process Features	Categorizing projects for mission relevance		Categorizing projects for mission relevance		Categorizing projects for mission relevance	
	Technology transfer process		Consensus standard integration process		Peer review process for qualifying output quality	
	Peer review process for qualifying output quality		PHMSA regulatory program integration process		Monitoring projects for contractual performance	
	Monitoring projects for contractual performance		Peer review process for qualifying output quality		Contractual requirement for submitting conference papers	
	Contractual requirement to notify PHMSA of U.S. patent		Monitoring projects for contractual performance			

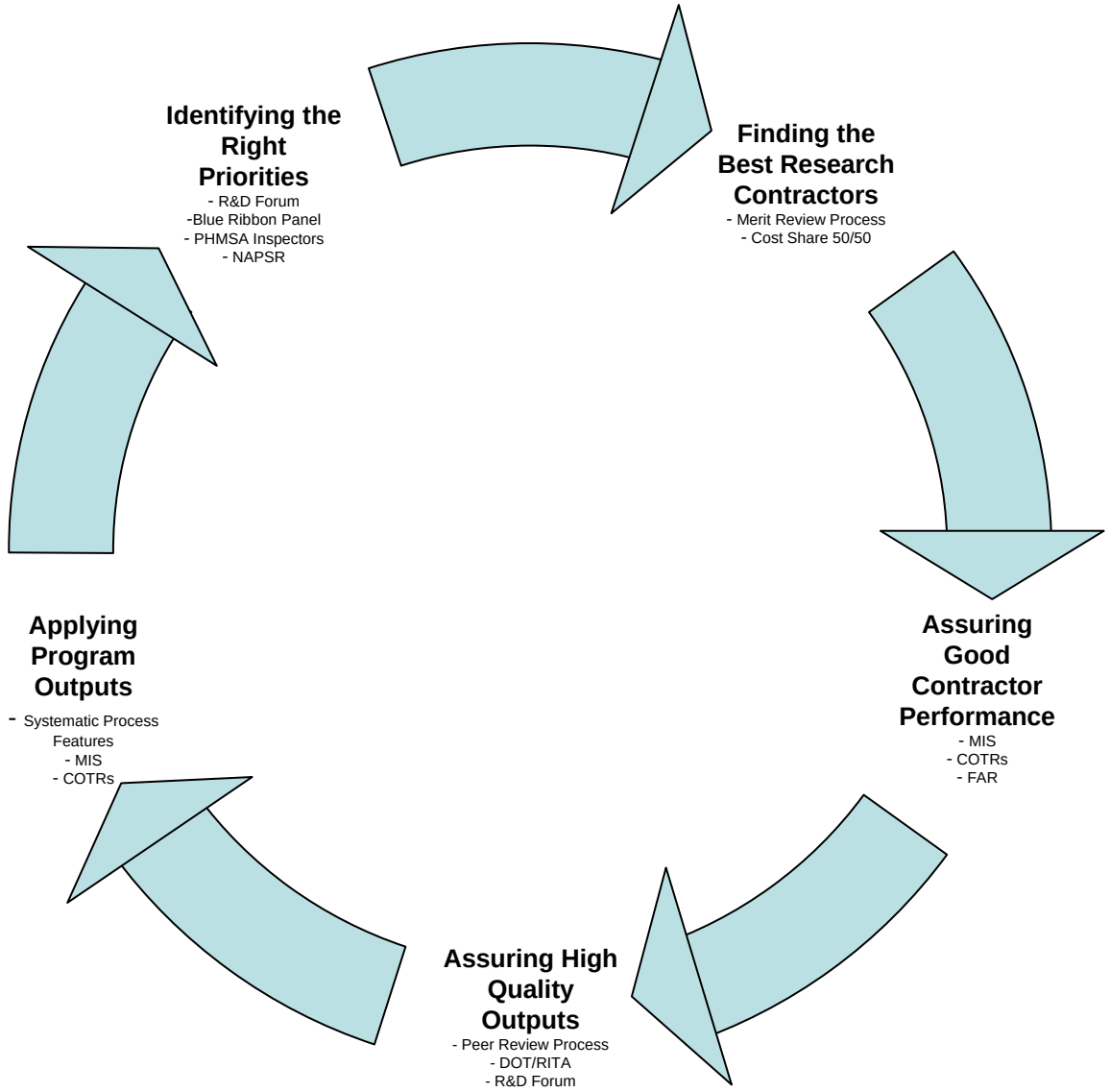
PHMSA

Systematic RD&T Implementation

Systematically addressing…

- Mission Relevance
- Stakeholder Coordination
- Resource Leveraging
- Effective Management
- Accounting Controls
- Contractor Performance
- Quality
- Knowledge Transfer

…through the research cycle.



Safety

RD&T Strategy…

Improving pipeline safety by working collaboratively with all stakeholders within the systematic RD&T implementation process.

Output…

Technology solutions and strengthened consensus standards for safely transporting energy to end users through pipelines.

Safety (cont.)

Pipeline Safety Elements & Goals

	Program Elements	Program Element Goals
1.	Damage Prevention	Reducing the number of incidents and accidents resulting from excavation damage and outside force
2.	Pipeline Assessment and Leak Detection	Identifying and locating critical pipeline defects using inline inspection, direct assessment and leak detection
3.	Defect Characterization and Mitigation	Improving the capability to characterize the severity of defects in pipeline systems and to mitigate them before they lead to incidents or accidents
4.	Improved Design, Construction, and Materials	Improving the integrity of pipeline facilities through enhanced materials, and techniques for design and construction
5.	Systems for Pipeline Mapping and Information Management	Enhancing the ability to prevent and respond to incidents and accidents through management of information related to pipeline location (mapping) and threats definition
6.	Enhanced Operation Controls and Human Factors Management	Improving the safety of pipeline operations through enhanced controls and human factors management
7.	Risk Management & Communications	Reducing the probability of incidents and accidents, and mitigating the consequences of hazards to pipelines
8.	Safety Issues for Emerging Technologies	Identifying and assessing emerging pipeline system technologies for opportunities to enhancing their safety

Safety (cont.)

Pipeline Safety Elements & Possible Products

	Program Elements	Possible Products < 5 years
1.	Damage Prevention	• Subsurface mapping technology • ROW monitoring technology • Pipe detection technology for HDD
2.	Pipeline Assessment and Leak Detection	• Expanded use of Direct Assessment • Robotic inspection platforms • New & more powerful inspection technology
3.	Defect Characterization and Mitigation	• New models to characterize damage • New protocols to streamline repairs
4.	Improved Design, Construction, and Materials	• Strain based design standards • Better pipeline coating • New construction methods • Expanded use of composites
5.	Systems for Pipeline Mapping and Information Management	• Aerial mapping systems • GPS integration into aerial mapping
6.	Enhanced Operation Controls and Human Factors Management	• New human factor protocols for pipeline monitoring and control operations
7.	Risk Management & Communications	• New models to assess risk • Improved knowledge for first responders
8.	Safety Issues for Emerging Technologies	• New knowledge of hydrogen economy impacts • New knowledge of LNG safety

Safety (cont.)

Future Trends & Development

- Monitor pipeline safety statistics
- Monitor regulatory changes
- Address long-term/fundamental RD&T through participation with SBIRs and UTCs

Anticipated RD&T Needs

- Strictly TBD
- Continue collaborative process for *"Identifying the Right Priorities"*
- Monitor Administration directives (i.e. hydrogen/ethanol)

Environment

RD&T Strategy…

Improving environmental protection by working collaboratively with all stakeholders within the systematic RD&T implementation process.

Output…

Technology solutions and strengthened consensus standards to protect the environment while transporting energy to end users through pipelines.

Environment (cont.)

Pipeline Safety Elements & Goals

	Program Elements	Program Element Goals
1.	Damage Prevention	Reducing the number of incidents and accidents resulting from excavation damage and outside force
2.	Pipeline Assessment and Leak Detection	Identifying and locating critical pipeline defects using inline inspection, direct assessment and leak detection
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8.	Safety Issues for Emerging Technologies	Identifying and assessing emerging pipeline system technologies for opportunities to enhancing their safety

Environment (cont.)

Pipeline Safety Elements & Possible Products		
	Program Elements	**Possible Products < 5 years**
1.	Damage Prevention	
2.	Pipeline Assessment and Leak Detection	• Aerial leak detection systems (helicopter, fixed wing & UAV based) • Ground based leak detection systems
3.	Defect Characterization and Mitigation	
4.	Improved Design, Construction, and Materials	
5.	Systems for Pipeline Mapping and Information Management	• Aerial mapping systems • GPS integration into aerial mapping
6.	Enhanced Operation Controls and Human Factors Management	
7.	Risk Management & Communications	
8.	Safety Issues for Emerging Technologies	

Environment (cont.)

Future Trends & Development

- Monitor pipeline safety statistics
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Anticipated RD&T Needs

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Hazardous Materials Safety RD&T

Safety -- Global Connectivity -- Environmental Stewardship -- Security

Strategies

- Conduct practical research to improve hazardous materials transportation implementing strategic goals
- Influence and utilize research of Operating Administrations, other government agencies, and industry for these purposes
- Involve stakeholders, use products, and promote technology transfer.

Safety -- Global Connectivity -- Environmental Stewardship -- Security

Future Trends and Developments

- Pilot of cooperative hazardous materials transportation research program
- Security
- Transition to a hydrogen economy

Safety -- Global Connectivity -- Environmental Stewardship -- Security

Anticipated RD&T Needs

- Risk assessment and risk management
- Route analyses
- Data sources and analyses
- Reduce accidents and crashes
- Emergency response and security

Hazmat Elements & Goals

	Program Elements	Program Element Goals
1.	Emergency response	Provide a scientific basis for and easy use (human factors) of the Emergency
2.	Incident database design and analysis	Hazardous material incident reporting provides a foundation for understanding how the system is operating.
3.	Packaging design	Ensure that packaging design conforms to hazards and risks.
4.	Performance packaging testing	Demonstrate that performance packaging requirements are being met.
5.	Hazard identification	Promote understanding of transportation hazards.
6.	Risk Assessment / Risk Management	Identify and quantify risks inherent in hazardous materials transportation and point to ways to control and minimize these risks.
7.	Consequence Modeling	Allow for better understanding of potential impact of incidents.
8.	Security	Assess hazardous materials transportation security vulnerabilities and measures to mitigate security risks.

Hazmat Elements & Possible Products

	Program Elements	Possible Products < 5 years
1.	Emergency response	Development of 2008 Emergency Response Guidebook (ERG). Development of AEGLs in support of the ERG.
2.	Incident database design and analysis	Examination of trends, costs, and root-cause analysis to provide a basis for regulatory changes.
3.	Packaging design	Development of nondestructive testing techniques and failure analysis.
4.	Performance packaging testing	Continued testing of performance packaging to ensure regulatory requirements are met.
5.	Hazard identification	Lithium battery (primary and secondary) testing.
6.	Risk Assessment / Risk Management	Examination of procedures for selecting routes for spent nuclear fuel. Risk characterization and risk communication studies.
7.	Consequence Modeling	Studies and analyses for specific hazardous materials.
8.	Security	Development of tools for this evolving area. Examination of security for flammable liquids and solids.

Hazardous Materials Transportation Cooperative Research Program

- **SAFETEA-LU requires PHMSA to enter into a contract with the National Academy of Sciences to carry out the 9 research projects called for in Special Report 283.**
- **Funding of $1,250,000 for each of fiscal years 2006 through 2009 is authorized from the Highway Trust Fund for these purposes.**
- **Our intent is to conduct specific research projects while testing the viability of a cooperative hazmat transportation research program**
- **Stakeholder interest, involvement, and feedback is vital during the pilot**
  - **Participation on stakeholder oversight board**
  - **Participation on project panels**

Hazardous Materials Transportation Cooperative Research Program (con't)

Nine research projects:

1) **Assessment of Opportunities to Integrate and Supplement Safety and Security Measures for Hazardous Materials Transportation**

2) **Data on Predominant Traffic and Highway Geometric Characteristics in Large-Truck Crashes for Use in Risk Analysis**

3) **Recommendations for Development of Conditional Release Probabilities for Highway and Intermodal Bulk Containers Involved in Transportation Accidents**

4) **Development of Correlations Between Incident Risks and Consequences to Aid in Decision-Making Models**

5) **Development of an Environmental Hazard Assessment System for the Transport of Hazardous Materials**

Hazardous Materials Transportation Cooperative Research Program (con't)

Nine research projects:

6) **Recommendations for Commercial Transportation Incident and Commodity Flow Data Collection and Reporting**

7) **Detailed Information for Conducting Hazardous Materials Commodity Flow Studies**

8) **National Hazardous Materials Emergency Response Capability Assessment**

9) **Transportation Emergency Response Guidelines for Hazardous Materials**

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Additional project information is available by contacting:

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