



**7th International Pipeline Conference
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**TECHNOLOGY TRANSFER:
MOVING KNOWLEDGE FROM RESEARCH INTO INDUSTRY
STANDARDS**

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Outline

- Setting the Stage
- Industry Response
 - PSDOCC
- MOA with PHMSA
- R&D – Industry Standards – Regulations
- Questions



° Setting the Stage

Bellingham, WA



Photo by Brad Bennett



Photo of the Olympic Pipeline explosion taken by Angela Lee Holstrom at the corner of James and Virginia Street. (6/10/99)



Carlsbad, NM







Media Response

- Pipelines: America's Hidden Hazards (Seattle Post Intelligencer -- Three Day Series)
- Pipelines: The Invisible Danger (Austin American Statesman -- Four Part Series)



Setting the Stage

- High profile pipeline failures in late 1990's and early in 2000's increased public and governmental interest about pipeline safety
- The Public pushed for greater assurances that the nation's pipelines are safe and reliable
- U.S. Congress passed a series of bills targeting pipeline integrity and safety



Congressional Solution

- U.S. Department Of Transportation Office of Pipeline Safety (renamed the Pipeline Hazardous Materials Safety Administration –PHMSA) directed to develop and implement integrity management regulations



Industry Response



Industry Response

- Pushes for new solutions and assurances for ensuring pipeline integrity.
- Pushes for a coordinated standard developing approach
- Pushes to develop standards that can be the backbone of new regulations



PSDOCC

- In late 2000 the Pipeline Standards Developing Organizations Coordinating Council (PSDOCC) was formed
- The PSDOCC provides a forum for coordination of the development and implementation of *operating* standards used in the pipeline industry



PSDOCC Membership

- American Gas Association
- American Petroleum Institute
- American Society of Mechanical Engineers
- American Society of Testing and Materials
- American Welding Society
- Association of Oil Pipelines
- Gas Technology Institute
- Interstate Natural Gas Association of America
- NACE International
- National Fire Protection Association
- Plastics Pipe Institute Inc.
- Pipeline Research Council International



Why Standards Coordination

- Many U.S. regulators including PHMSA incorporate standards into the Code of Federal Regulations (CFR)
- Incorporation strengthens and streamlines the code, reducing prescription and allow for performance to drive how regulations are met
- Standards can carry the equivalent weight of law when incorporated by reference into the CFR.
- Standards are intended to ensure the safe design, construction, operation, maintenance and repair of pipelines.



PHMSA & Standards

- PHMSA incorporates several dozen consensus standards by reference either in part or in whole
- These standards come from over a dozen SDOs and strengthen PHMSA's regulatory program
- Standards constantly require new knowledge to be effective.



PHMSA & Industry Response

- The pipeline industry and PHMSA are partnering on research addressing Standards to strengthen their scope and to expand their applicability
- PHMSA believes successful R&D projects affecting standards must provide knowledge transfer to the standards-making process
- To ensure success with this research objective, PHMSA and the PSDOCC entered into a Memorandum of Agreement (MOA) in 2006



PHMSA - PSDOCC MOA

- MOA enhances cooperation and coordination, facilitating more effective and efficient integration of pipeline safety research results into the development and revision of voluntary consensus technical standards.
- The systematic process described in the MOA is vital to ensure knowledge from pipeline safety research is transferred to end users.



Role of R&D & Industry Standards

- One program objective is coordinating the development and knowledge transfer of research targeting standards
- Strengthening consensus standards via PHMSA's program and by others is paramount for SDOs to continue updating standards and keeping them relevant



Role of R&D & Industry Standards

• The Pipeline Safety Improvement Act of 2002 drives the new PHMSA R&D Program

Since 2002 the program has awarded in total 133 research projects

Roughly 34 of these projects are targeting national consensus standards

\$13M of PHMSA

\$18M of industry co-funding

All in all, a \$31M effort is underway to strengthen standards and keep them relevant to emerging issues

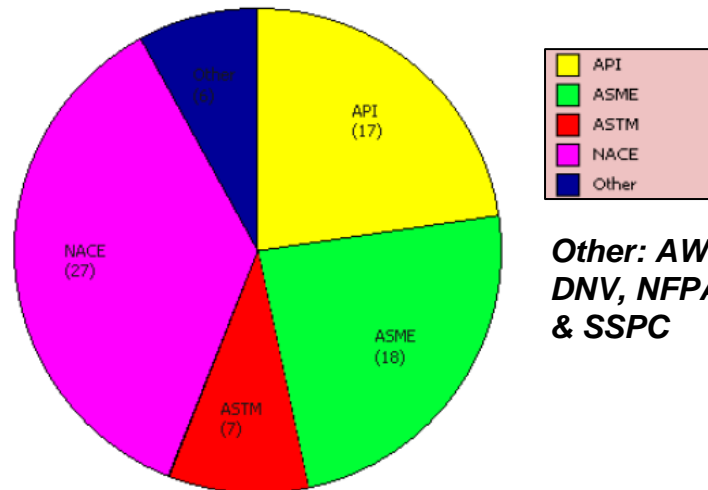
Source: <http://primis.phmsa.dot.gov/rd/splan.htm> at the time this paper was finalized.



Role of R&D & Industry Standards

- In 2007 PHMSA issued a data call to affected SDOs about how the collaborative research with industry is impacting their standards
- SDOs revise standards on a 3 or 5 year frequency so it could take multiple years to register the final and desired impact
“Standard Revised”

Research Relevance with SDO



Other: AWS, DNV, NFPA & SSPC

Impact Status on Standards Developing Organizations

No.	Organization Name	% Affected ^{A, B}	% Revised ^C	% Out to Committee ^D	PHMSA	Industry	Total	Standard Relevance Count ^E	Impact Meter
1.	American Petroleum Institute (API)	21%	11%	23%	\$ 6.37M	\$ 9.25M	\$15.63M	17	■■■■
2.	American Society of Mechanical Engineers (ASME)	22%	0%	5%	\$ 7.90M	\$12.01M	\$19.91M	18	■■■■
3.	American Society for Testing and Materials (ASTM)	8%	0%	0%	\$ 2.80M	\$ 2.67M	\$ 5.48M	7	■■■
4.	American Welding Society (AWS)	3%	0%	0%	\$ 1.36M	\$ 3.83M	\$ 5.20M	3	■■
5.	Det Norske Veritas (DNV)	1%	0%	0%	\$ 0.17M	\$ 0.16M	\$ 0.33M	1	■
6.	NACE International (NACE)	34%	7%	22%	\$ 6.42M	\$ 8.50M	\$14.93M	27	■■■■■
7.	National Fire Protection Association (NFPA)	1%	0%	100%	\$ 0.21M	\$ 0.22M	\$ 0.43M	1	■
8.	Society for Protective Coatings (SSPC)	1%	0%	0%	\$ 0.14M	\$ 0.39M	\$ 0.53M	1	■

Footnotes:

- A. The number of projects affecting an SDO divided by the number of projects the PHMSA program has addressing all consensus standards.
- B. These percentages may not total 100% since some projects are targeting the development of new standards yet directed by an SDO.
- C. The number of projects revising standards issued by an SDO divided by the number of projects affecting that same SDO.
- D. The number of project results sent to committee officers targeting a standard issued by an SDO divided by the number of projects affecting that same SDO.
- E. The total number of PHMSA projects targeting consensus standards issued by an SDO.

NOTE: Funding amounts are more that actual amounts because a project can affect more than one standard. PHMSA is working to best reflect the relevance of investments.

Research Program Category & Impact

SDO	Affected Standards	Revised Standards	Standards Out for Revision	PHMSA	Industry	Total
Damage Prevention						
American Petroleum Institute (API)	1		1	\$ 0.07M	\$ 0.08M	\$ 0.15M
American Society of Mechanical Engineers (ASME)	1		1	\$ 0.07M	\$ 0.08M	\$ 0.15M
Category Sub-Totals:	2	0	2	\$ 0.14M	\$ 0.16M	\$ 0.30M
Pipeline Assessment and Leak Detection						
American Petroleum Institute (API)	5	1	2	\$ 1.50M	\$ 1.84M	\$ 3.35M
American Society of Mechanical Engineers (ASME)	6			\$ 1.48M	\$ 1.75M	\$ 3.24M
American Society for Testing and Materials (ASTM)	1			\$ 0.35M	\$ 0.46M	\$ 0.81M
Det Norske Veritas (DNV)	1			\$ 0.17M	\$ 0.16M	\$ 0.33M
NACE International (NACE)	20	2	5	\$ 5.05M	\$ 5.99M	\$11.04M
Category Sub-Totals:	33	3	7	\$ 8.57M	\$10.21M	\$18.79M
Defect Characterization and Mitigation						
American Petroleum Institute (API)	3	1		\$ 1.98M	\$ 2.44M	\$ 4.43M
American Society of Mechanical Engineers (ASME)	3			\$ 1.68M	\$ 1.96M	\$ 3.65M
American Society for Testing and Materials (ASTM)	1			\$ 0.55M		\$ 0.55M
NACE International (NACE)	1		1	\$ 0.08M	\$ 0.08M	\$ 0.16M
Category Sub-Totals:	8	1	1	\$ 4.30M	\$ 4.49M	\$ 8.79M
Improved Design, Construction and Materials						
American Petroleum Institute (API)	8		1	\$ 2.81M	\$ 4.88M	\$ 7.69M
American Society of Mechanical Engineers (ASME)	8			\$ 4.65M	\$ 8.21M	\$12.87M
American Society for Testing and Materials (ASTM)	5			\$ 1.89M	\$ 2.21M	\$ 4.11M
American Welding Society (AWS)	3			\$ 1.36M	\$ 3.83M	\$ 5.20M
NACE International (NACE)	6			\$ 1.29M	\$ 2.43M	\$ 3.72M
Society for Protective Coatings (SSPC)	1			\$ 0.14M	\$ 0.39M	\$ 0.53M
Category Sub-Totals:	31	0	1	\$12.17M	\$21.97M	\$34.14M
Safety Issues for Emerging Technologies						
National Fire Protection Association (NFPA)	1		1	\$ 0.21M	\$ 0.22M	\$ 0.43M
Category Sub-Totals:	1	0	1	\$ 0.21M	\$ 0.22M	\$ 0.43M
Grand Totals:	75	4	12	\$25.40M	\$37.06M	\$62.47M

NOTE: Funding amounts are more than actual amounts because a project can affect more than one standard. PHMSA is working to best reflect the relevance of investments.



Conclusions

- PSDOCC, PHMSA and pipeline industry coordinating standards development
- The PSDOCC assists PHMSA in the incorporation of appropriate standards into the CFR
- A process now exists to target research with consensus standards and to measure the research impact on standards



Conclusions

- PHMSA and the PSDOCC must work harder to share the research with the SDO committees to ensure the results are factored when revising consensus standards
- These impact measures will be posted on the PHMSA website at <http://primis.phmsa.dot.gov/rd/performance.htm>. Look for them by the end of 2008.



Questions?



Thank You!