Mechanical Damage Technical Workshop

The Nature of the Problem

Houston, Texas
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Pipeline & Hazardous Materials Safety Administration
National Association of Pipeline Safety Representatives

Mechanical Damage is a Problem

- Our Focus is Blurred
  - Common level of understanding is missing
    - Semantics and definitions are inconsistent
    - We have no shared understanding of the size of the problem
      - For example: Frequency v. Consequence
    - Accident/incident reporting is sub-par
      - Misinterpretation, inadequate guidance, legal concerns, etc.
      - Shared analyses defining the scope of the problem are not common
    - Technology is misapplied or incorrectly interpreted
      - Lessons from Integrity Management
        - Risk identification is not robust enough, so technology is misapplied
        - Technological limitations are not properly factored in
        - Timely tool/technique application and analyses need qualified personnel and procedures to generate reliable results
        - Integrative risk assessments have substantial room to improve

Mechanical Damage is a Problem

- …at a Time When It Needs to Sharpen
  - Communities are encroaching on pipelines across the country
  - Urban renewal and upgrades are accelerating
  - The underground is growing increasingly crowded
  - Demand and supply patterns are shifting with our demographics
  - Regionally capacity is being strained
  - Disruptions can create major ripples economically and politically
    - Natural or man-made impacts in one Region can clearly impact others
  - Funding made available for R&D, technology assessments, and standards development/updates is constrained to shrinking
- What Do Our Data Tell Us – A Tickler

Excavation Damage Data: 2002-2005

Operator Excavation Damage

Natural Gas Transmission				
CY	Incidents	Injuries	Fatalities	Financial
2002	2	0	0	$52,010
2003	2	0	0	$194,710
2004	4	1	0	$175,020
2005	2	0	0	$301,427
Totals:	**10**	**1**	**0**	**$723,167**

Hazardous Liquid				
CY	Incidents	Injuries	Fatalities	Financial
2002	5	0	0	$1,770,396
2003	3	0	0	$43,000
2004	6	0	0	$1,267,186
2005	3	0	0	$172,543
Totals:	**17**	**0**	**0**	**$3,253,025**

Third Party Excavation Damage

Natural Gas Transmission				
CY	Incidents	Injuries	Fatalities	Financial
2002	13	1	1	$52,010
2003	15	2	1	$194,710
2004	21	0	0	$175,020
2005	18	1	1	$301,427
Totals:	**67**	**4**	**3**	**$8,552,283**

Hazardous Liquid				
CY	Incidents	Injuries	Fatalities	Financial
2002	17	0	0	$2,71,613
2003	16	0	0	$5,561,195
2004	15	3	5	$4,010.057
2005	9	1	0	$2,386,365
Totals:	**57**	**4**	**5**	**$14,668,230**

Excavation Damage Totals: 2002-2005

All Excavation Damage

Natural Gas Transmission				
	Incidents	**Injuries**	**Fatalities**	**Financial**
Totals:	77	5	3	$9,275,450
Percent of all Incidents	16%	22%	50%	2%

Hazardous Liquid				
	Incidents	**Injuries**	**Fatalities**	**Financial**
Totals:	74	4	5	$17,921,255
Percent of all Incidents	13%	17%	63%	6%

Corrosion Damage: 2002-2005

Internal Corrosion

Natural Gas Transmission				
CY	**Incidents**	**Injuries**	**Fatalities**	**Financial**
2002	15	0	0	$3,989,413
2003	13	0	0	$14,893,531
2004	23	0	0	$4,917,494
2005	14	0	0	$6,058,934
Totals:	**65**	**0**	**0**	**$29,859,372**

Hazardous Liquid				
CY	**Incidents**	**Injuries**	**Fatalities**	**Financial**
2002	10	0	0	$1,209,522
2003	14	0	0	$1,940,636
2004	14	0	0	$2,308,729
2005	16	0	0	$1,167,108
Totals:	**54**	**0**	**0**	**$6,625,995**

External Corrosion

Natural Gas Transmission				
CY	**Incidents**	**Injuries**	**Fatalities**	**Financial**
2002	7	0	0	$4,131,500
2003	12	0	0	$8,412,729
2004	15	0	0	$1,558,144
2005	15	0	0	*$90,074,758
Totals:	**49**	**0**	**0**	**$104,177,131**

Hazardous Liquid				
CY	**Incidents**	**Injuries**	**Fatalities**	**Financial**
2002	28	0	0	$10,707,717
2003	21	0	0	$5,405,155
2004	25	12	0	$18,783,705
2005	13	1	0	$5,233,486
Totals:	**87**	**13**	**0**	**$40,124,063**

** $87.5 million for singe incident*

Corrosion Damage Totals: 2002-2005

All Corrosion Damage

Natural Gas Transmission				
	Incidents	**Injuries**	**Fatalities**	**Financial**
Totals:	114	0	0	*$134,036,503
Percent of all Incidents	24%	0%	0%	35%

Stress Corrosion Cracking
14% of Natural Gas Transmission External Corrosion Incidents were SCC

Hazardous Liquid				
	Incidents	**Injuries**	**Fatalities**	**Financial**
Totals:	141	13	0	$46,750,058
Percent of all Incidents	26%	57%	0%	16%

Stress Corrosion Cracking
6% of Hazardous Liquid External Corrosion Incidents were SCC

** $87.5 million for singe incident*

How do we find solutions?

- Better Communicate What We Know and What We Don't
- Sharpen Our Data Driven Strategies
  - Improve accident reporting
    - Refile reports if necessary
    - Sharpen reporting guidance
  - Clarify definitions and semantics
  - Fortify risk identification and assessments for effectiveness and efficiency
- Collaborate in focused R&D investments to leverage efforts
- Accelerate technology and knowledge gains into standards and regulations (e.g., new MOA w/SDOCC)
- Find opportunities to improve processes and people too