The U.S. Aging Infrastructure –

Bill Tackett – Director of Risk Management Services – OMAG

OMAG – Oklahoma Municipal Assurance Group
✓ 40 year old statewide municipal pool
✓ 500 Cities and Towns
✓ Providing liability, property, workers compensation and specialty coverages
   ➢ Approximately 10% of membership operate municipal natural gas distribution systems
OMAG a 40 year old municipal pool that does not insure cities and towns...
We insure people (individuals) and stuff
Natural gas distribution systems are the perfect mixture of people and stuff
Proxy for risk (we all use them) have for years

Number of employees; Size of payroll; Number of vehicles; Number of miles driven etc. It’s impossible to know the risks we insure so we use stand-ins, proxies for the risk exposures we take on.
Past performance is the predictor for future outcomes that we all rely on.

In the era of “big data” for public entity pools, what if we relied less on proxies and more on data?

What if we knew more about the risk exposures we took from our members and passed on to our reinsurers?
This session is a case study on one pool’s effort to know one of their risk exposures as told through the lens of an audit program to examine and evaluate all of the municipal natural gas distribution systems in the pool’s liability plan.
What gets measured gets done

What gets measured with feedback gets improved

What gets measured and rewarded gets repeated
What gets ignored doesn’t go away…
Research for both municipal owned and privately owned infrastructure

Bringing together teams of:

1. Engineers
2. Economists
3. Social and information scientists
4. Risk management experts

The Broader Impact:

Finding root cause(s) for the deterioration of civil infrastructure that lead to new methods of preserving and/or improving the infrastructure, thereby demonstrating the ability to meet the most basic needs of attracting industry to otherwise economically depressed areas.
The U.S. Aging Infrastructure – Energy Systems

“Due to private ownership, national safety concerns, and cost of service (municipal), there is limited public visibility into infrastructure investment needs across electricity, natural gas, and alternative energy sources.”

“Municipals are not always able to accommodate the increasing costs to maintain systems, and the subsequent impact on their physical system assets is deterioration at a rate more rapid than planned.”

“Poll Everywhere” the following three questions:

Poll #1
1. In a word, describe your level of knowledge of municipal infrastructure systems.

Poll #2
2. What public service gets repaired/replaced most often using revenues from other utilities?

Poll #3
3. When a “claim” occurs, what are two things that provide a municipal with defendable outcomes?
The U.S. Aging Infrastructure – Energy Systems

Overview
Much of the U.S. energy system predates the turn of the 20th century. Many of the natural gas and electric transmission and distribution lines were constructed in the 1950s and 1960s with a 50-year life expectancy.

Capacity and Condition
In general, the capacity and condition of energy systems depend on ownership and geographic region, with privately-owned sources in the best position to invest. The systems rebuilt in the 1980s and 1990s are not reaching their life expectancy due to lack of proper care and maintenance.

The U.S. Aging Infrastructure – Energy Systems


- Oil – 44%
- Electricity – 42% (includes all fuel types)
- Natural Gas – 14%

Incentive Types

The federal government has provided an estimated $837 billion for energy developments since 1950 through tax incentives, funded regulation, and R&D.
The U.S. Aging Infrastructure – Energy Systems

Electricity
Of the 640,000 miles of transmission lines much of the U.S. energy system predates the turn of the 20th century. Even lines constructed in the 50’s and 60’s were not originally engineered to meet today’s demand, nor severe weather events.

Capacity and Condition
Often a single line cannot be taken down for maintenance because it will overload other interconnected lines in operation causing outages.

The U.S. Aging Infrastructure – Energy Systems

Oil and Natural Gas
America’s 2.6 million miles of oil and gas pipelines connect wells and processing facilities to consumers. Two thirds of the lower 48 states depend on natural gas, and most are owned by private utilities and municipalities.

Capacity and Condition
Periodic failures in existing pipelines, and quality concerns in new construction point to the need for increased monitoring and maintenance spending.

The U.S. Aging Infrastructure – Energy Systems

A Sample of Recommendations made by ASCE

1. Adopt a federal energy policy
2. Streamline permitting processes to facilitate new electric and natural gas lines
3. Promote usage of remote sensing and inspection technologies
4. Focus operation and maintenance spending on highest-risk system components
5. Promote the usage of accepted engineering standards to ensure safety and reliability
6. Implement performance-based regulations that mandate verification of pipeline integrity
7. Increase investment in early corrective action for all inadequate pipelines

The U.S. Aging Infrastructure – Energy Systems

Effects of Aging Electrical Infrastructure – Reliability / Outage Incidents

1. Manufacturing
2. Financial Services
3. Technology Services
4. Data Centers
5. Pharmaceuticals and Food Processing
6. Traffic and Tele-Comm Control Centers
7. Medical Facilities / Hospitals
8. Military Operations
9. Entertainment Industry
10. The Electric Utility

Production, Economic Transactions, Public Health, National Security, Consumer Pricing
The U.S. Aging Infrastructure – Energy Systems

Effects of Aging Natural Gas Infrastructure – Reliability / Failure Incidents

DOT/PHMSA Reports\(^1\) from 1997-2016

1. Fatalities = 324
2. Injuries = 1333
3. Property damage = $7B
4. Exec Prison terms* = 2

\(^*\)Associated Press Jun 19, 2003 Olympic Pipeline-Bellingham, Washington
\(^1\)phmsa.dot.gov/analytics

Public Safety - Production, Economic transactions, Public health, National Security, Consumer pricing
Comparable Risk in Infrastructure – Trend 1999-2016

Comparison of Incidents: Pipelines and Airlines by Year

- Increased by double
- Decreased by half

[Graph showing comparison of pipeline and airline incidents with data points for years 1999 to 2016]


"Crashes Rate per Year", Bureau of Aircraft Accidents Archives (ACRQ). Retrieved 2017-02-17.
Comparing Risk in Infrastructure – Trends

When Errors Occur . . .

Causes for Airline Incidents by Type of Errors

15% Asset/Equipment
4.30% Communication
2% Monitoring and Measurement

24.20% Policy and Procedure
3.60% Resource Management
6.30% Situational awareness
4.30% Systems (Information and Reporting)

16.90% Tactical decision making
23% Monitoring and Challenging

“Policy, Process, Performance Measures, and Investment” - ASCE
Comparing Risk in Infrastructure – Trends

When Errors Occur . . .

Causes for **Natural Gas** Incidents by Type of Errors

**Category: Distribution Systems**
- Procedure Related: 75%
- Maintenance Related: 25%

**Category: Distribution - Customer Premise**
- Procedure Related: 50%
- Failure to Warn Customer: 50%

“Policy, Process, Performance Measures, and Investment” - ASCE

AEGIS 2002-2011 claims
CASE STUDY – Basis for Natural Gas System Audits of OMAG Members

Municipal Natural Gas Systems

- Economic Assessment
  1. Gas unaccounted-for
  2. Cost of gas purchased
  3. Pricing for gas sold
  4. O&M budgeting
  5. Capital improvement plan

- Technology Systems Assessment
  1. Make records traceable, verifiable, and complete.
  2. Audit systems for hardcopy records
  3. Create higher levels of trust with jurisdictional authorities.
  4. Streamline operations: integrate new technologies seamlessly so as not to disrupt customer service.

- Organizational Assessment
  1. Determine commitment to operational rigor, compliance, and continuous improvement.
  2. Increase both the consistency and efficacy of risk management.
  3. Integrate risk factors into planning, core operations and business process.

- Operational Assessment
  1. Standardize processes with measurable performance metrics that drive efficiencies, reduce risk and improve productivity.
  2. Shift low-risk/low-performing assets to a lower operational cost structure where possible.
  3. Determine how scalable operations are for market changes (i.e. new customers/community development).

- Gas System Assessment
  1. Operations Maintenance & Emergency Plan (“OM&E Plan”) with annual review
  2. Leakage Detection
  3. Cathodic Protection Readings
  4. Emergency or Key Valve
  5. Regulator & Relief
  6. Atmospheric Corrosion evaluation
  7. Odorant Sample
  8. Public Awareness Program
  9. Operator Qualification training
  10. DIMP and SHRIMP plans for Distribution Integrity Management Program
Performance measures are currently based on how well the “boxes are checked” creating a minimum standard for public safety, and a culture resistant to change.

Efforts to measure risk may expose me to even greater liability and cost.

The end of jurisdictional pipe, leaves me hanging . . . no real guidance.
CASE STUDY – Natural Gas System Audits and What We Found

Municipal Board Member View

✓ Typical compliance solutions provide management reports about how well the boxes have been checked, and paper documents support the systems used for reporting.

Public Works Personnel View

✓ Field employees have difficulty expressing the need to change to best practices because management reports all show “compliance” is being met, and inspections are passed.
Balanced Spending, and Best Practices Providing Defendable Outcomes

“Policy, Process, Performance Measures, and Investment” - ASCE
Policy, Process, Performance Measures, and Investment

**Combine:**
- Risk awareness training for Board members and gas personnel
- Field operations audits
- Smart Data capture (photos, videos, bar codes, etc.)
- Data Analysis

**Require:**
- Controls (policies, procedures and processes)
- Expectations (measuring performance/accountability)
- Investment (material and methods)
- Quality assurance / Continuous Improvement

**Benefit from:**
- Operational intel that demonstrates your best practices, and becomes the evidence (or proof) that you are a prudent operator

*Best Practices Thinking . . .
Commercial insurers are in business to make money; pools’ purpose is to reduce risk and enhance public services which in turn saves public funds and improves outcomes for local governments and their taxpayers . . . agrip PR Toolkit ©2014

Q & A

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Thank You!
Aging Natural Gas Infrastructure – A Side Note

How do Sewer Systems Effect Municipal Natural Gas?

Mitigating “outage” effects through Policy, Process, Investment and Measuring Performance
Audit Categories

PI Pipi ieline P P e r s p e c t i ve
1. Material / Vintage
2. Locatable
3. Type of Odorization
   a) Procedures and schedules
4. Riser type
   a) Anodeless
   b) Isolated steel
      1) Protected/Unprotected
5. Records - TVC
6. Construction Standards
   a) Fusion Procedures
7. Over Pressure Protection
8. Forces of Nature

O Operations P p e r s p e c t i ve
1. Damage Prevention Plan
2. Overpressure Protection
3. Odorization
4. Leakage Management
5. Corrosion Management
7. Customer and Public Safety Awareness
8. Emergency Call Response
9. Continuing Surveillance
10. Distribution Integrity Management Plan
11. Operating, Maintenance and Emergency Plans
12. Contractor Relationship Management

Municipal Infrastructure – Natural Gas System Audits for OMAG Members

CASE STUDY – Natural Gas System Audits for OMAG Members

Scoring the Audit Categories

[Diagram showing a matrix with likelihood and operations dimensions, with scores ranging from 0.5 to 2.75.]
Natural Gas Assessment Findings and What They Tell Us