NACE INTERNATIONAL

THE CORROSION SOCIETY

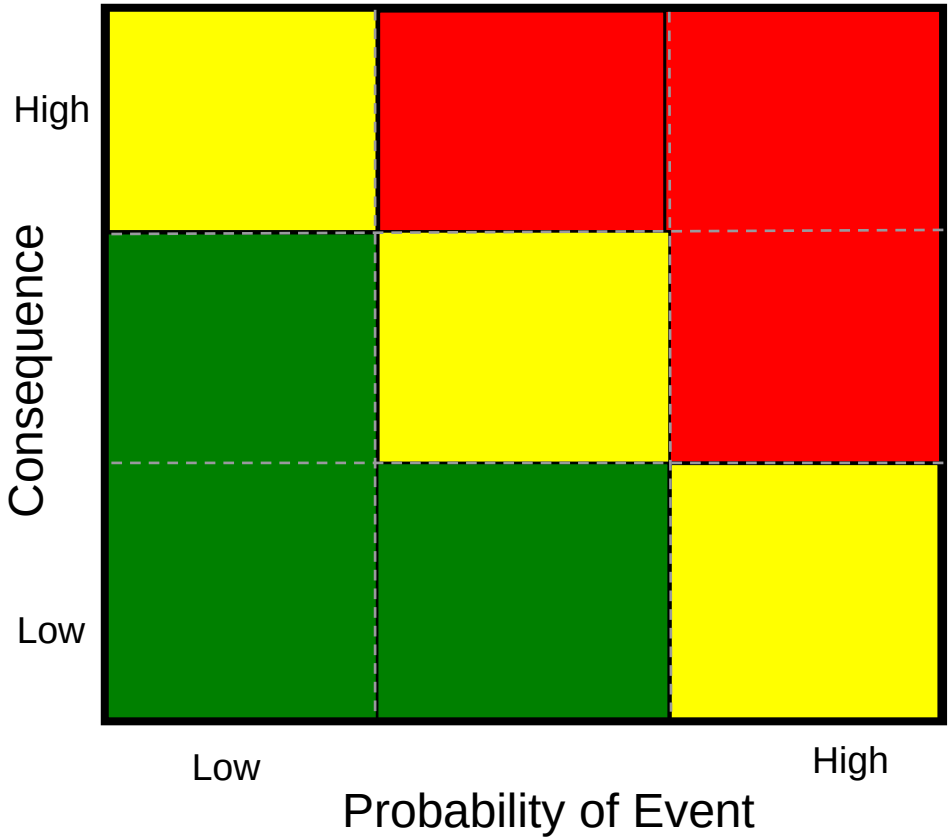
How Should Recordkeeping Gaps Influence Risk Assessments

Oliver C. Moghissi, Ph.D.
President, NACE International

Who is NACE International?

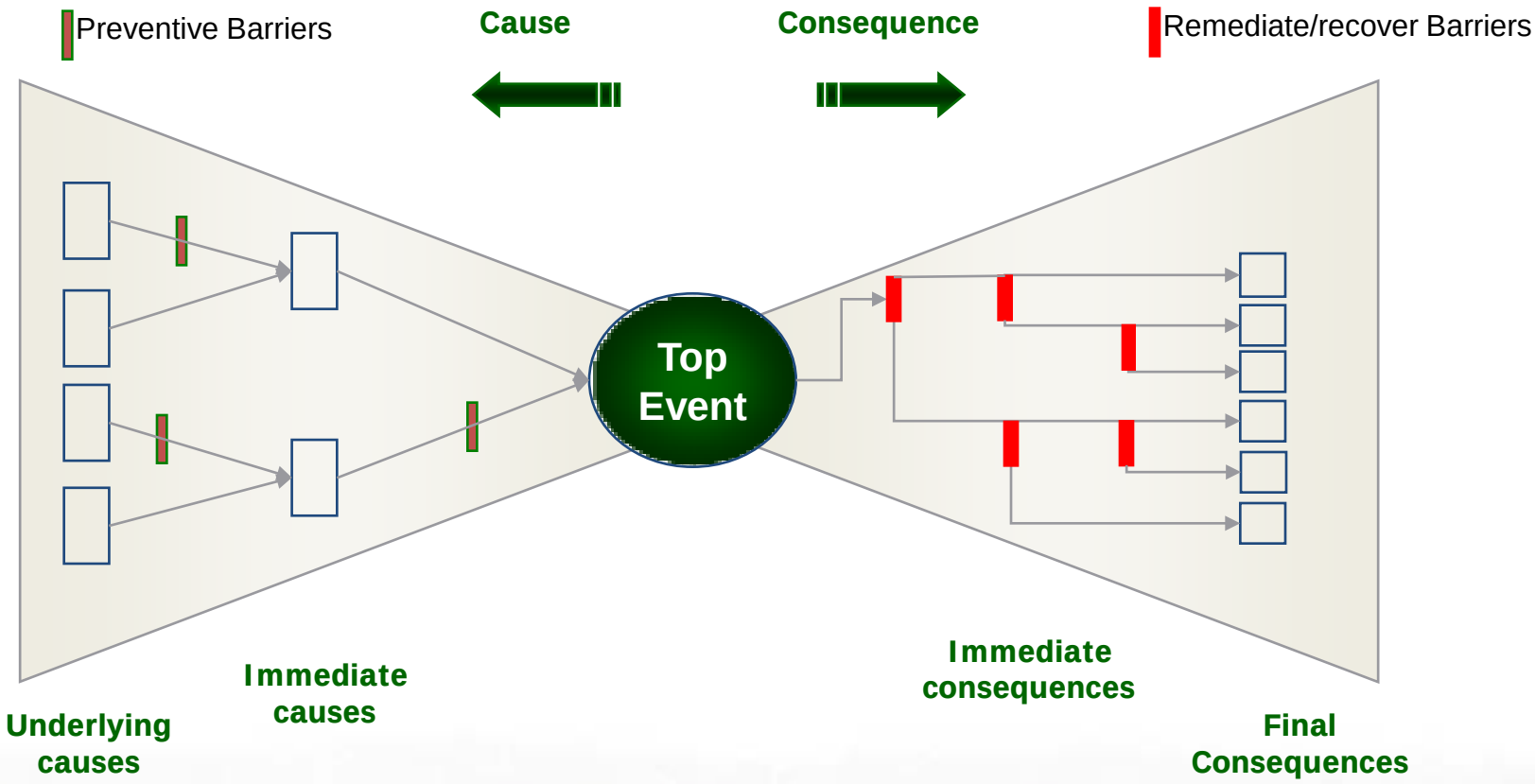
- Corrosion Technical Society
  - >27,000 members
  - Founded by 11 pipeline engineers in 1943
- Mission
  - Protecting People, Assets and the Environment from the Effects of Corrosion

Risk Matrix



Risk = (Probability) x (Consequence)

Barrier (Bow Tie) Assessment



Why are Gaps Important?

- Not knowing risk ≠ no risk
- Need sufficient understanding of risk to drive risk management decisions

How Are Gaps Treated?

1. Address consequence
2. Industry data for likelihood
3. Assume the worst
4. Fill some gaps

1. Address Consequence

- For pipelines with little information about risk
- Identify highest consequence locations
  - Reduce consequence (e.g., spill response)
  - Ensure barrier in Bow-Tie model
  - Take out of risk matrix red box
- Probability not well understood, so risk is not optimized (safety, environment, cost)

2. Industry Data for Likelihood

- Use industry average failure rates
  - Common for risk assessment studies
  - Underlies RBI
- Get a sense of typical failure rates
  - Usually low
  - Drives consequence management
- Don’t know if a specific pipeline is special
  - High risks (due to probability) cannot be identified
  - Strength of integrity assessments for specific threats
- ROI on data collection always low
  - Cannot reduce likelihood assessment in significant way

3. Assume the Worst

- Unknown = Bad
  - ROI for collecting data always high
- Confuses risk ranking and optimization
  - Unknowns and bad-knowns are equal
- Better to
  - Mitigate risk on knowns
  - Better understand risk of unknowns

4. Fill the Right Gaps

- We collect information to improve decisions
  - Value of Information > Cost to Acquire
    - Items with value drive decisions
      - Reduced uncertainty is low value unless it changes a decision
    - Cost can be direct or new risk (e.g., excavation)
- Example – coating at girth welds
  - Are some bare?
  - Are some taped?
- Record low value data if low cost to acquire
  - While in the ditch, make the observation & write it down

Example Pipeline

- Assume we know little about a 100mile natural gas pipeline operating safely for 20y but with moderate internal corrosion (IC) near former producer input
  1. Consequence assessment identifies river crossing. Action taken to evaluate risk at crossing. IC threat possibly identified.
  2. Use industry-average data for failure probability. No action required.
  3. Assume the worst for all threats. Panic, and take resources from other pipelines with known higher risk
  4. Identify what data is needed to assess the relevant threats and acquire it. Mitigate as needed.

Gaps Across DIKW

- Data, Information, Knowledge, Wisdom
- Recordkeeping has low value without context and understanding
  - It can't drive a decision without this
- Gaps the DIKW chain can include
  - Risk management systems
  - Competent People
  - Technology
  - Technical standards & Regulations

Conclusions

- Need enough information to drive risk management decisions
  - No more and no less
- Need the right information
  - Information has different value and different cost to acquire
  - Records are low cost with range in value
  - Filling in gaps should consider value of information and cost to acquire

NACE International
1440 South Creek Drive
Houston, TX 77084
+1 281 228 6200
www.nace.org