Impact of 80% SMYS Operation on Time Dependent Threats

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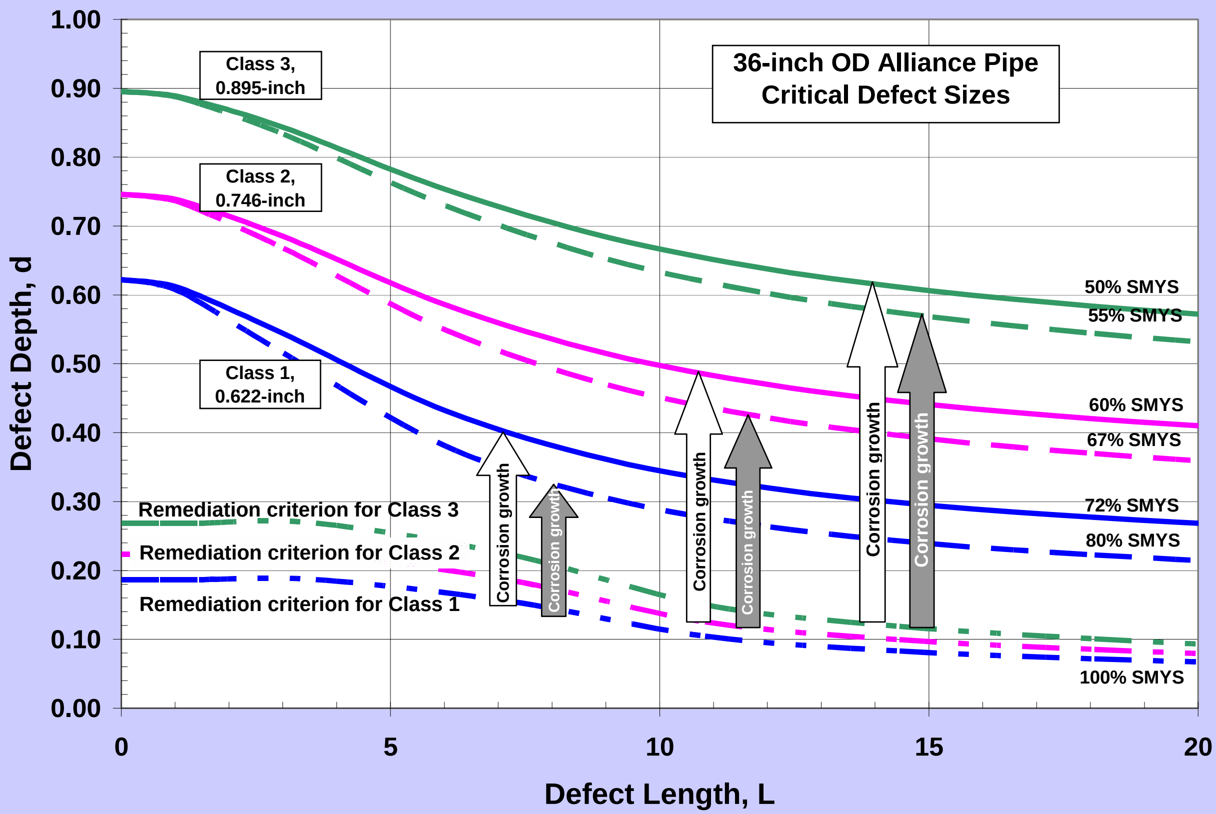
Considerations for Assessing Impacts at Increased 80% SMYS Operation

- Flaw initiation
- Critical flaw size
- Flaw growth
- Re-assessment intervals
- Integrity Management/Assessment Strategies

Impact at 80% SMYS

Threat	Initiation	Critical Size	Growth	Re-Assessment Interval
External Corrosion (EC)	No Impact	Small Reduction	No Impact	Small Reduction
Internal Corrosion (IC)	No Impact	Small Reduction	No Impact	Small Reduction
Stress Corrosion Cracking (SCC)	No Impact	Small Reduction	No Impact	Small Reduction

Critical Flaw Sizes (EC, IC,SCC)



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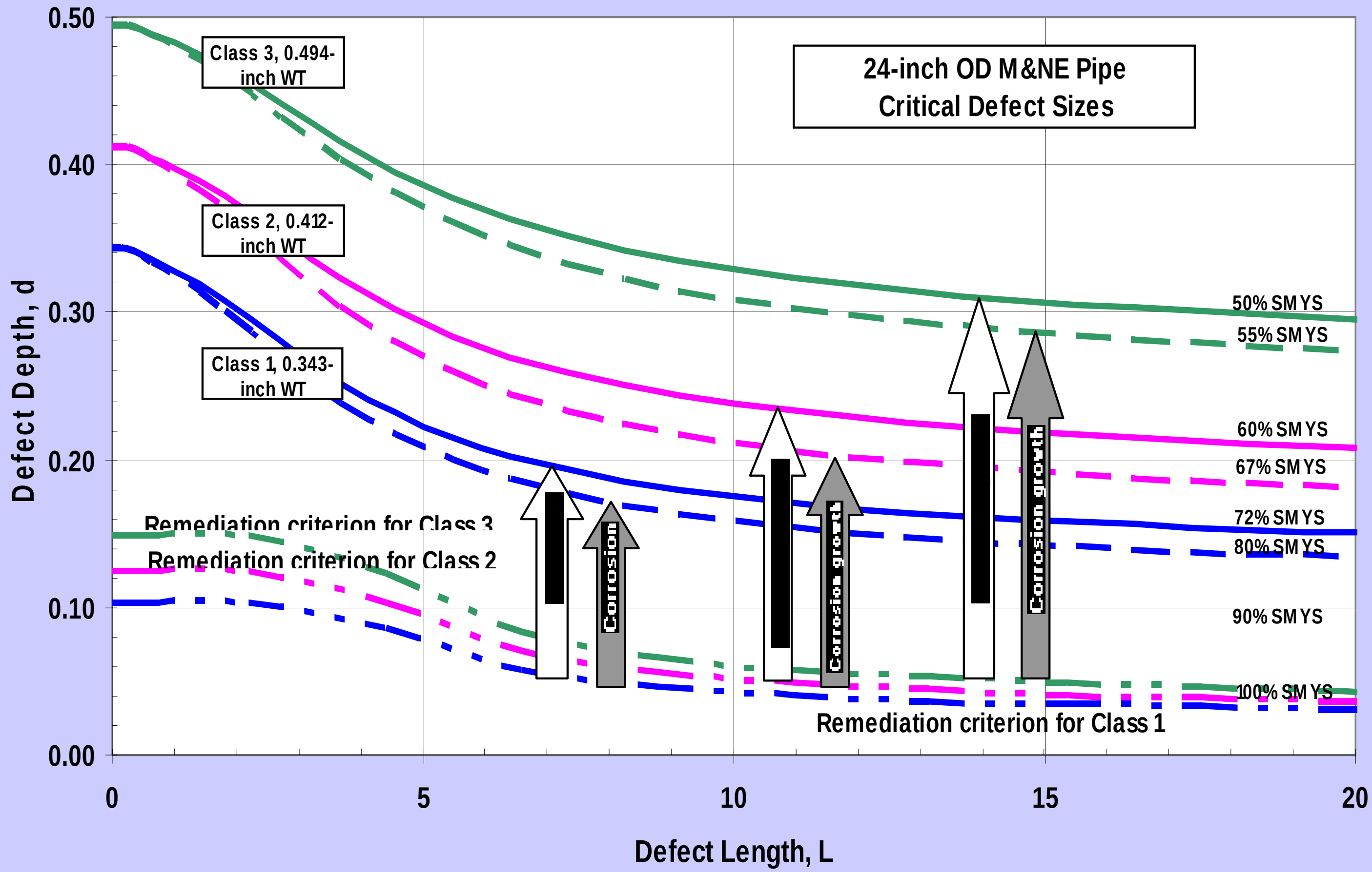

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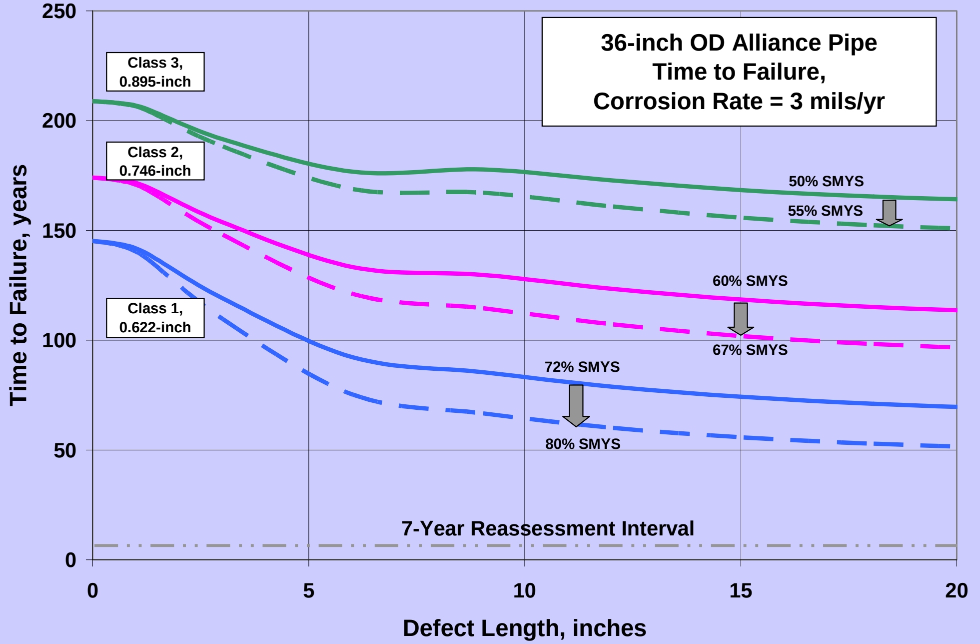
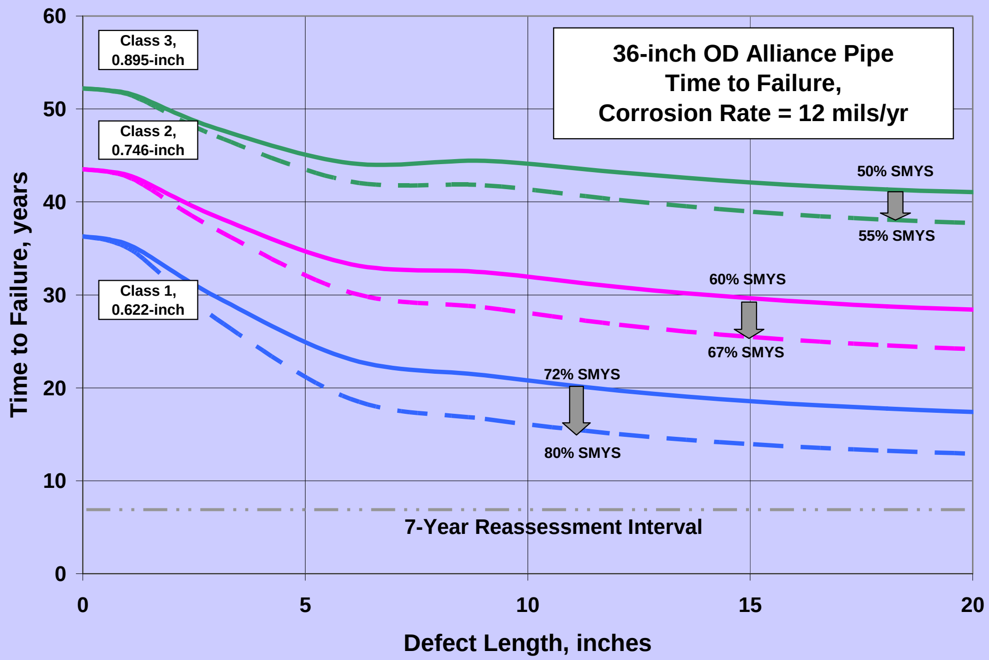
Flaw Growth (EC, IC, SCC)

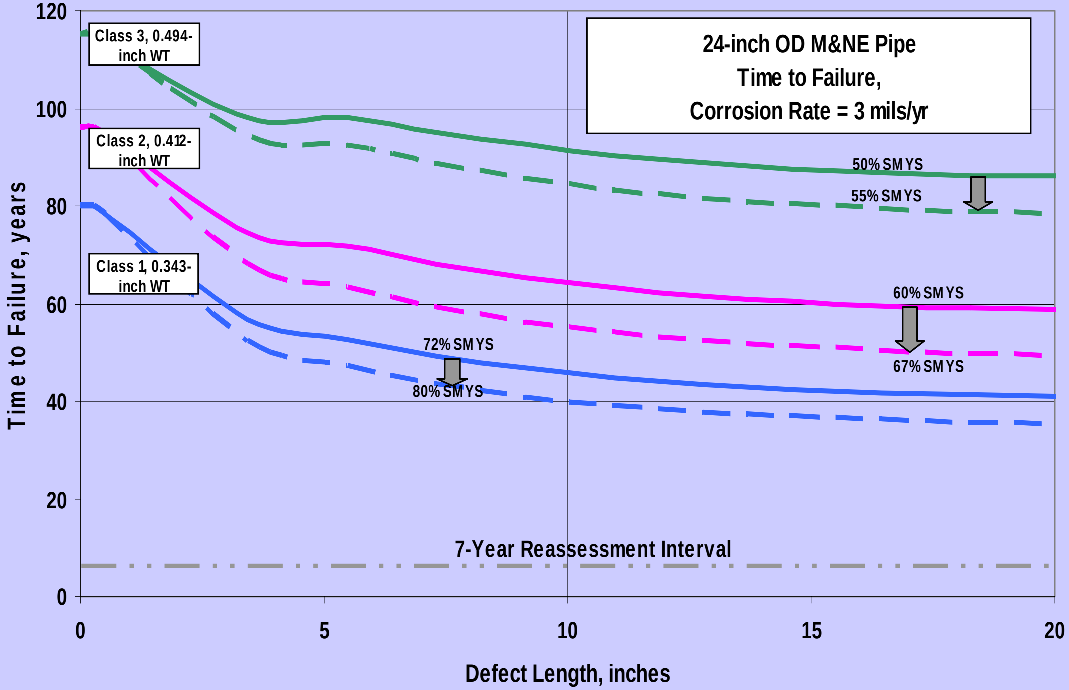
- EC and IC flaw growth is governed by the environment and the corrosion mechanism, not operating stress.
- SCC flaw growth is also rate limited by the same factors that control corrosion.
- For SCC Growth controlling parameters include temperature, the environment (pH), coating type, cathodic polarization, and pressure history.

Re-Assessment Interval





Even implausibly high corrosion rates can be safely managed within the normal ILI reassessment interval in all Class Locations.



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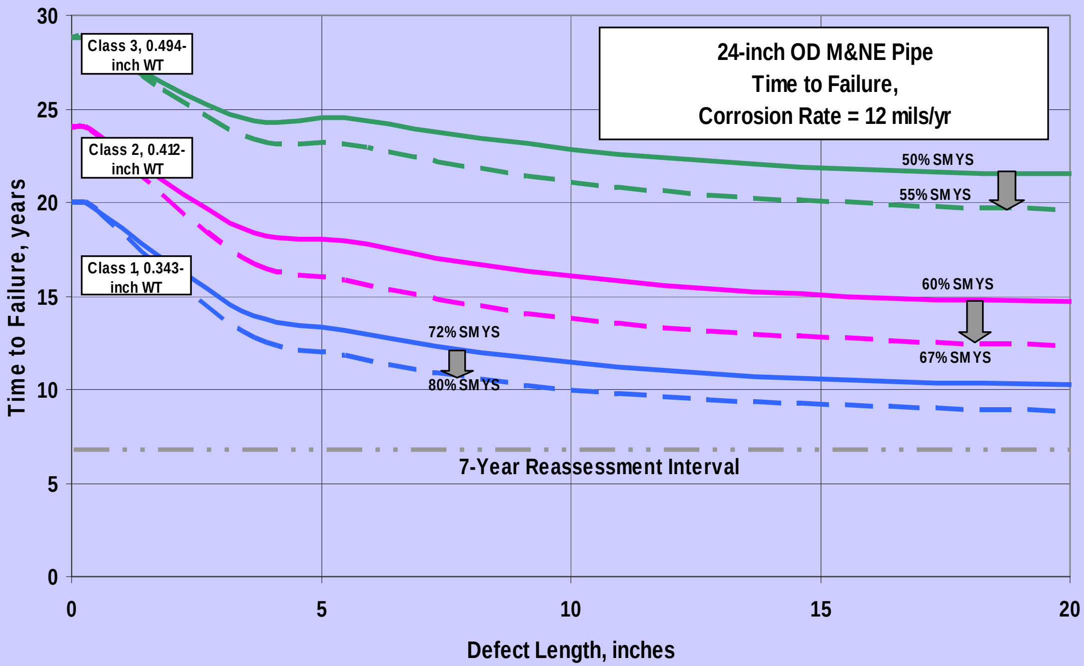

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Impacts on Time Dependent Threats at 80% SMYS

- No different strategies really require deployment at 80% SMYS, versus 72% SMYS. When considering impacts to flaw initiation, flaw growth, critical flaw size, and reassessment intervals, current integrity practices are still effective at ensuring safety for 80% SMYS operations.
- Since critical flaw size and subsequent re-assessment intervals are incrementally impacted at higher stress operation, it can be argued that some additional strategies to address these impacts make sense.

Integrity Management Strategies for Time Dependent Threats at 80% SMYS Operation – Best Practices

- Utilize a high integrity, high performance mill applied coating system that will not disbond and shield CP.
- Inspect the pipeline with a high resolution magnetic flux in-line inspection tool at regular intervals.
- Implement an External Corrosion Mitigation Plan that includes
  - a baseline Close Interval Survey (CIS)
  - mitigation of any potential interference or design inefficiencies,
  - integration of CP and ILI data on a regular basis, and
  - continual optimization using CP monitoring and testing.
- Implement gas quality monitoring and operating procedures/controls that ensure against an internal corrosion environment.

Conclusions

- Time dependent threats are only incrementally impacted by operations at 80% SMYS.
- Current integrity management practices and technology can ensure safe operation at 80% SMYS.
- Implementing a series of Integrity Management Best Practices will offer improved safety and life cycle management for pipelines operating at 80% SMYS.