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Office national de l'énergie

Mechanical Damage Overview

- A Canadian Perspective

Pipeline and Hazardous Materials Safety Administration
Mechanical Damage Technical Workshop
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Christine van Egmond
National Energy Board, Canada

Canada

Introduction

- National Energy Board (NEB)
- Overview of NEB-regulated pipelines
- How big is the problem in Canada?
- NEB Approach to Damage Prevention
- 2 Case Studies on Detection & Characterization

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National Energy Board of Canada

- NEB's role is to promote safety, environmental protection and economic efficiency in the regulation of pipelines, energy development and trade
- Regulates about 27,000 miles (45,000 km) of transmission pipelines that cross interprovincial or international borders

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Major Oil Pipelines in Canada

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Major Gas Pipelines in Canada

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Mechanical Damage in Canada

How big is the problem in Canada?

- Not really considered an issue

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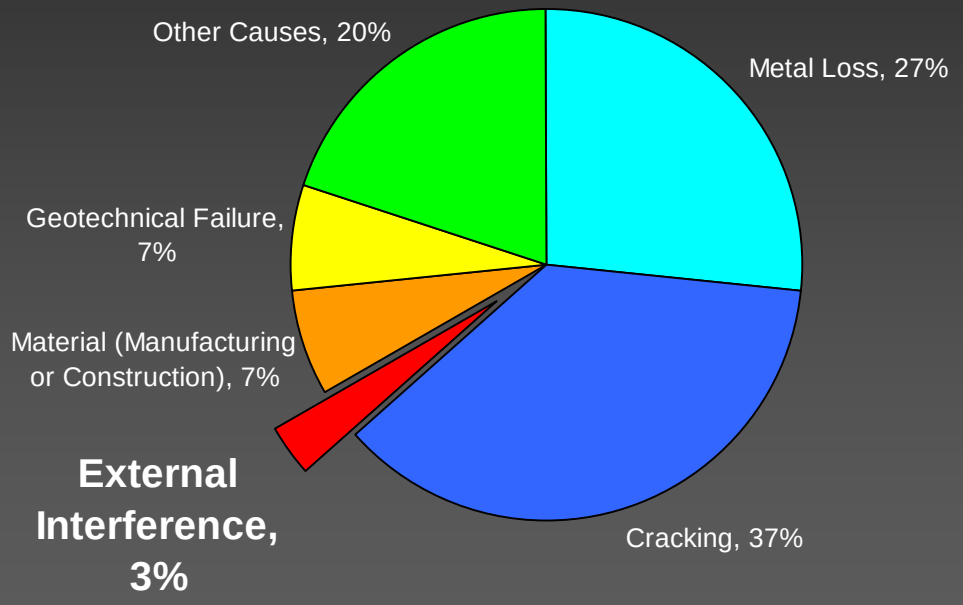
NEB Rupture Primary Causes (1991-2004)



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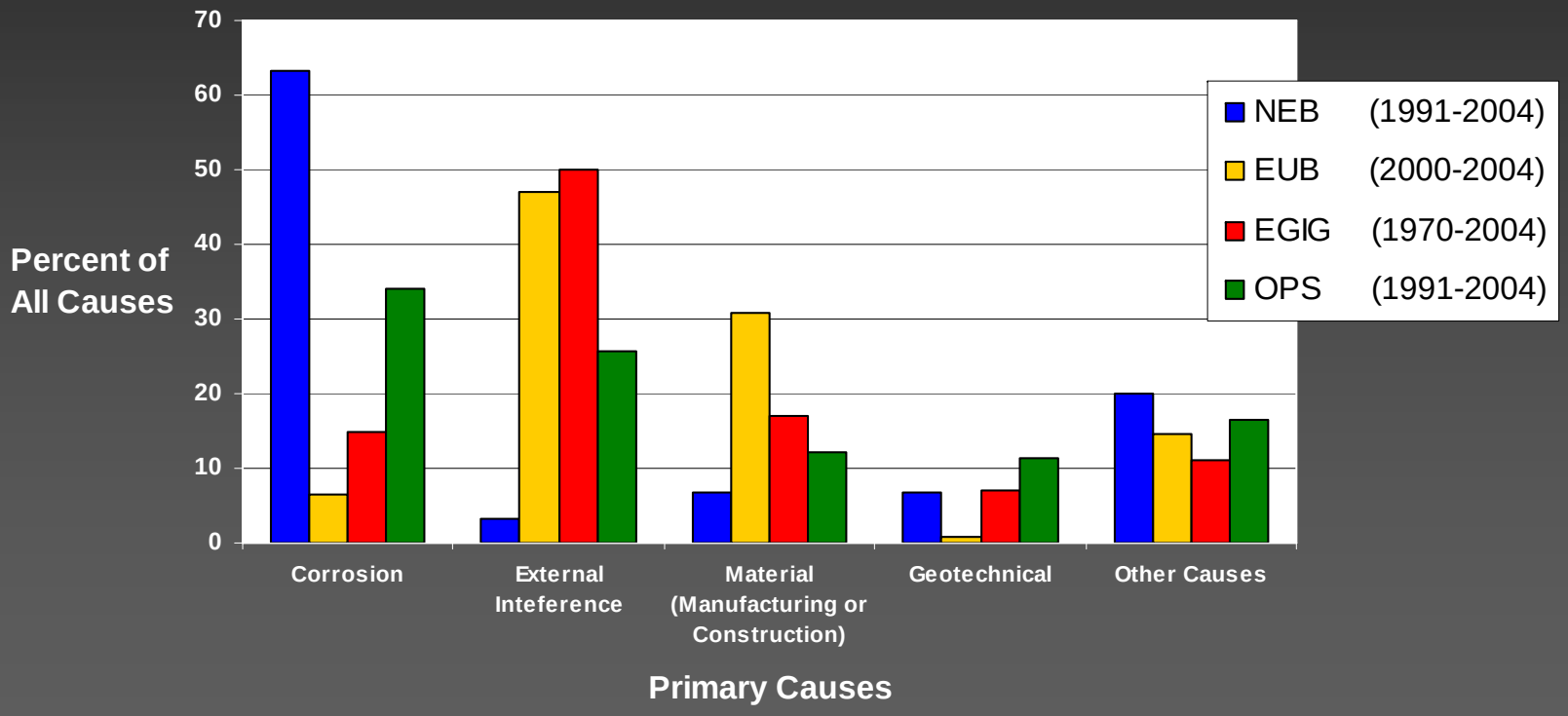
Rupture Primary Cause Comparison



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Why isn't Mechanical Damage a problem?

- Majority of pipe in low population density
  - NEB 98% Class 1 pipelines
  - OPS 90% Class 1 pipelines
- Implementation of Crossing Regulations in 1988

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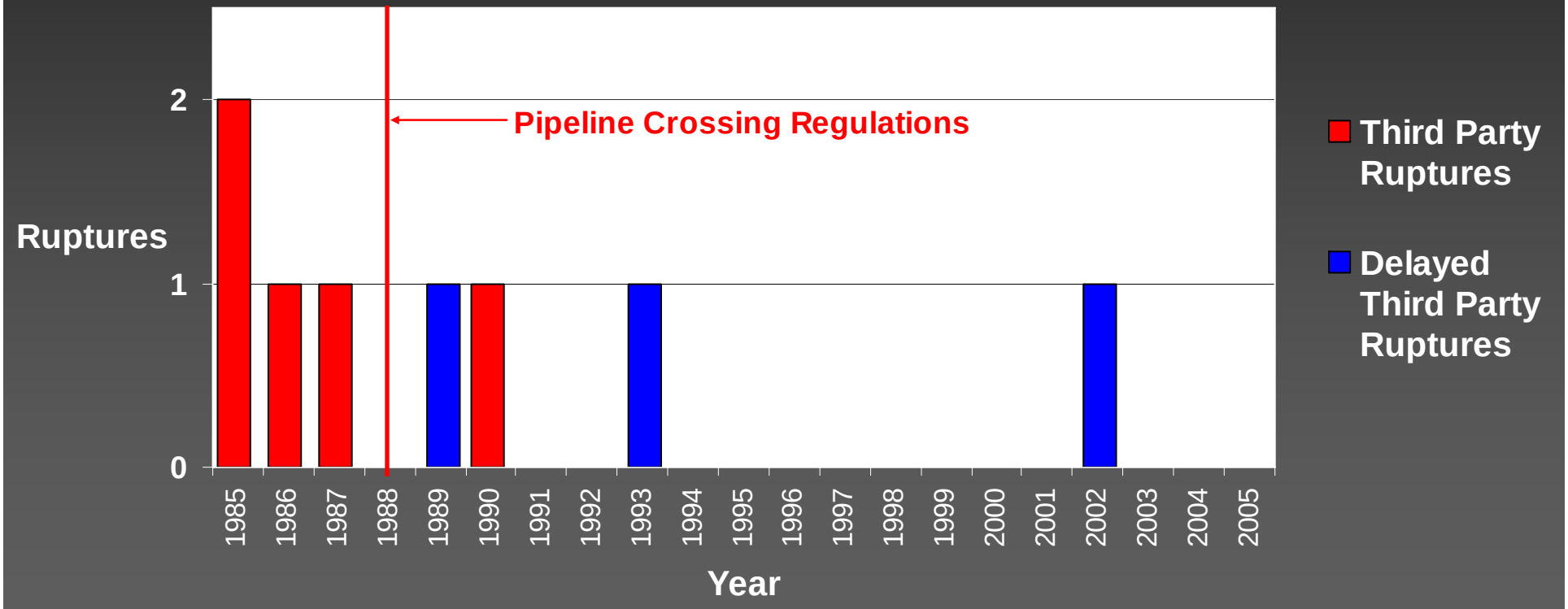
Ruptures Due to Mechanical Damage By Year



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Pipeline Crossing Regulations

- **Part I – Requirements for Third Parties**
  - **Establishes criteria that 3rd party must fulfill for pipeline companies, otherwise must obtain approval from the NEB**
- **Part II – Requirements for Pipeline Companies**
  - **Establishes criteria that pipeline company must fulfill for 3rd parties**
- **30m "Safety Zone" on each side of RoW**

Violations to Crossing Regulations

- Reportable to NEB
- Investigated by crossings specialist
- Reported violations continue to rise
  - Activity near pipelines increasing (urban sprawl)
  - Companies more vigilant
- Crossing violations are a leading indicator for mechanical damage

Violations to Crossing Regulations

- Majority of Violations Ground Disturbance
- Contacts per year, per 10,000 miles (2000-2004 Average)
  - NEB: 0.59
  - EUB: 4.31 (Alberta)
- Mechanical Damage Ruptures per year, per 10,000 miles (2000-2004 Average)
  - NEB: 0.07
  - EUB: 0.72 (Alberta)

Future Direction re Damage Prevention

- Damage Prevention Regulations replace Crossing Regulations Summer 2006
  - More goal-oriented approach, greater flexibility
  - Regulatory focus more on audits
- Strong support for provincial one-call systems
- Continued focus on public awareness

Detection & Characterization of Mechanical Damage

- **2002 Rupture – Liquids Line**
  - **MFL indicated a dent in 1998 ILI, misdiagnosed as field bend**
  - **Lack of training/opportunity for interpretation of ILI integrity inspections**
  - **Field excavation, review of route alignment, or engineering calculation would catch problem**
  - **History of crossing violations with landowner**

Detection & Characterization of Mechanical Damage

- **1989 & 1993 Ruptures – Gas Line**
  - Constructed in 1952, dent repairs in 1988
  - Visual inspection caught gouges during construction, missed several
  - Rupture in 1989 from mechanical damage
  - 2nd rupture 1993 from mechanical damage
  - MFL indicated anomaly, report received after rupture

Summary

- What have we learned?
  - Mechanical Damage not major problem in Canada
  - Proactive approach has reduced frequency of Mechanical Damage
  - Different causes require different strategies
- Future regulatory direction
  - Damage Prevention Regulations