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Oil Pipelines: Industry Performance over 50 Years

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CONCAWE's OPMG

- The Oil Pipeline Management Group (OPMG)
- Founded in the early 1970s
- A forum for EU pipeline operators to exchange non-confidential information about pipeline operation, maintenance, safety and environmental performance
- Yearly survey / report on hydrocarbon spillage from EU pipelines since 1971

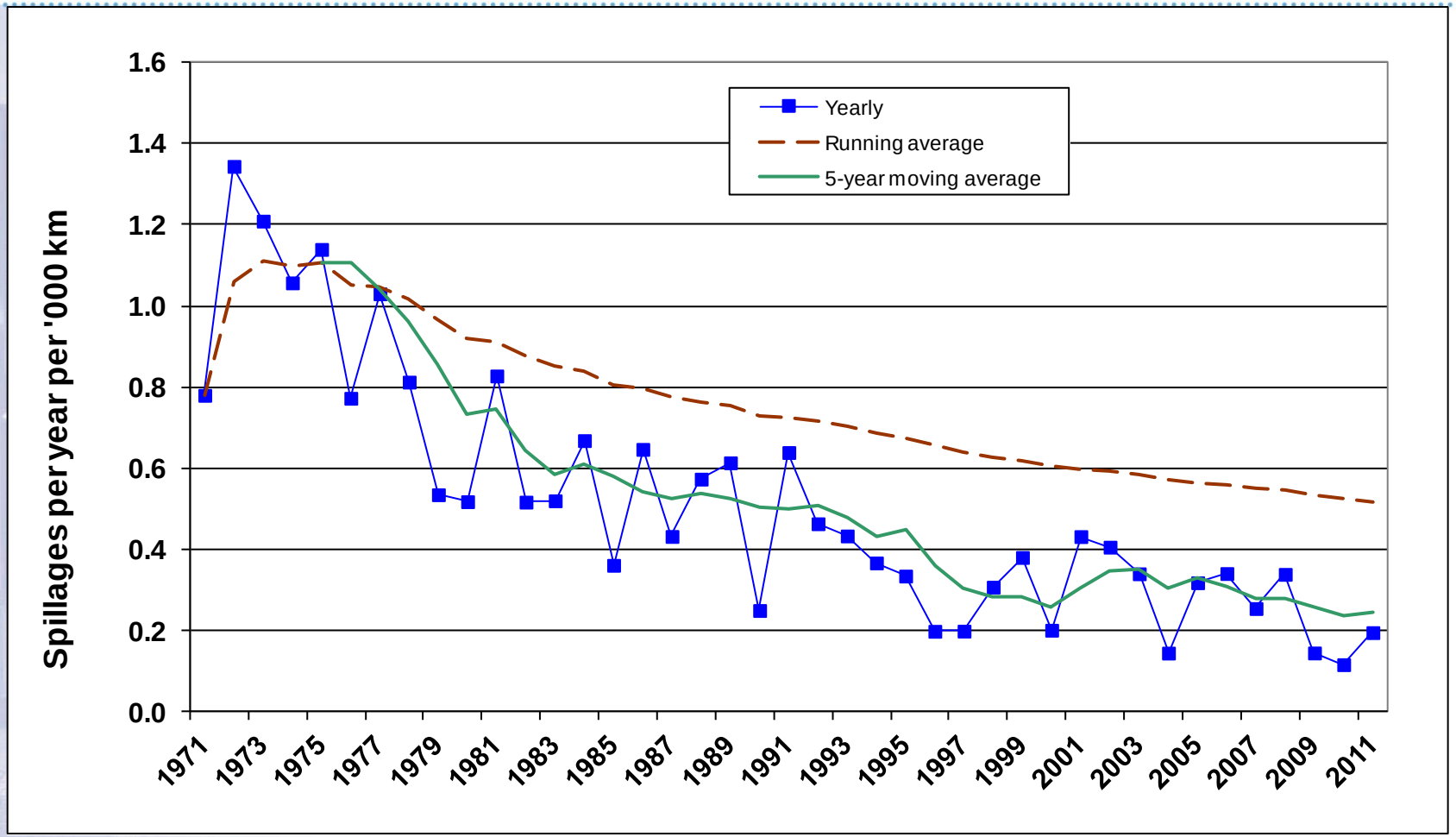
The "CONCAWE" Network in Figures

- Returns from some 70 companies
- About 150 separate pipeline systems
- Combined length: > 35,000 km
  - 1/3 crude oil
  - 2/3 products
  - "Hot" pipelines transporting heavy fuel oil or lube oil components at elevated temperatures now represent a combined length of less than 100 km.
- Activity
  - Combined throughput ± 800 Mm^3/a

concawe Safety Record (in relation to spillage incidents)

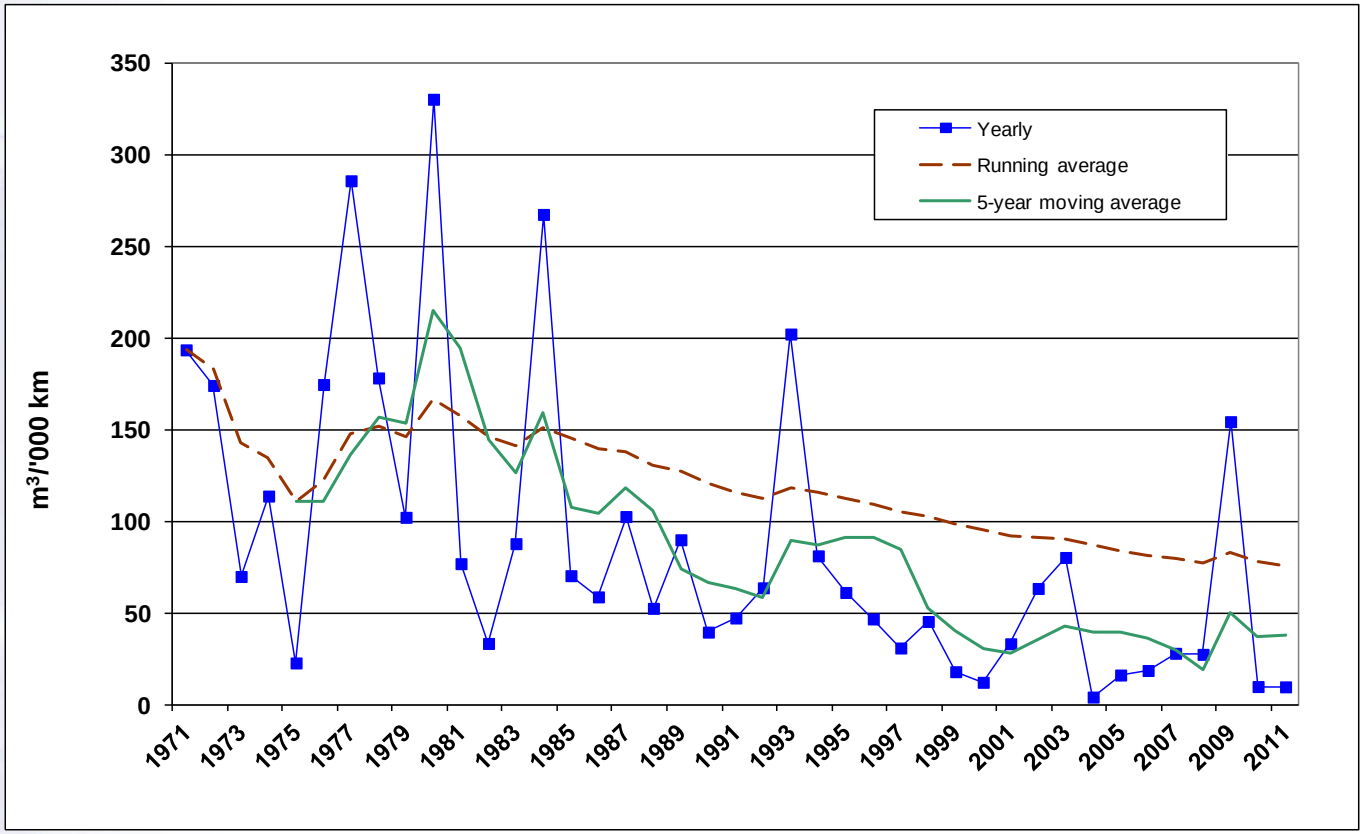
- 3 injuries reported since 1971
  - Last recorded injury was in 2006
- 14 fatalities in 41 years, none involving members of the public
  - Last recorded fatality was in 1999 (1 fatality)
- 9 fires in 40 years
  - Last fire in 1999

Spillage Incidents Frequency



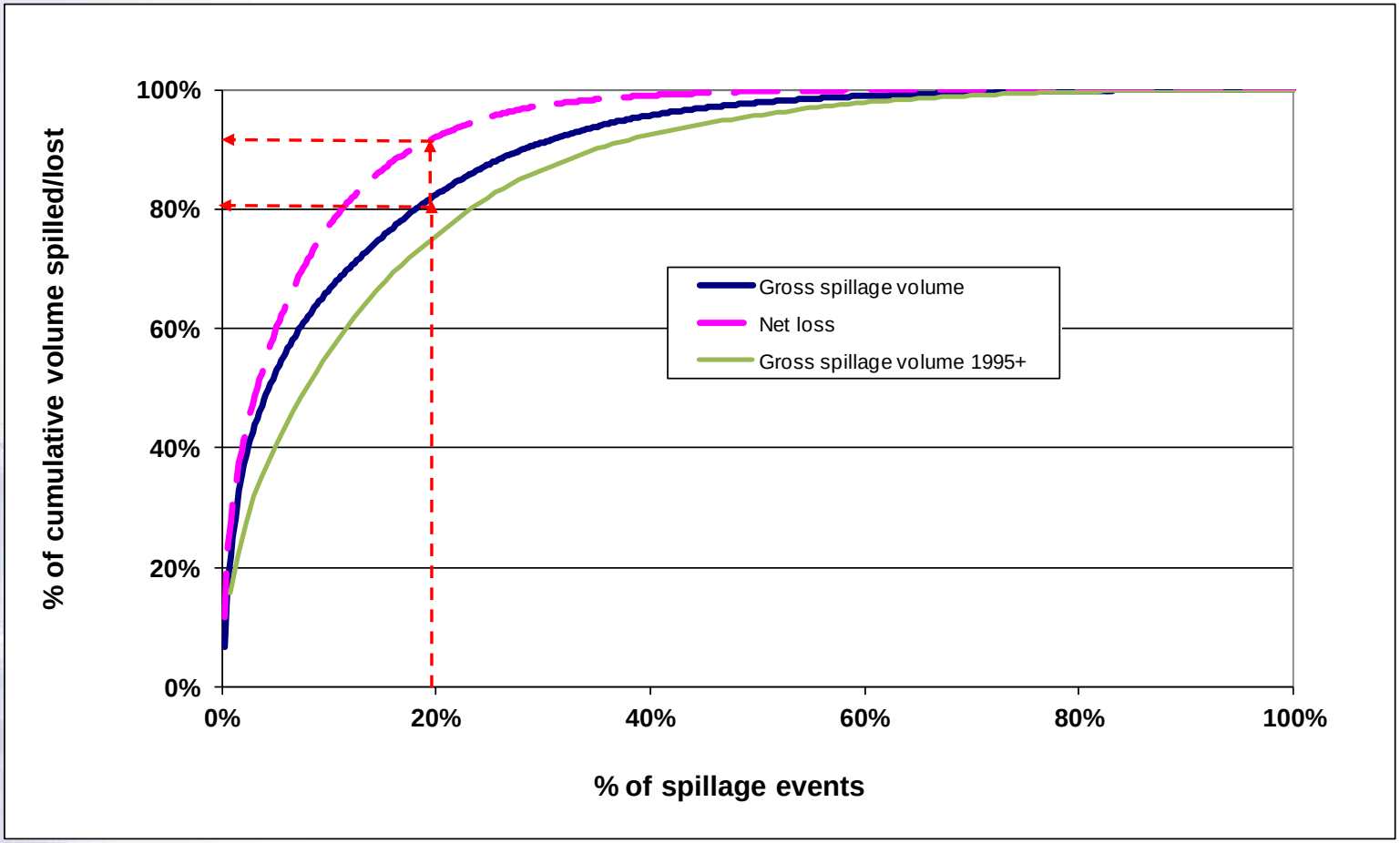
- The number of spillage incidents has steadily decreased over time

Volume Spilled



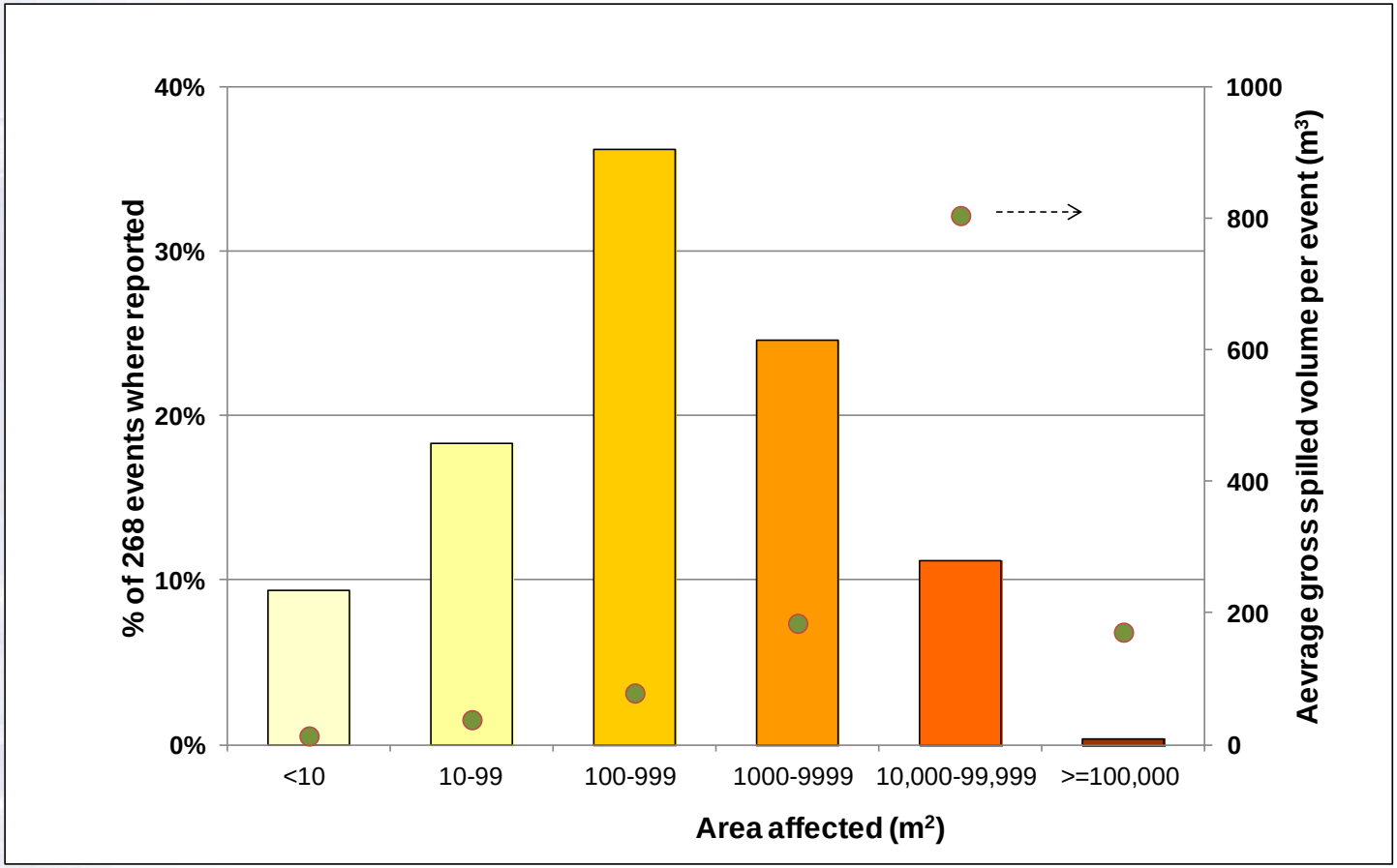
- Although short term variability is wide, average spilled volume per incident has also decreased over time
- On average, about 60% of the gross spilled volume is recovered

Spillage Volume Distribution



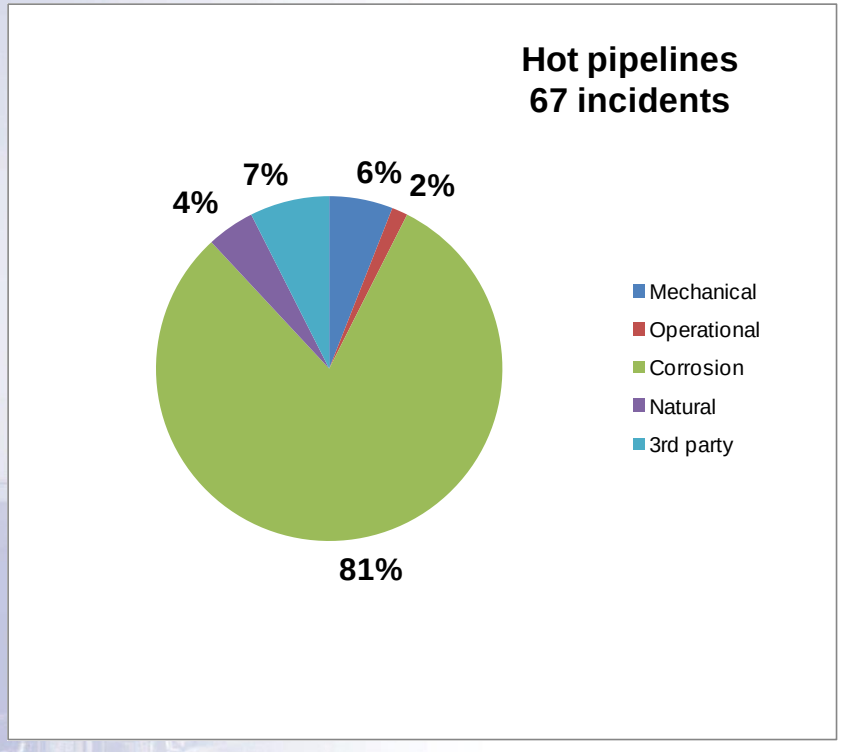
- 20% of events account for 80% of the gross spillage and 90% of the net loss
  - The picture has not changed much with time

Ground Area Affected by Spills



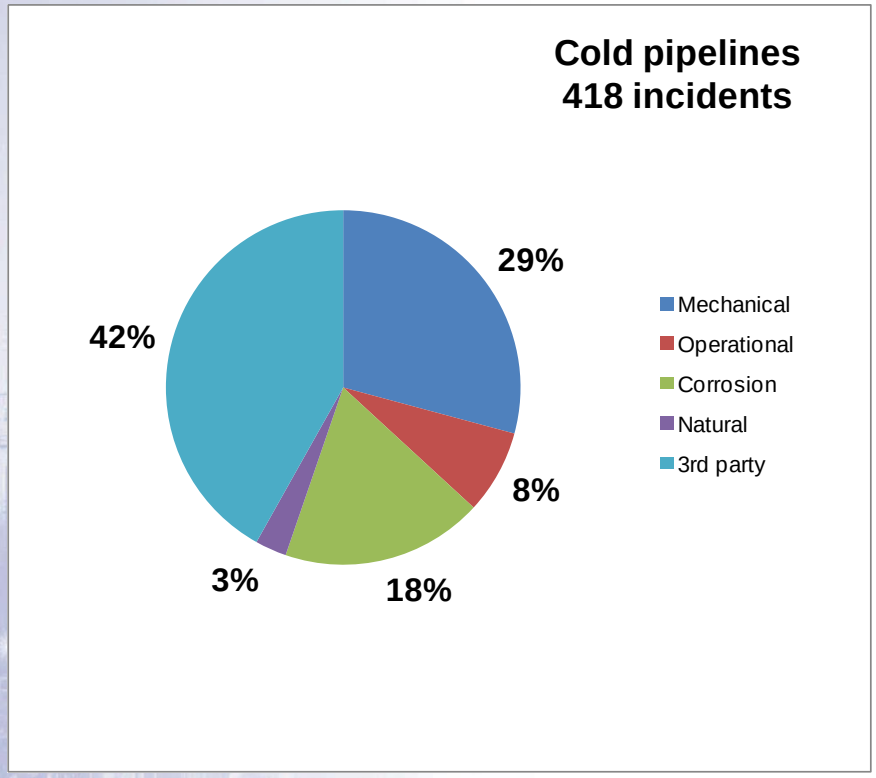
- Larger spills generally affect larger ground areas although there are exceptions

Causes of Spillage Incidents for Hot Pipelines



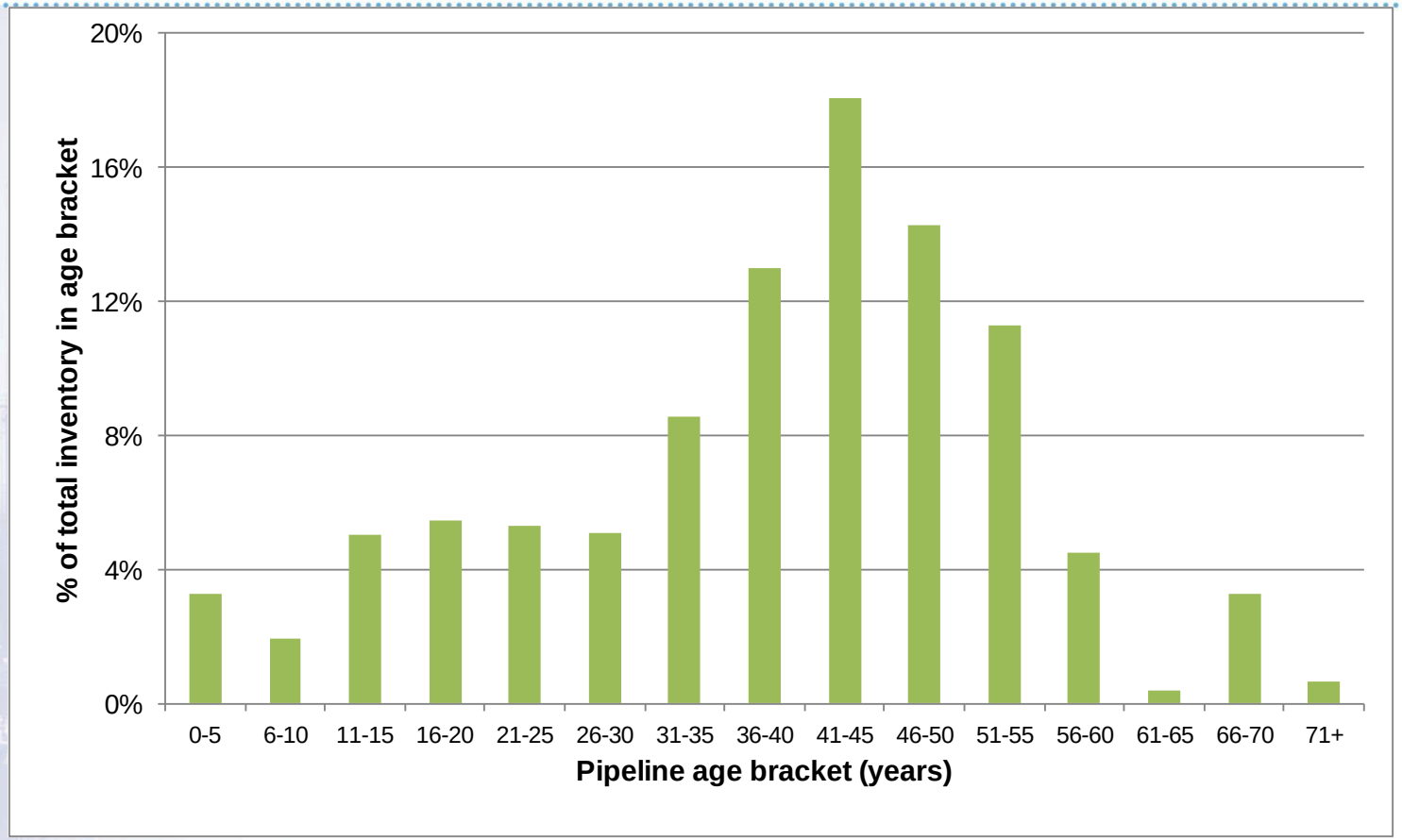
- A small proportion of the inventory is made up of "hot" pipelines
- They have been responsible for a disproportionate fraction of all incidents
- They are particularly sensitive to corrosion, mostly external – under insulation
- Most hot pipelines have now been shut down, leaving only about 70 km in operation today
- There was only one spillage from hot pipelines in the last 10 years

Causes of Spillage Incidents for Cold Pipelines



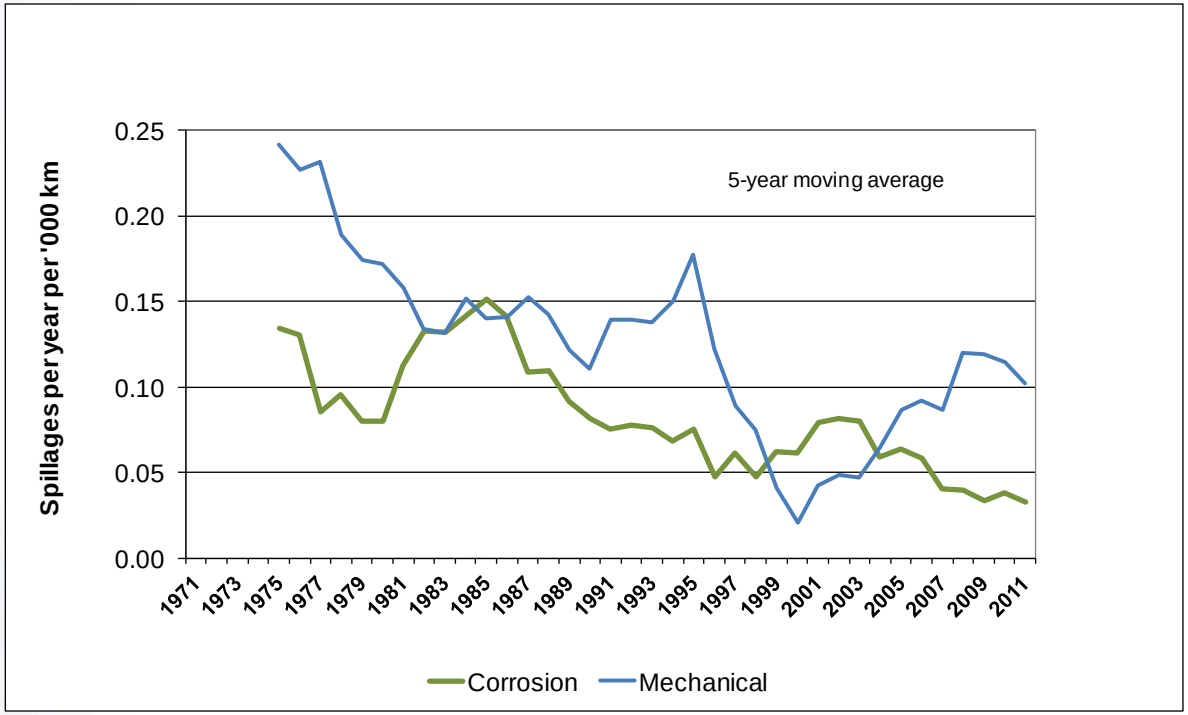
- For cold pipelines, corrosion is the third most common cause
- Mechanical failure is the second most common cause
  - This includes both lines and fitting (flanges, valves, pumps etc)
- Third party interference is the main cause of cold pipeline spillage

The Pipeline Inventory is Ageing



- Today 57% of the pipeline inventory is over 40 years old
- Some lines are almost 70 years or older

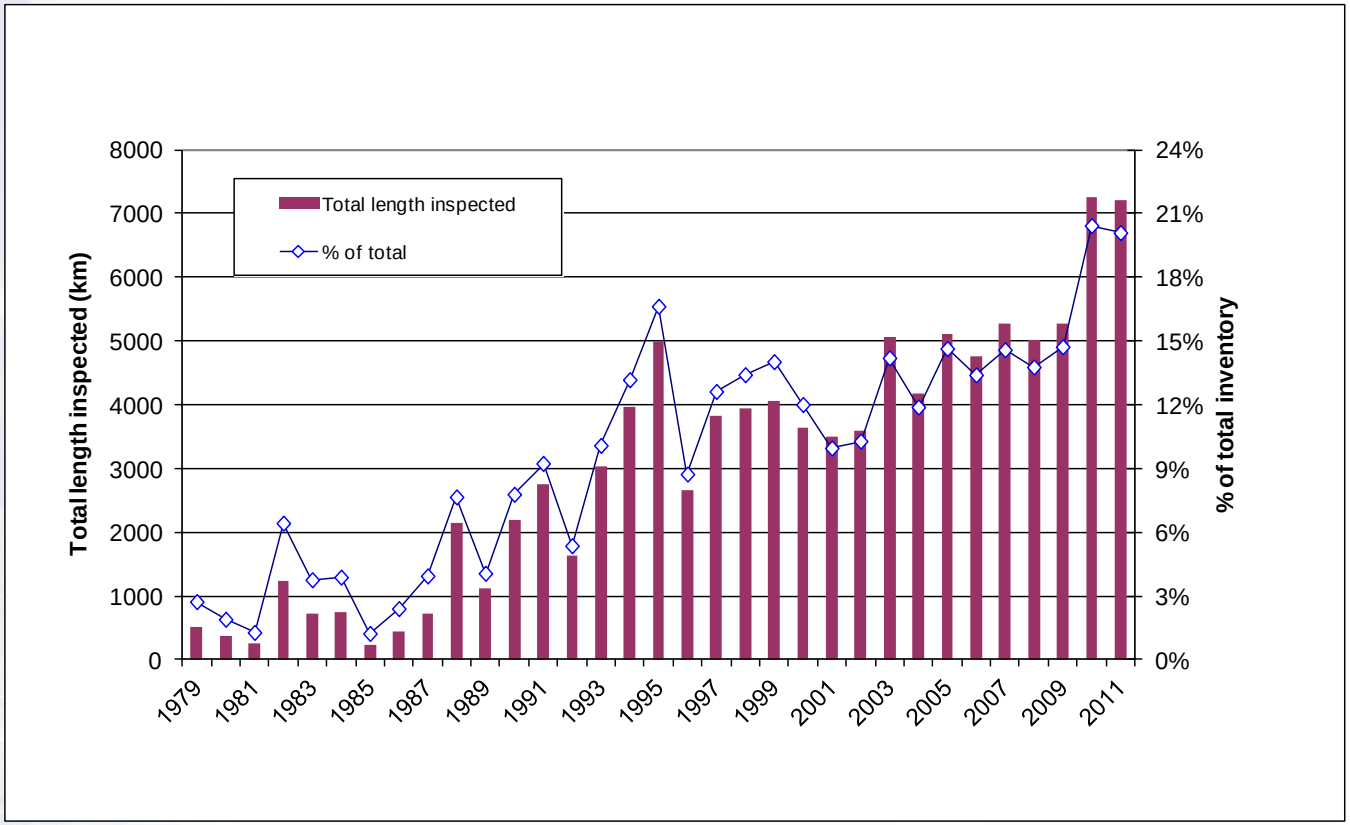
Is pipeline ageing a problem?



- The frequency of corrosion-related failures has slowly but steadily declined over time
- In spite of an increase in the last decade, the frequency of mechanical failures show the same long term trend
  - Only a few of recent mechanical failures can be attributed to metal fatigue

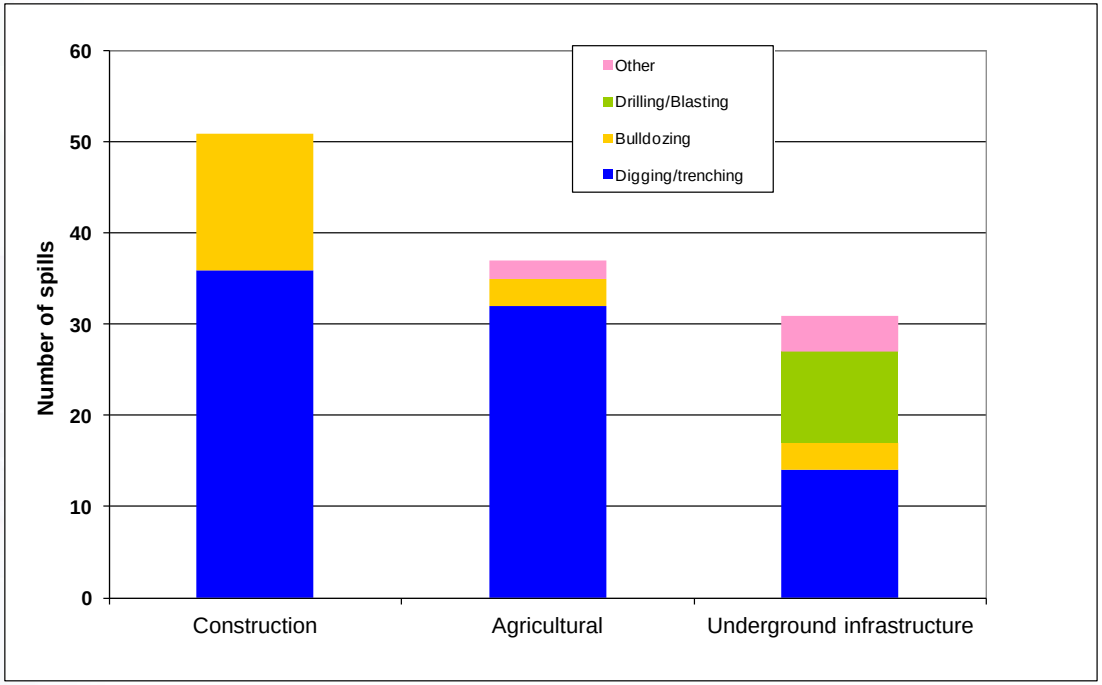
Inspection Techniques Have Improved

- In-line inspections by "intelligence" pigs first appeared in the late 1980s and have become increasingly sophisticated and effective ever since
  - They now allow detection of deformation, wall thinning, cracks etc
  - Their use has increased steadily over time and they have become an integral part of a modern Pipeline Integrity Management System



Third Party Interference

- 180 spillage incidents (over 40% of the total) were caused by third party interference
- 126 incidents were "accidental" i.e. the result of excavation activities



- 28 were "incidental" i.e. the time-delayed consequence of third party damage at some point in the past

Third Party Interference: Theft

- 26 incidents were "intentional" i.e. resulting from deliberate damage
- 19 were related to product theft or attempted theft
  - All except one occurred after 1998
- In addition a number of theft attempts that did not result in a spill have been reported in recent years
- Originally primarily an Eastern and Southern EU issue, this is becoming a global threat
- With the increasing relative value of hydrocarbons, this is a new threat for which the Industry must develop countermeasures

End of Presentation

Thank you very much!