



# World Gas Conference 2006



## **RISK-PRIORITISED DISTRIBUTION ASSET MAINTENANCE**

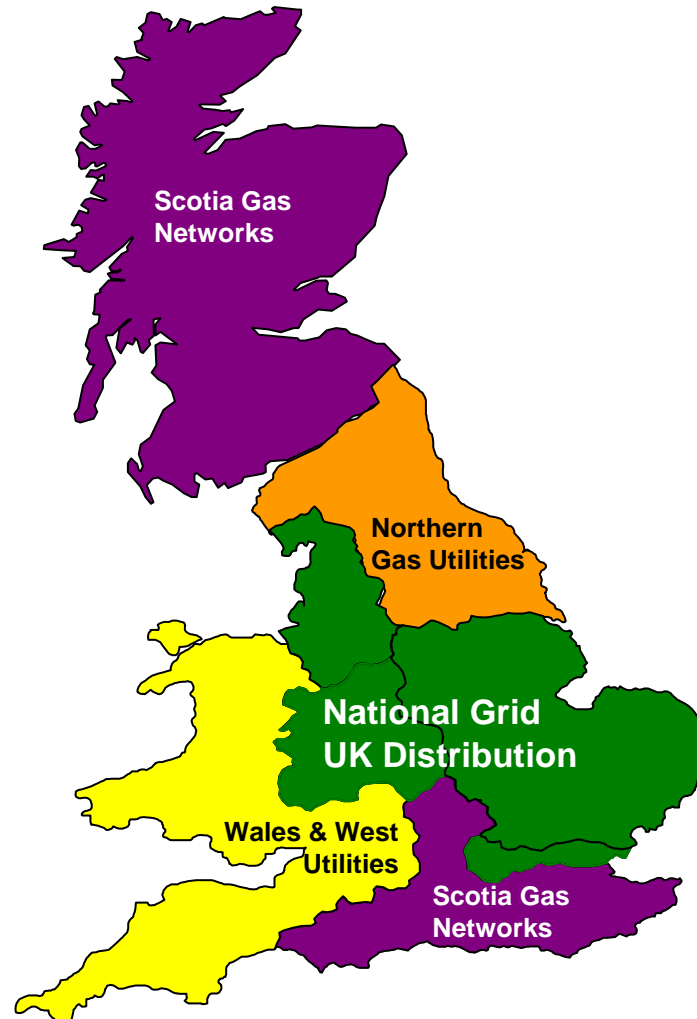
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## RISK-PRIORITISED DISTRIBUTION ASSET MANAGEMENT



### National Grid UK Gas Distribution Operating Area





## RISK-PRIORITISED DISTRIBUTION ASSET MANAGEMENT



### National Grid's Gas distribution mains population in Great Britain

(Kilometres)	Operating Pressure			Total
	Below 75 mbar	75 mbar to 2 bar	2bar to 7 bar	
Polyethylene	55670	9125	525	65320
Cast & Ductile Iron	50210	2850	0	53060
Steel	3275	2280	2235	7790
Total	109155	14255	2760	126170



# Pipe failure mechanisms

- Metallic pipe fracture or corrosion failure
  - Caused by ground movement & soil conditions
  - Public safety issue
  - Can give rise to sudden and significant escape
  - Risk of fire or explosion & injury or damage
- Leakage from joints
  - Economic & environmental issues
  - Risk to safety arises from excavations



### Mains Replacement 1977-1999

- LP (<75mbar): Small diameter cast iron and steel mains close to buildings with cellars or places of public assembly
- MP (2bar) Cast iron mains <12" diameter close to buildings with cellars or places of public assembly.
- 60,000km replaced with PE pipe from 1977 to 1999 throughout Great Britain

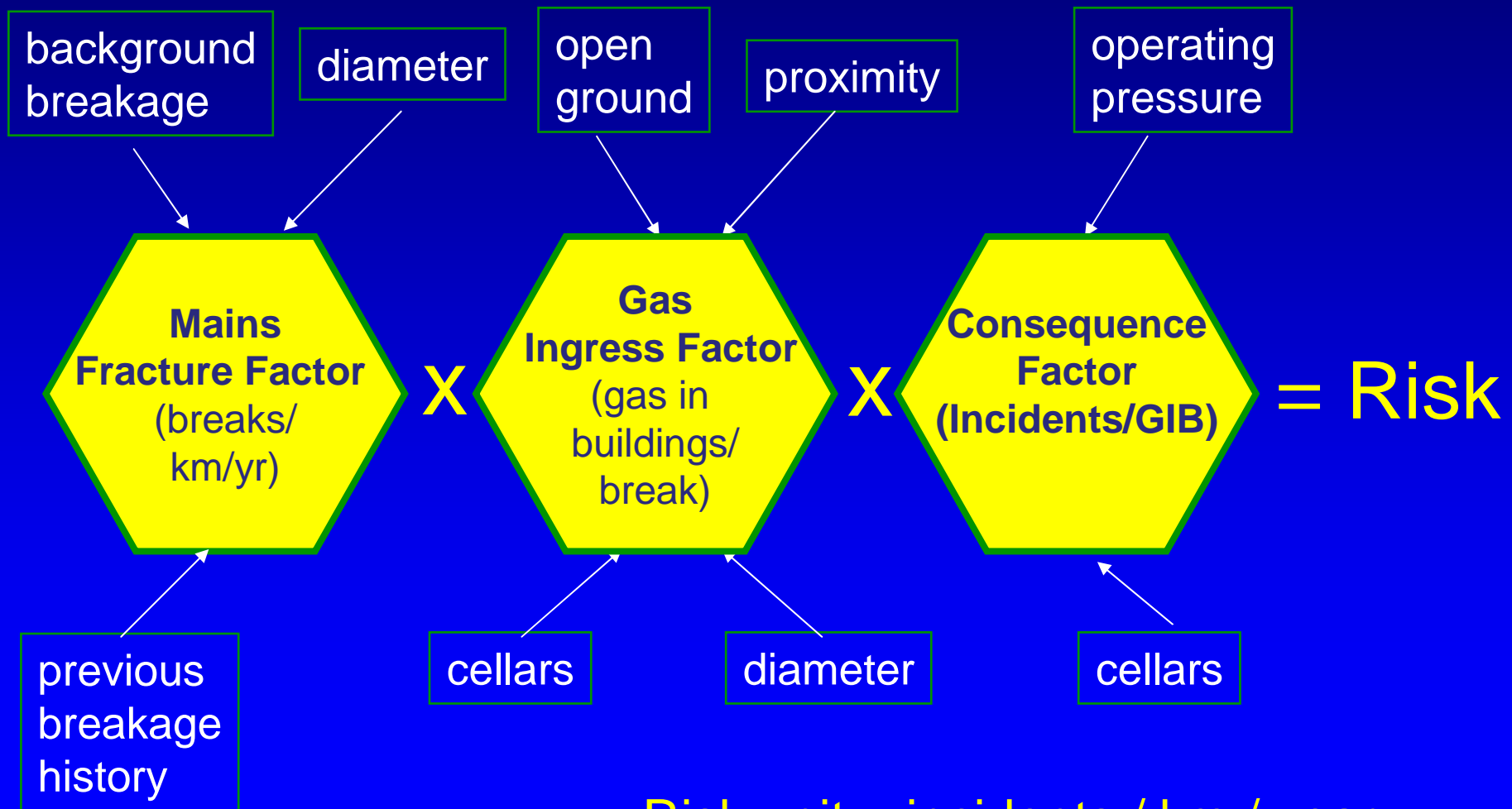


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## Calculation of risk value for individual pipes



Risk unit = incidents / km / year



### Definition of Replacement Programmes from 2000

- UK Pipelines legislation provides a duty to maintain pipelines in efficient working order and good repair
- Health & Safety Executive Policy is for all iron mains within 30m of buildings to be replaced within 30 years
- Safety and Economic Regulators review this policy & funding requirements every 5 years
- National replacement programmes totalling 3,600km of replacement per annum are approved by the HSE

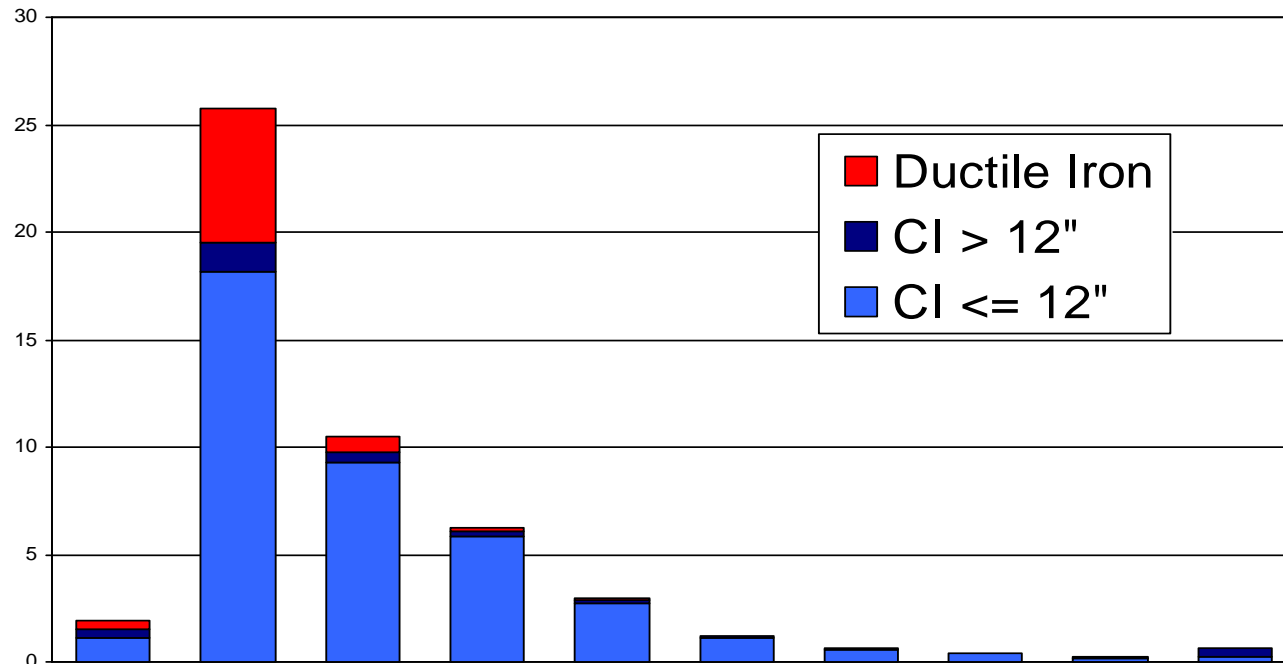




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## Example risk profile



Risk value	<=0	0-30	30-60	60-90	90-120	120-150	150-180	180-210	210-240	>240	Total
Length km	1918	25723	10519	6237	2928	1218	655	436	249	659	50543
Inc/annum	0.00	0.38	0.46	0.46	0.30	0.16	0.11	0.08	0.05	0.33	2.35



### Benefits from Quantified Risk Assessment model

- Analysis of pipe population enables allocation of resources for optimal risk reduction
- Informs contracting, purchasing, recruitment and technology development strategies
- As risk reduces, analysis of other investment drivers, e.g. leakage & integrity, can be combined to maintain effectiveness of replacement programmes
- Supports Regulatory programme reporting & analysis, providing an objective basis for establishing investment requirements



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