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MEP Naturalhy Presentation

Explosion Hazard for Natural Gas/Hydrogen Mixtures

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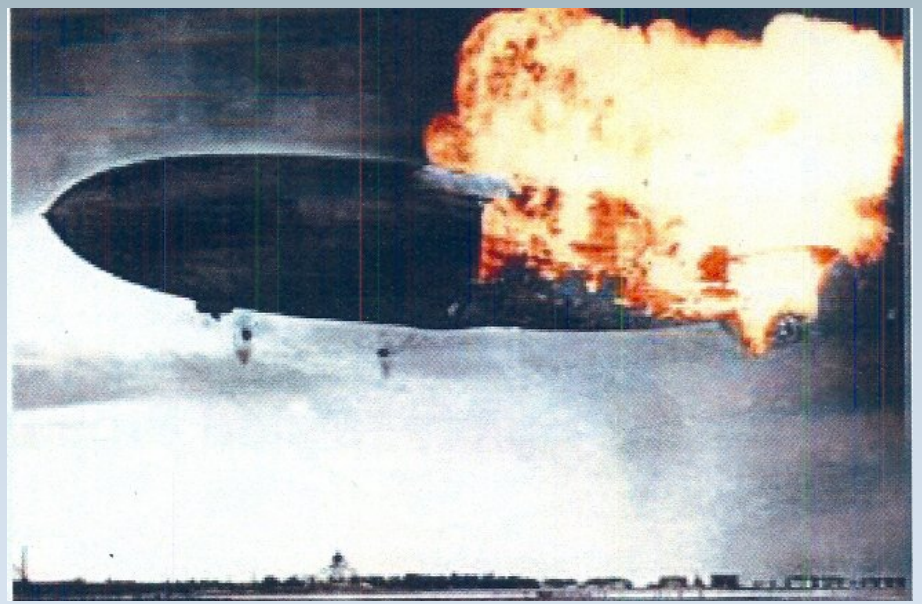
The Explosion Problem

- Perception is that ‘Hydrogen will explode’
- Historical events such as the Hindeburg disaster linger in the memory
- What about Natural Gas/ Hydrogen Mixtures?



Naturalhy Explosions

- Confinement of walls creates pressure when gas ignited

- But without walls pressure can be generated by obstacles in path of flame-VCE

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Explosions in Buildings

Typical result for Natural Gas or Mixture with up to 20% Hydrogen

Typical result for mixture with 50% hydrogen

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Vapour Cloud Explosions

- Presence of obstacles in flame path causes flame acceleration and high pressures
- Relevant to industrial sites
- Flixborough incident (1974) involving cyclohexane was classic example

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Effect of Hydrogen Content

- Flame speed increases then decreases

- Continued flame acceleration

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Conclusions

- Up to 30% H_2 can be added without significant increase in pressure compared to natural gas so unlikely to be an issue for Naturalhy concept
- For higher concentrations, an increase in explosion severity may arise
- Reducing obstacles will reduce explosion severity

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