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Introducing the Engineering Practice Guide

APGA Convention 2021

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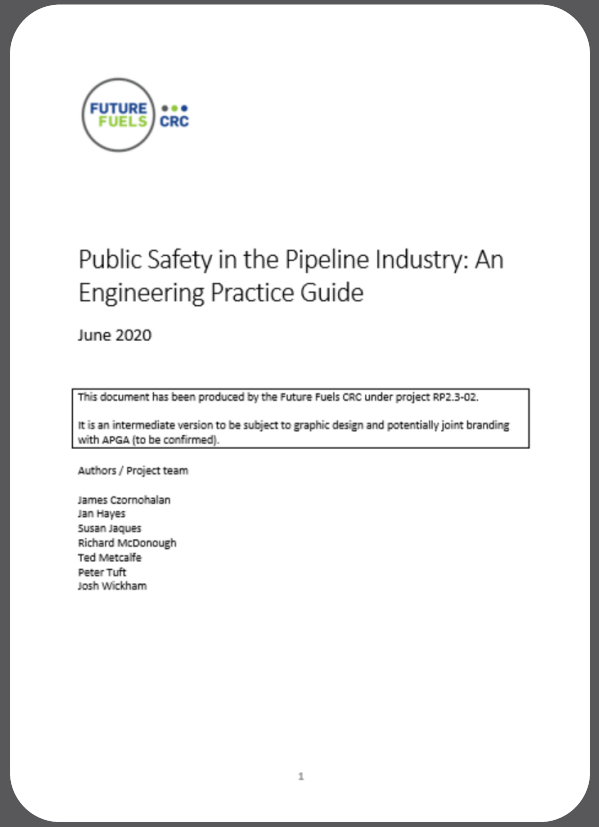
Agenda

- Introduction of the Practice Guide
- Origin of the Guide
- Learning from the Past
- Content Overview
- Safety Oriented Culture & Management
- Individual Practice Principles
- ‘Highlights’
- Questions



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Public Safety in the Pipeline Industry: An Engineering Practice Guide

June 2020

This document has been produced by the Future Fuels CRC under project RP2.3-02.

It is an intermediate version to be subject to graphic design and potentially joint branding with APGA (to be confirmed).

Authors / Project team

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Ted Metcalfe
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Introduction of the Practice Guide

- Public Safety in the Pipeline Industry: An Engineering Practice Guide
- Report developed under the *RP2.3-03*
- Meeting expectations of society of our pipeline assets
- Supporting our professional obligation

"The aim of this practice guide is to support pipeline engineers to act professionally when it comes to public safety, even in the face of pressures from other individuals, their own organisation, from contractors or from clients"

Steering committee

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Origin of the Guide

- Idea originates from at least 2015 and discussions re the last update to AS 2885.1.
- Long term home for the non-technical outputs of EPCRC RP4 Organisational Accident Prevention research.
- Engineering professional practice topics deserve an industry endorsed guideline

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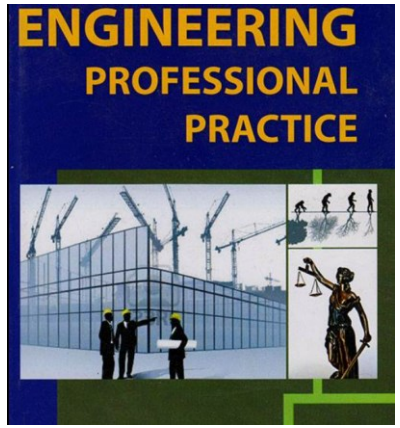

Learning from the Past

- Disaster case studies
  - Case based learning
  - How past failures can inform the future
  - Case studies are used in the guide to inform
- Individual development & decision making
  - Examples in the guide
  - Be aware of the environment
- Organisational culture
  - Create the right atmosphere

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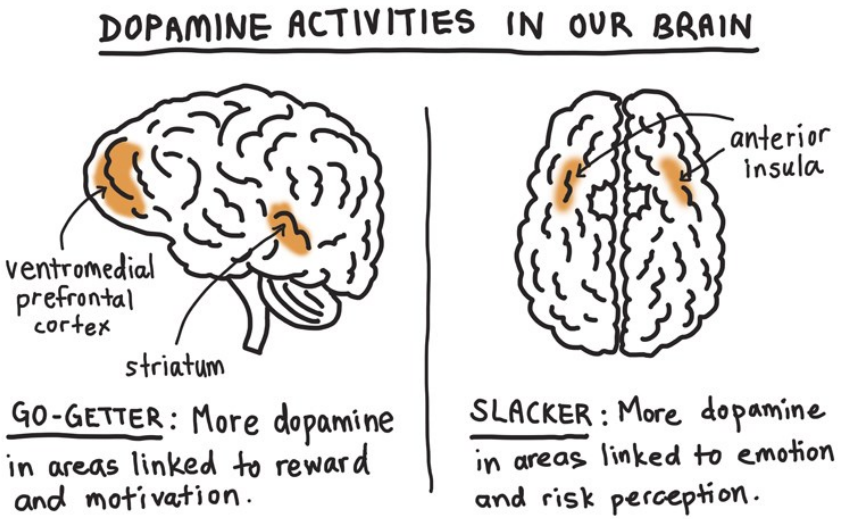
Content of the Practice Guide

- **Scope & Ethics**
- **Organising for Safety**
  - Safety Orientated Culture
  - Safety Orientated Management
- **Promoting Excellent Public Safety Outcomes**
  - Talk about public safety
  - Focus on the long term
  - Speak up for safety
  - Think beyond compliance
  - Work only within your area of competence

Safety Orientated Culture

- Rewarding the right behaviours
- Advocate for safety in contracts & engagement
- The right structure encouraging employees to “speak up for safety”
- Responding to problems / act on hazard reporting
- Create opportunities to share stories **more on this later**



Safety Orientated Management

- Pipeline engineering teams
- Stakeholders
- Engineering policy statement **more on this later**
- Management structure
- Technical authority
- Competence & resourcing
- Planning & communication
- Engineering **Quality Assurance** (QA)

Individual Practice Principles: **Talk about public safety**

- Understanding the consequences of engineering decisions
- Consider the potential impact on the general public & community
- Engineering decisions have real world consequences
- Step back / take 5
- Have a meaningful & positive impact on public safety

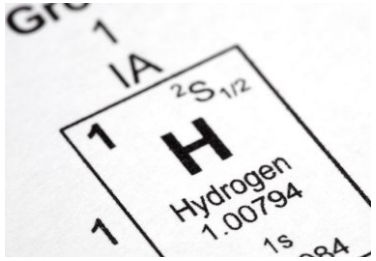
Case Studies
Quebec bridge collapse

Florida Uni footbridge

Enbridge drill-bit pipeline failure

Individual Practice Principles: **Focus on the long term**

- Take a long-term view in safety decision making
- Failure may occur far in the future as a result of actions taken now
  - Our industry has built assets operating for over 50 years.
  - Our assets often operate well beyond the original design intent.
- Be aware of short term pressure compromising longer term benefits
- Recent industry example – designing current natural gas pipelines for a future hydrogen service



Case Study
Hurricane Protection System Levee breaches (Hurricane Katrina)

Individual Practice Principles: **Speak up for Safety**

- Many disaster cases where people kept their concerns to themselves
- Do you have the knowledge/responsibility to stand up for safety?
- Decisions regarding safety often involve risk trade-offs:
  - Influence of cost and time
- Ensure safety considerations are heard and explicitly considered **when decisions are made**
- AS/NZS 2885 Part 6 – know the requirements
- Speaking up can be hard – know your professional obligations to society for what you produce

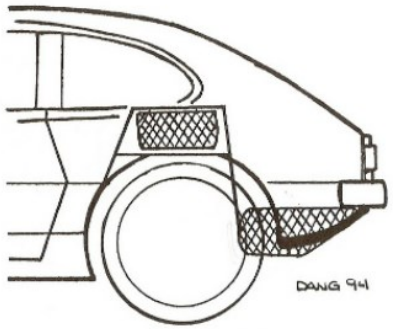


FIGURE 2
This diagram shows the actual placement of the fuel tank, as well as the alternative placement above the rear axle.

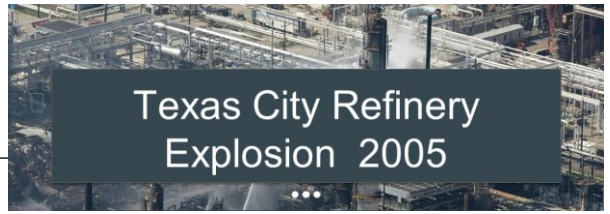
Case Studies

Ford Pinto fuel system

NASA's infamous o-ring (the Challenger disaster)

Individual Practice Principles: **Think Beyond Compliance**

- Expertise is much more than simple rule following
- Understanding *why?*
  - Developing judgement over a career
  - Apply knowledge and experience
- AS2885 developed for **competent** engineers,
  - Risk based not a recipe book
  - Includes minimum requirements
- Thinking of the future & continuous improvement



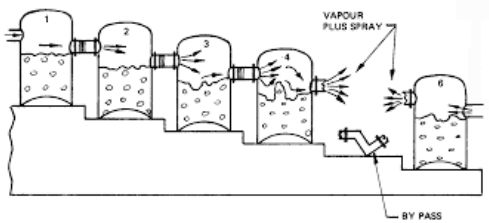
Case Study

Texas City Refinery

Individual Practice Principles: **Work within Competence**

- Keep up to date with knowledge developments in your industry and in your discipline
- Know what you don't know
- Communicate your areas of knowledge as well as where you need help from others
  - Sign-off on work within the bounds of your competency
  - Expand your knowledge in sustainable ways
  - Beware of assuming responsibility without the knowledge to back it up
- APGA Pipeline Engineer Competency Standards

Case Study
Flixborough chemical plant explosion



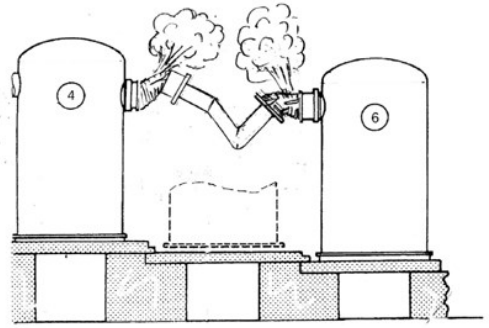


Fig.2 View of fractured temporary pipe

Example ‘role play’

Highlights: Engineering Policy Statement

- Principle: For safety to be paramount that vision should be formally documented and promulgated.
- All engineering teams should work under a clearly stated policy for community/public safety, security of supply, environment and workers' health and safety.
- Such statements should align with other relevant Client policy statements such as those for Quality Assurance, Health and Safety, etc.
- The engineering policy statement should be made available to all engineers on the project

Highlights: Opportunity to Share Stories

- Learning through our collective experience
- Why stories resonate with others
- Reinforcing knowledge about safety
- Create opportunities to share your knowledge:
  - A lunch and learn session about a recent incident.
  - Shared reading of major disasters. Understand why events occurred.
  - Discuss recent incidents of professional interest / safety moments
  - This conference:
    - Find someone to share your experience with
    - Seek another to learn from!

Future Utilisation of the Guide

- The intent is for the Practice Guide to become an APGA branded document and disseminate it to the APGA membership at a **launch webinar in Feb 2022**
- Future opportunity – include as a reference tool for an element in the Pipeline Engineering Competency Standards – i.e. part of 'General Engineering' (GE012 Technical Governance)
- Consider using in your own **individual** and **organizational** training

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QUESTIONS?

PANEL / DISCUSSION

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