Health and Safety
Executive

HSE

UKOPA Technical Seminar

Regulatory Inspection of Ageing Assets

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Overview

- What is ageing
- Is it important
- What is the HSE looking for
- Questions

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- Is it important
- What is the HSE looking for
- Questions
- I know that!

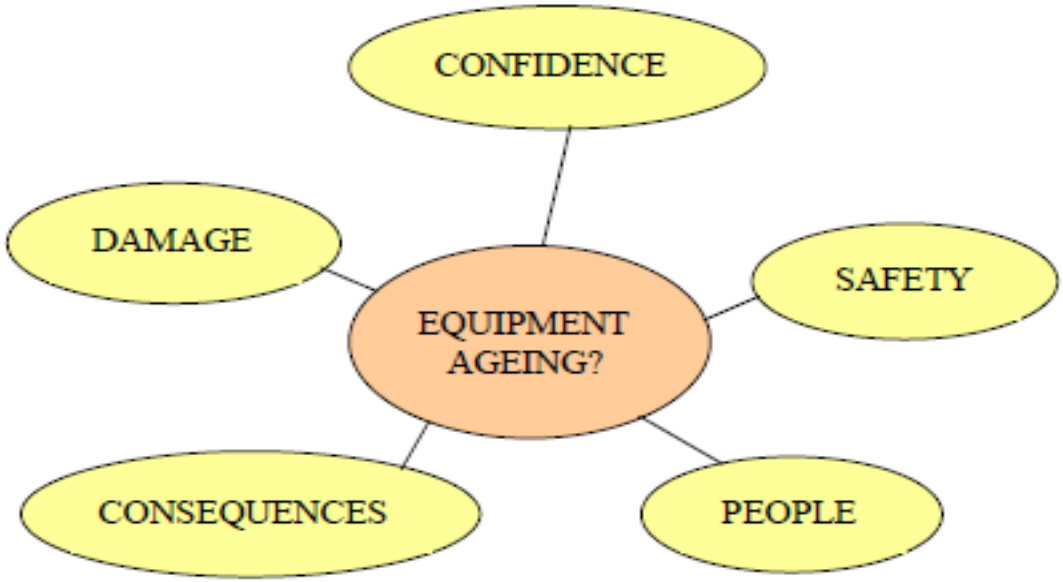
Ageing Assets

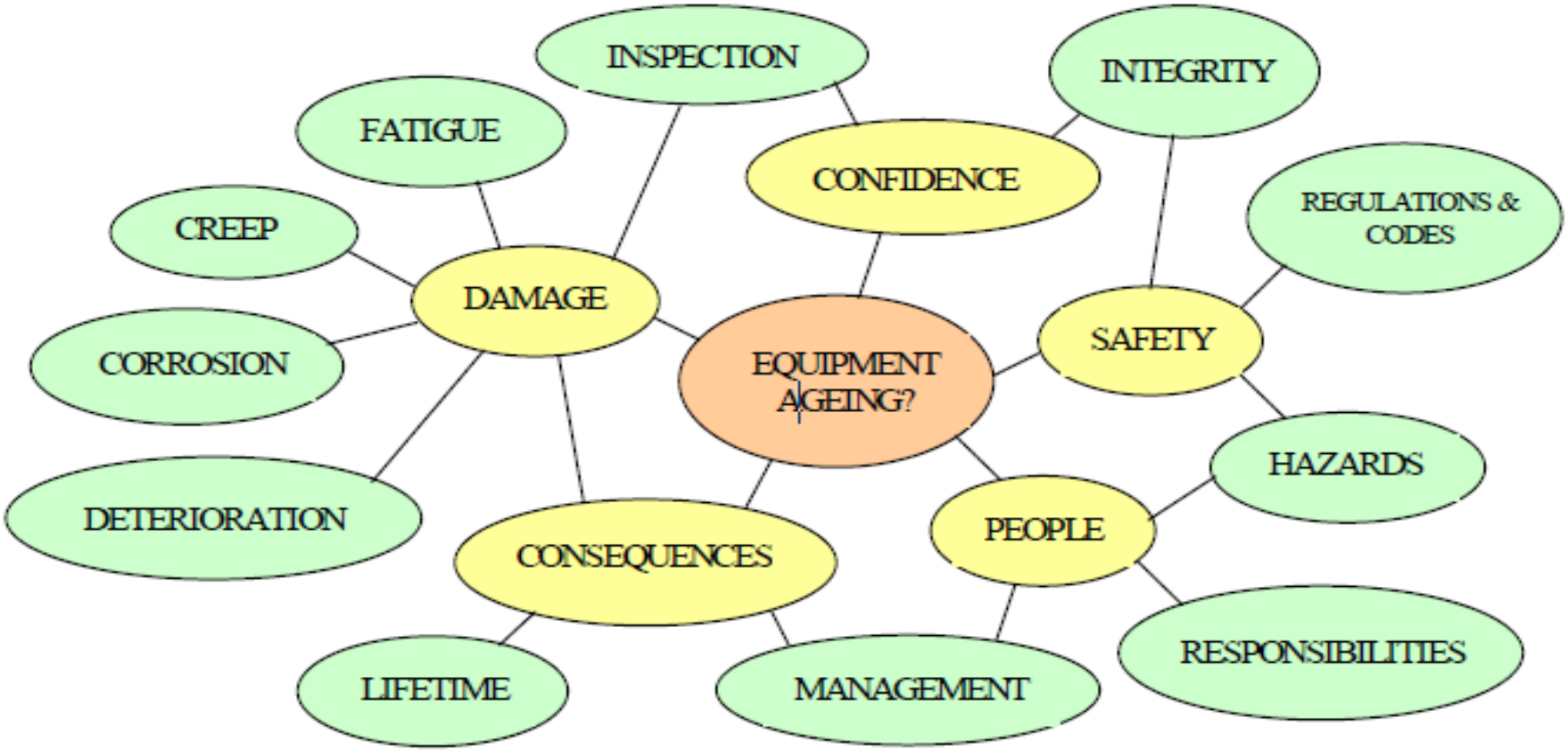
- **2006 Research Report RR509**
- **Plant Ageing -** Management of equipment containing hazardous fluids or pressure

- “Ageing is not about how old your equipment is; it is about its condition, and how that is changing over time. Ageing is the effect whereby a component suffers some form of material deterioration and damage (usually, but not necessarily, associated with time in service) with an increasing likelihood of failure over the lifetime.
- Ageing equipment is equipment for which there is evidence or likelihood of significant deterioration and damage taking place since new, or for which there is insufficient information and knowledge available to know the extent to which this possibility exists.
- The significance of deterioration and damage relates to the potential effect on the equipment’s functionality, availability, reliability and safety. Just because an item of equipment is old does not necessarily mean that it is significantly deteriorating and damaged. All types of equipment can be susceptible to ageing mechanisms.”

Ageing Assets

- Equipment that has degraded
- May be time based, often not chorological
- Design standards moved on
- Fitness for service affected
- Applies to all items of plant


CONFIDENCE
DAMAGE
SAFETY
EQUIPMENT AGEING?
CONSEQUENCES
PEOPLE


INSPECTION
INTEGRITY
FATIGUE
CONFIDENCE
REGULATIONS & CODES
CREEP
DAMAGE
SAFETY
CORROSION
EQUIPMENT AGEING?
HAZARDS
DETERIORATION
PEOPLE
CONSEQUENCES
RESPONSIBILITIES
LIFETIME
MANAGEMENT

Is Ageing Important

- **2010 HSE study** (HSE Research Report RR823 – Plant Ageing Study Phase 1)
- RIDDOR: 173 loss of containment incidents related to ageing
- EU MARS: 96 major accident loss of containment incidents estimated to be due to ageing plant
  - Approx 60% of European major hazard loss of containment incidents are related to technical integrity and of those, 50% have ageing as a contributory factor
  - 11 Fatalities
  - 183 Major Injuries
  - Economic loss?

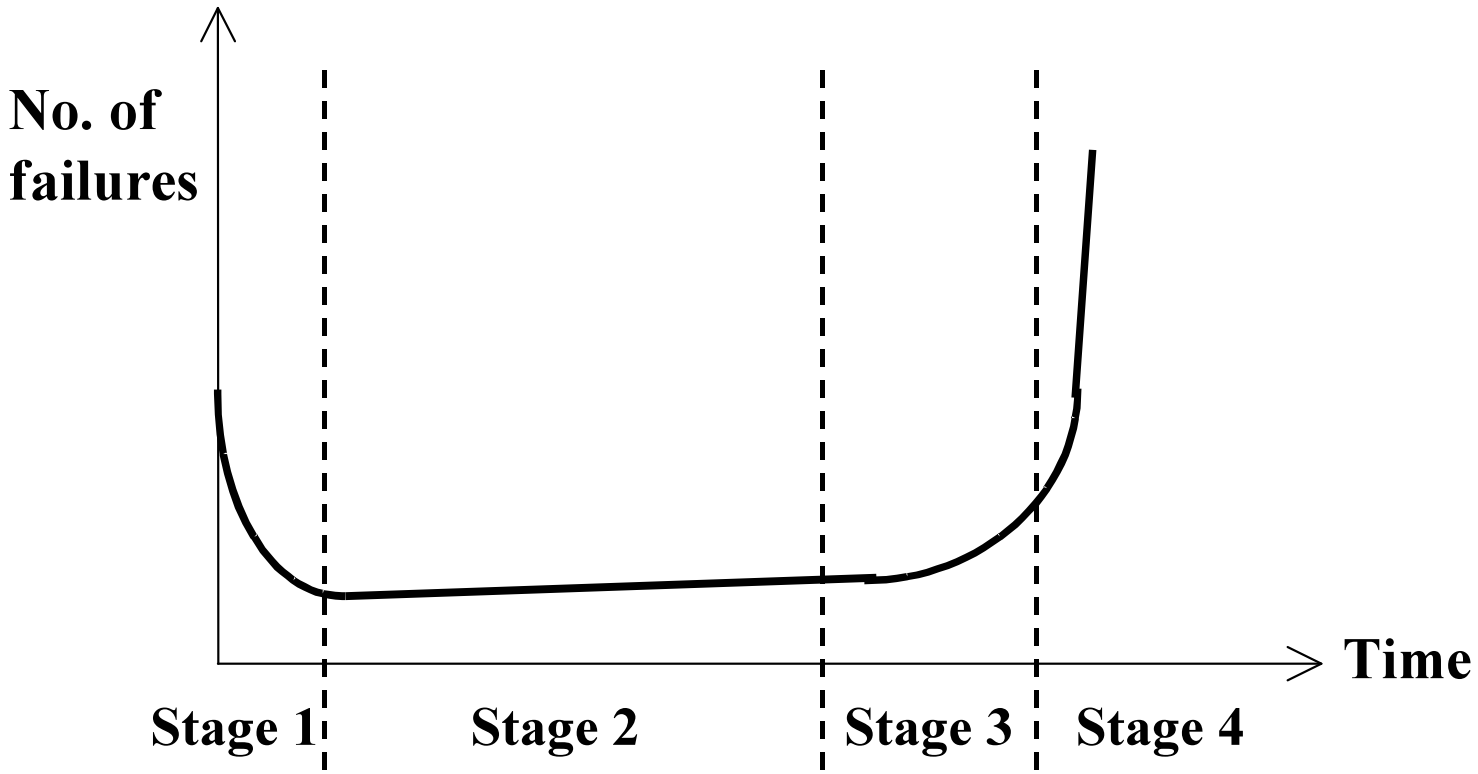
Legislation

- Pipelines Safety Regulations 1996
- Provision and Use of Work Equipment Regulations 1998
- Management of Health & Safety at Work Regulations 1999
- Health & Safety at Work etc. Act 1974

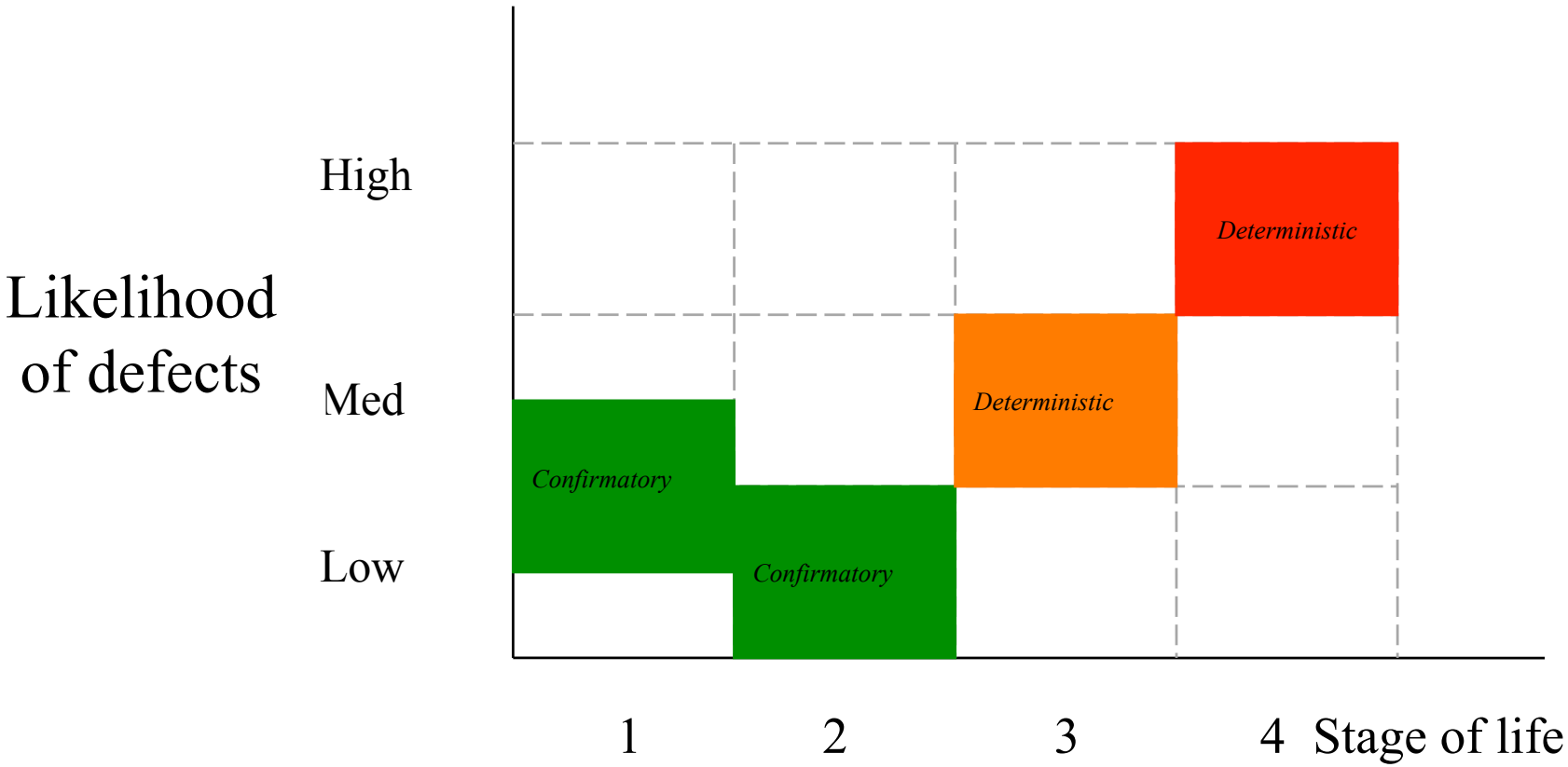
Pipeline Safety Regulations

- **Regulation 5** Design of a pipeline
- **Regulation 7** Access for examination and maintenance
- **Regulation 10** Work on a pipeline
- **Regulation 13** Maintenance
- **Regulation 15** Damage to pipeline
- **Regulation 20** Notification before construction
- **Regulation 23** Major accident prevention document

4 stages of ageing



Approach to inspection with increasing ageing



Key Initiators of pipeline ageing

- High cycling rate of extreme temperatures, pressures loads or flexing
- High operating temperatures and pressures
- History of operating beyond the original design envelope
- Aggressive environmental conditions
- History of poor maintenance
- Associated EC&I equipment that is obsolescent or no longer supported by the manufacturer or supplier.

Indicators of ageing

- Design limits approaching, or exceeded
- Evidence of active deterioration e.g. erosion, cracking, corrosion, creep
- Degradation rate increasing – less predictable
- Increase in frequency of inspection and testing regimes for pipeline systems or associated equipment
- Reduced reliability and standard in performance, eg safety devices
- Repairs, refits, modifications, unplanned maintenance
- Reduction in pipeline Safe Operating Limits or temporary isolation or down-rating due to deterioration or discovery of defects

Situations where ageing is not being identified/monitored

- Gaps in management interfaces between operator companies and internally
- Equipment not listed on the asset register or maintenance management system.
- Lack of full history, operations and maintenance
- Records and findings from inspections not being kept and reviewed for lessons, trends or important issues
- Findings not used to check/modify testing and inspection frequencies.
- Inadequate recording and use of operational performance data for pipeline integrity
- Gaps in maintenance and corrosion management routines

Ageing guidance

- RR509 audit tool has 17 questions in 4 sections.
  - Integrity awareness and culture
  - Management of ageing assets
  - Identification and control of ageing
  - Assessing ageing through assessment and remediation
- KP4 Asset Life Extension
  - aim to ensure that the risks to asset integrity associated with ageing and life extension are controlled effectively
  - HSG65 model
- Pipeline Integrity Delivery Guide
  - Aim to ensure consistent approach to inspection, and provide an overview of success criteria

Management System (HSG65)

- Understanding & recognition at senior management level
- Policy that is owned at senior management level
- Senior management support for inspection, maintenance, repair and replacement
- Fitness for purpose demonstrations are described
- Clear roles and responsibilities
- Competence
- Asset Registers and records
- Inspection procedures and plans
- Targeted inspection and maintenance

Management System Cont.

- Performance standards
- Leading and lagging SPIs
- Management of contractors
- Management of change
- Evaluation of wear, deterioration and damage
- Obsolescence identified and managed
- Management reviews and acts on findings
- Audit arrangements in place

Summary

- Looking beyond symptoms, or lack of
- Management Systems
  - HSG65
- Not a project – day to day

Questions ?