Across society, engineers have created many great pieces of infrastructure and people have become used to their continuing to work seamlessly. Most people involved in maintenance recognise that as soon as an asset goes into use it can be regarded as ‘ageing’, but we now have some very old facilities in private and public ownership with ever-increasing user numbers (or throughput) and may have reduced freedom to carry out inspections and maintenance.

Current issues:
- The need to design structures that ‘fail gracefully’. Not that they should be used until the point of structural failure but that they have predictable and identifiable failure modes as they age.
- There may be a growing gap between ‘work as imagined’ and ‘work as delivered’ with the passing of time. Temporary fixes may become permanent.
- Human-machine interfaces may be obsolete and, through piecemeal replacement, can become inconsistent across a facility.
- Increasing maintenance needs mean more ‘at-risk’ time for maintainers.
- Some industries may be in their ‘sunset’ (regionally, at least). Investment and management or societal focus can move on despite no substantive reduction in risk.
- Some sectors use cyclic reviews to identify such issues.

Future issues foreseen
- Innovative changes or modifications can be rendered more costly by the need to bring wider assets to current standards. Existing facilities may be difficult or event impossible to substantiate before an upgrade or modification.
- Risk tolerability can change requiring retrofit.
- Partly renewed equipment or structures could shift the ‘load’ in unexpected ways meaning failure is less predictable.
- Tacit knowledge of the workforce will be lost as people move. This needs to be recognised and investment to capture.
- Increasing automation and AI may lead to unpredictable failure modes – the methods and ability to identify and respond to these needs to keep pace.

Useful links
- [https://www.cross-safety.org/uk](https://www.cross-safety.org/uk)
- [https://www.csb.gov/](https://www.csb.gov/)
- [https://onderzoeksraad.nl/en/](https://onderzoeksraad.nl/en/)

Key Takeaways
- Watch out for divergence over time of what is done or in place from what was imagined when risks were considered
- Cyclic review is a good but must be followed by appropriate management follow up
- Stand back and understand the whole risk of the asset: build, use, maintain, modify, demolish, replace