

Ageing industrial assets in the UK

Critical industrial manufacturing assets throughout the UK are ageing; key UK industrial hubs such as Grangemouth, Ellesmere Port, and Teesside have industrial histories dating back over 100 years. In our experience working on various ageing assets throughout the UK, the plant and civil infrastructure on these types of facilities tends to be over 40 years old.

With typical design life for civil & structural infrastructure being between 25-50 years, it begs the question: Is enough being done by asset owners to understand the condition and risk posed by these ageing assets to the safe and continued operation of their site?

In our experience, the answer to this question is often no.

The fundamental function of all civil & structural assets is to safely support applied loadings be it equipment, environmental, operational, or human. As assets age, it is essential that integrity is understood, monitored, and maintained to ensure that it functions to meet its current performance requirements, which may change over time due to plant modifications. Regular maintenance can have substantial cost implications for older assets, and as such, these are often considered lower risk and an unnecessary spend. The repair of identified defects is often delayed or ignored until they begin to affect operations or the safety of personnel.



*What was found under when investigated...
holing, severe section loss, heavy pitting and failures.*

Redundancy within the design and ductility of construction materials often means signs of distress are identified prior to a major collapse occurring. However, once an operational industrial structure reaches a severe level of distress, it is significantly more expensive to safely correct the defects. Furthermore, this may have already led to damage to mechanical plant due to excessive stress in pipework, or vessels due to deformation and movement.

Over the last few years, IKM has been involved in several major remediation projects on ageing assets. These projects resulted in severe financial and operational consequences for our clients due to:

- Complex repairs in constrained, congested areas of the plant,
- Unplanned capital expenditure,
- Unplanned shutdown of business-critical plant; and
- Associated loss of earnings.

In each of these projects, poor detailing coupled with a lack of maintenance and action on historical inspection report recommendations for further investigation allowed significant structural deterioration to occur.

The unsafe operational conditions resulted in the client having to isolate and remove plant from operations, costing millions of pounds in repairs and lost revenue. These defects

were de-prioritised as they initially looked minor; however, further investigation quickly identified hidden defects behind fireproofing and encasements.

Although the severe cost implications associated with these major repair projects affected our clients greatly this could have been much worse. The consequence of a structural failure, particularly within a high-hazard process or industrial environment, can be catastrophic, leading to a loss of containment and ultimately more serious financial, legal or business continuity implications.

Sharing our experiences and learnings from recent projects, we would encourage asset operators, to consider the following:

- Understand the asset. Including degradation mechanisms, key member utilisations, critical component members, previous repairs, known defects, existing conditions and criticality of the asset to the business.
- Implement robust inspection regimes. These should be appropriate to the type, age, condition and criticality of the plant. This will ensure emerging structural issues and deterioration are identified quickly, providing an opportunity for planned maintenance.

- Act on inspection recommendations in a timely manner. This will ensure minor issues do not deteriorate into major costly repairs. Investigating signs of distress (cracking, movement, etc) early will ensure that business risk is minimised and known.

- Undertake timely maintenance. Depending on environmental and operational conditions, minor defects have the potential to significantly deteriorate when left unchecked.
- Remove redundant plant. Aging assets often have large quantities of redundant plant left in situ, adding additional and unnecessary loading to the structure. Redundant plant often obstructs inspection, hinders access, and adds risk that could be easily mitigated.
- Understand and control modifications. Uncontrolled modification can have severe implications on a structure causing deformation, deterioration, and potential failures. These changes typically make repairs more complex.

It is important, particularly in post-COVID recovery and financial uncertainty, that ageing assets reaching or surpassing their design life are not neglected. Allocating appropriate funding and implementing regular inspection and maintenance programmes, could at minimum, save assets a lot of money and reduce operational outages.



Author: Gordon Nelson, Lead Engineering Associate

**For further details visit
<https://www.ikmconsulting.co.uk>**