



EPSC Position Paper on Ageing Facilities

Many petrochemical and downstream chemical establishments in Europe have an ageing asset profile comprising plant and equipment in which chemical and/or physical processing, and material transfers occur. From a process safety perspective the integrity of these assets is crucial to avoiding losses of containment such as leaks and spills which have the potential to escalate to major accidents.

Consequently, chemical plant owners are now being challenged to deal with replacement and/or upgrade of such assets. This involves careful financial (capital investment) analysis, as well as planning and design of the required resources to carry out the work to ensure that asset integrity is maintained. A key part of this process is the comparative assessment of various alternatives for scheduling the replacement of the ageing plant with respect to life extension with upgrades and/or revised maintenance. The spare part strategy and management of the ageing plant (replacement and life extension) are inter-related and the goal is to maintain or improve over-all reliability within or exceeding established corporate and legal requirements for protection of people and the environment through risk management at realistic cost.

The European Process Safety Centre Technical Steering Committee set up in 2010 a group to explore:

- Member company practices which assess the issue of ageing facilities
- Other sources of guidance on the issue of ageing facilities
- Potential for research in the area of ageing facilities

In three group meetings:

- Contributing EPSC members shared their practices and perceived needs. Most are addressing the issue of ageing facilities within their mechanical integrity and Loss of Primary Containment (LOPC) programmes. These are focused on Process Equipment such as storage tanks, pressure vessels, reactors, columns, piping, isolation and disposal tools and safeguards. Outputs include condition reports and Loss of containment incidents with follow up. Inspection frequency and – content is based on either on statutory requirements or internal analysis allowing detection of potential deviations in advance thus avoiding run to failure.
- Reviewed available literature and found to be comprehensive and helpful with regard to improving potential inspection content. References are appended to the end of this position paper.

When contributing member company practices are considered along with the advice available from some competent authorities and existing research results, there seems to be little reason to request or support new research. The application of existing knowledge is sufficient to sustain or improve member company practices.



Areas where literature offers some potential improvements include:

- Setting up a distinct policy for ageing facilities

Process Vessels:

- Enhancing plant equipment records specific to Process Containment Equipment by adding an design expected lifetime and specifying dates by which lifetime extension needs to be evaluated:
 - Review periodic inspection reports
 - Analyse condition to determine if deterioration is taking place
 - Determine if
 - Replacement
 - Enhanced inspection and testing

Are required

If decision is to extend lifetime, setting of new lifetime period and dates for review.

Piping systems:

- This is an area which has medium potential in terms of loss of primary containment (scale and frequency). Inspection methods such as API 572 represent good practice which can be enhanced by the elements relating to Process Vessels described above.

Areas for further improvement in managing ageing plants are seen in providing future support in

- Regular update of operational process procedures
- Regular update of procedures improving maintenance, inspections and audits
- Consideration of structural requirements
- Availability of competent workforce
- Identification of ageing characteristics leading to latent errors up to now (e.g. change of corrosion behavior with time)
- Avoidance of emerging latent failures) resulting from process changes
- Collection of factors determining decisions on lifetime extensions
- Limitations of risk based ageing assets management versus a hazard based approach, thus limiting decisions for lifetime extensions.

References:

HSE RR 509 Plant ageing

HSE RR 823 Plant ageing study 2010

INERIS International Benchmark on regulations and practices as regards managing industrial installation ageing