

Life Extension of aged assets

Overview

World-wide the Operators experience that their oil and gas assets (pipelines, risers, structures, pressure vessels, etc.) reaches their original design life while there is still a need and financial viability to operate the systems for more years.

As the system age, the operators have several new challenges to consider when required to operate beyond the design life such as:

- Changes in integrity, e.g. time dependent degradation mechanisms such as corrosion and fatigue or random mechanical damages (e.g. third party damages)
- Changes in infrastructure from the as built, e.g. increased fishing activity or heavier trawl gear for a pipeline
- Changes in operational conditions, either as a natural
- Change in well-stream condition, tie-in to other pipeline system or increased production rates.

Therefore the question would be what should be assessed when required to operate beyond the design life and still ensure compliance with the original safety level.

Life Extension process

The life extension process can also be called a re-qualification.

It is triggered by the decision that the operation of the system will be continued beyond the original service life.

The process that may be followed in a life extension is outlined in Figure 1 (NORSOK Y002).

The purpose of the life extension process is to document acceptable system integrity to the end of the extended service life. The overall life extension process is as follows:

- Define the premise for the extended operation, and identify new threats to the system. The premises for the life extension shall be established.

This may include the following:

- Life extension period;
- Battery limits (what to be included/system description);
- Regulatory requirements (e.g. according to this NORSOK standard);
- Reference to company specific procedures, if relevant (e.g. procedure for handling of deviations from design codes);
- Reference to applied design codes;
- Technical/functional requirements (e.g., design pressure, design temperature, product composition).
- Assess the integrity of the system, in other words as far as possible quantify the current condition;
- Carry out a reassessment of the system based on the available information from integrity assessment and established life extension premises, current industry practice and available technology.
- The reassessment can conclude that the integrity of the system is acceptable up to the end of the extended life, in which case the process moves on to documentation and implementation.
- If the integrity is not acceptable, modifications shall be considered together with the feasibility of the entire life extension.

The life extension process shall take into account the degradation that has taken place since the installation of the system and is initiated well ahead of the end of the original service life (Figure 2).

The original service life is not limited by the original design life, but the operator requested service life shorter than design life.

In the original design, a given degradation model was used, which does not provide sufficient design life for the desired extended service life.

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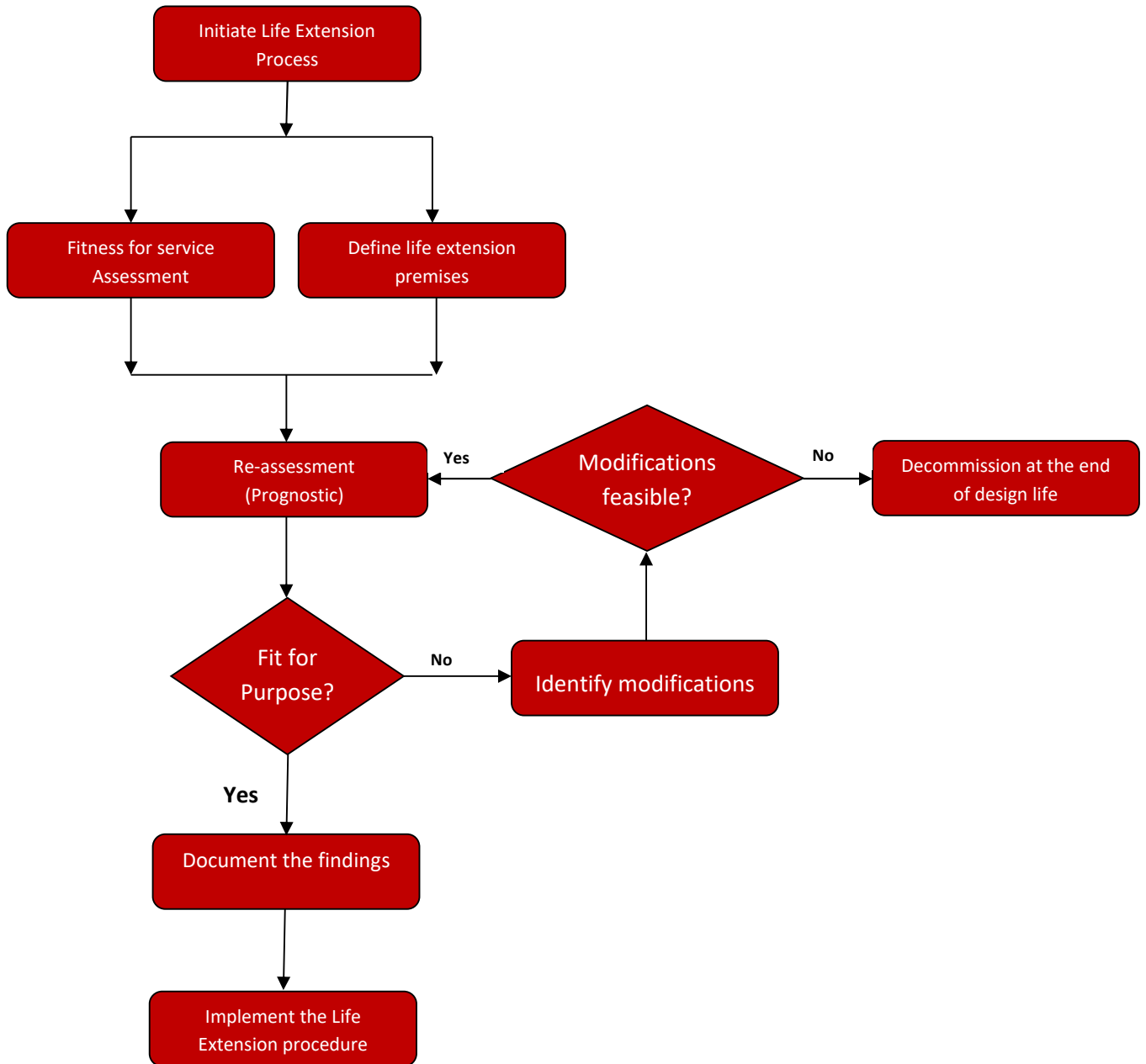


Figure 1 Life extension process flow chart to NORSOK Y002



Figure 2 General corrosion of external surface of pipework