TUBELIFE

Remaining Life Assessment (RLA)

Innovative proprietary software: TubeLife

A proprietary software developed in a collaborative effort - TubeLife was created expressly to stop the gap in assessing the remaining service life of reformer tubes due to the fact, that there were no publicly available codes or practices that formally addressed the complexity of reformer tube life behavior.

TubeLife achieves this by integrating strain and crack size data into its proprietary model. In the past, estimates of this important quantity were based on the principles and elements of post-construction standards such as API 571, API 579, R5 and/ or BS7910. However, the application of these standards is less than ideal, as they do not directly reflect the complexity of the damage mechanisms that affect the longevity of reformer tubes.

The benefits

- **Service life overview** of each individual catalyst reformer tube
- **Based on a modified Dyson model** as the best possible practical approach
- **Taking real measured strain and eddy current data** into account
- **Integration of multiple degradation types** for realistic remaining life calculation
- **Successfully executed for many companies worldwide**

What is the remaining service life of your tubes?

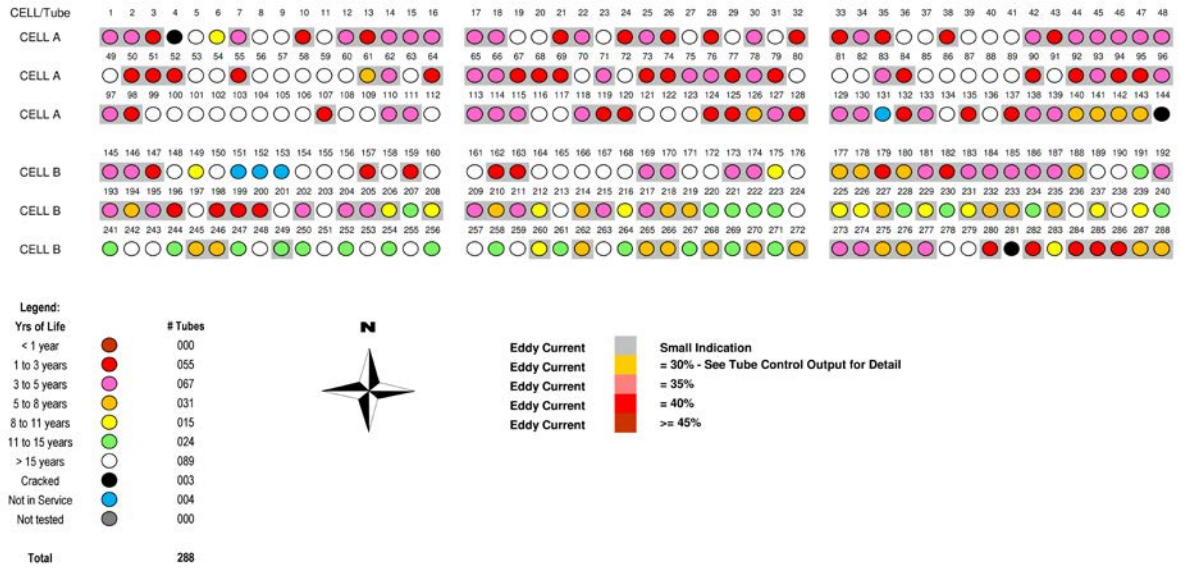
Unprecedented use on several degradation mechanisms in the software TubeLife

A modified Dyson model incorporated into TubeLife assesses the strain accumulated over a given period as a means of projecting material degradation and calculating the remaining service life. Furthermore, the analysis weights eddy current measurements that indicate wall damage, since cracks usually initiate the tube failure mode.

The software also draws on laser diametrical data for the strain measurement, along with process information and shutdown history.

The model calls on several degradation mechanisms that are known to occur in reformer tubes. These include thermal ageing/softening, strain softening, coarsening of the grain structure (especially secondary carbides) and increases in mobile dislocation density, creep void formation/cavitation and growth.

The integration of multiple degradation types allows for realistic estimates of remaining life based on strain accumulation over the lifetime of the tube, coupled with accurate assessment of crack formation via the EC signals.



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