

# True Transformer Age for Replacement



## ELECTRIC UTILITIES

### Data Sources

- Load, temperature and oil/gas analysis data is stored in PI
- Equipment heat run properties are stored in a SQL database

### Calculations & Conditions

- Formula
- Value search
- Scatterplot
- Scorecard
- Asset swapping
- Treemap

### Reporting & Collaboration

- Trends, Metric tables, multivariate scatter plots, and Treemap visualizations are combined into an Organizer Topic for quick consumption of the analytics by stakeholders.

### Challenge

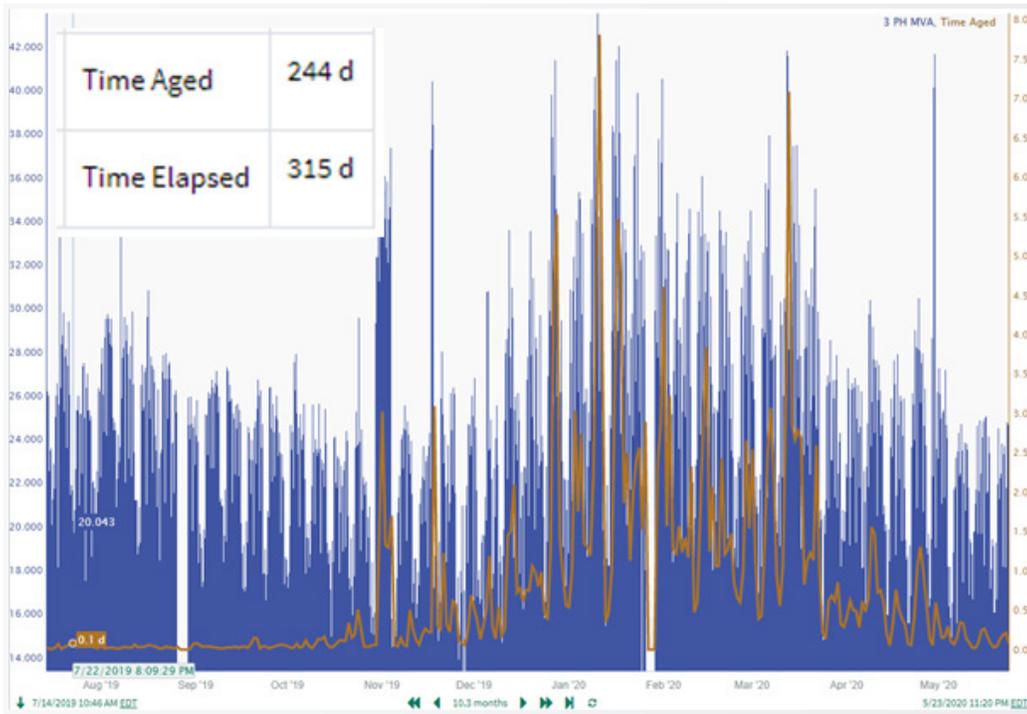
Knowing when to replace a substation power transformer is a difficult task. How do you know you have utilized the full life of the transformer? Most transformer manufacturers define the end of life as age 40. However, lightly-loaded transformers may not reach the true age of 40 until their 60th or 70th year in service. Without the correct data analytics tools, the effects of loading beyond a transformer's nameplate rating over time are extremely difficult to calculate, making it almost impossible to know a transformer's true age and when it should be replaced.

### Solution

The IEEE C57.91-2011 standard provides algorithms for calculating the aging acceleration factor for a given load and temperature and the percent loss of life of transformer insulation. Using Seeq, users can combine real-time temperature and loading data from data historians with nameplate/characteristic data stored in SQL databases to calculate true age for a system of transformers.

### Results

The use of Seeq advanced analytics reduces capital expenditures by prioritizing replacement based on actual equipment condition and improves system reliability to avoid \$10s of millions in downtime and capital expenditures for premature replacement. The Seeq application also allows for aggregation of data from multiple data sources, extrapolation of data to installation year, and rapid iteration across assets.



Shown in the picture: A Seeq Scorecard showing calculated age versus time elapsed and a trend showing loading and calculated age.

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