

# RailLife™

## Rail Life Forecasting Model



**RailLife is a rail planning and management tool that allows the user to make the efficient rail maintenance decisions.**

### What is RailLife?

The Rail Life Forecasting Model (*RailLife*) is an analytical software tool for helping users determine when rail requires replacement based on failure/degradation history and predefined safety/maintenance thresholds.

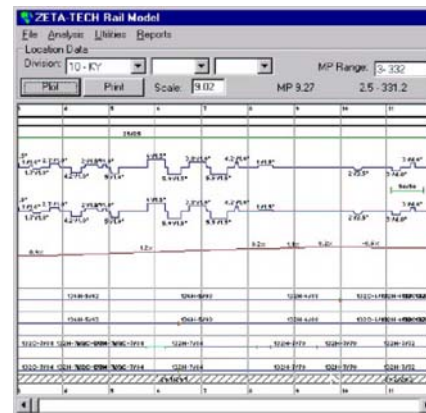
*RailLife* utilizes statistical and empirical techniques for determining rail degradation based on actual inspection information. Two primary techniques are utilized, the Weibull statistical technique evaluates rail fatigue, and multivariate regression techniques evaluate rail wear. Both techniques make use of inspection car information (ultrasonic test results and rail wear measurements) for the engineering analyses.

### How Does RailLife Work?

The analysis steps utilize historical railroad data for rail installation (type, date, etc.), traffic (annual/cumulative MGT), geometry (curvature, grade, etc.), and rail degradation (defects and wear). Homogeneous segments of rail are developed and these segments are processed and analyzed using a hierarchy of techniques to determine the controlling failure mechanism and rate of degradation. Based on these rates and predefined maintenance thresholds, a forecast replacement date can be determined for each rail segment.

### Benefits

- Helps users determine when rail requires replacement
- Determines degradation based on actual inspection information
- A forecast replacement date can be determined for each rail segment
- Identifies location of track with accelerated degradation
- Tool for prioritizing rail maintenance



*The analysis results highlight rail segments requiring maintenance as red (within 1.5 years), yellow (1.5 to 3 years) or green (3 to 5 years).*

Forecast replacement dates are displayed graphically. The analysis results are superimposed on a track chart, driven off the database. Rail defects are shown to help understand the analysis results.

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### Features

- Easy-to-Use Windows™ application
- Forecasting based on historical degradation and predefined safety/maintenance thresholds
- Two primary techniques are used:
  - Weibull statistical technique for rail fatigue
  - Multivariate regression techniques for rail wear
- Analysis steps utilize historical railroad data for rail installation
- Uses hierarchy of techniques to determine the controlling failure mechanism and rate of degradation
- Color-coded analysis results
- Displays input/output data Graphically.

### Easy-to-Edit Analysis

The main menu allows the user to select files to analyze, perform analysis steps, edit analysis parameters, and generate reports. Several data tables are required as input, and the output is stored to separate tables for further analysis and reporting. Each table in the database can be viewed as shown in the data table view port.

The primary interface screen for RailLife

Annual MG/T	Cum MG/T Left	Cum MG/T Right	Def Rate Left	Def Rate Right	Repl Year Left	Repl Year Right/MG
16.336	627.026	627.026	0	0	2003.026	2004.230/w
16.336	488.0802	488.0802	0	0	2003.150	2002.680/w
16.336	627.026	627.026	0	0	2003.930	2003.620/w
16.336	609.7294	609.7294	0	0	2003.710	2003.340/w
16.336	629.026	629.026	0	0	2002.714	2003.993/w
16.336	627.026	627.026	0	0	2007.007	2006.711/w
16.336	627.026	627.026	0	0	2003.748	2007.820/w
16.336	627.026	627.026	0	0	2002.350	2006.180/w
16.336	627.026	627.026	0	0	2007.195	2007.694/w
16.336	627.026	627.026	0	0	2002.285	2006.031/w
16.336	605.0814	605.0814	0	0	2011.618	2011.290/w
16.336	627.026	627.026	0	0	2008.604	2004.250/w
16.336	193.8677	193.8677	0	0	2009.694	2013.787/w
16.336	142.2567	142.2567	0	0	2004.170	2004.803/w
16.336	79.991	79.991	0	0	2006.418	2021.070/w
16.336	90.787	90.787	0	0	2006.540	2005.920/w
20.18	77.5201	77.5201	0	0	2009.53	2006.909/w
20.18	77.52	77.52	0	0	2004.012	2013.373/w
20.18	104.226	104.226	0	0	1997.756	1998.051/w

One of unique features of RailLife is the ability to edit several analysis parameters in order to understand the effects these parameters have on the resulting rail life. Below is an example of the wear maintenance thresholds. These thresholds vary by usage, rail section, and Head/gage location and define when rail should be replaced.

Left, an example of the wear safety maintenance thresholds

Other reports available through RailLife™ including complete tabular forecast by segment, summary rail requirements by year, and a host of others. RailLife™ also offers complete query capabilities

