Defect Initiation Rate vs. Cumulative Tonnage

Defect Rate (defs/mi/yr)

Cumulative MGT

Ann MGT = 25

α = 3.0, β = 2000

Defect Detection Reliability vs. Defect Size

Detection Reliability

% Head Area

— Detection Reliability

PROTRAN
T E C H N O L O G Y
A Harsco Rail Company
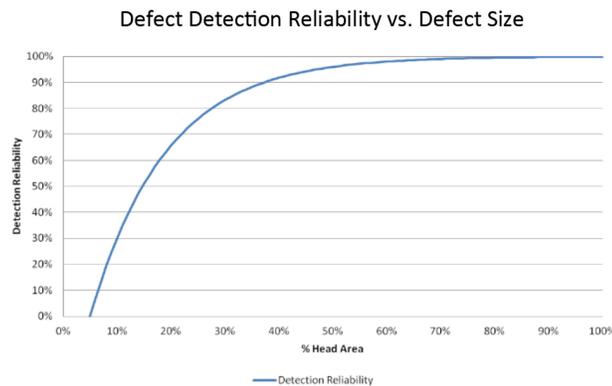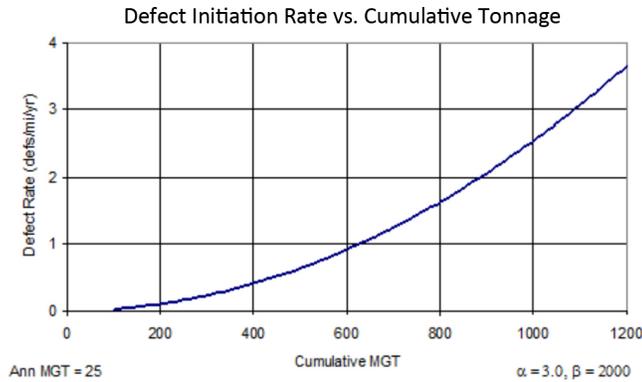
Benefits:

- Manage segment service defect initiation risk
- Gain understanding of testing program
- Gain useful information on preventive/corrective maintenance programs
- Manage testing schedule more efficiently

RAILTEST™

ULTRASONIC TESTING FREQUENCY MODEL

RailTest is an analytic model that recommends ultrasonic testing frequencies for each segment of tested track in the network to maintain a specified level of risk

A proper inspection schedule is paramount to maintaining both a safe and a cost effective railway system. Both surface inspection (visual/rail profile) and internal inspection is required to identify defects; specifically fatigue based defects. Early detection is critical as these defects could potentially grow into costly rail breaks (service defects) and/ or even more costly derailments. Since internal defects cannot be seen through visual inspection methods, ultrasonic testing is employed to find these flaws. If not scheduled in a timely manner, an internal defect could grow to failure between scheduled testing periods. Conversely, if a piece of track is tested too frequently, significant amounts of money could be spent on tests that may not improve system integrity.

RailLife evaluates historical defect occurrence (both service and detected defects), operating conditions, and previous inspection frequencies, to develop an inspection frequency that maintains a defined level of risk. Risk in this instance is defined as the annual rate of service defect occurrence, which research has shown to be related to the rate of broken-rail derailment occurrence.

Sample Yearly Application:
Defect Occurance Rates
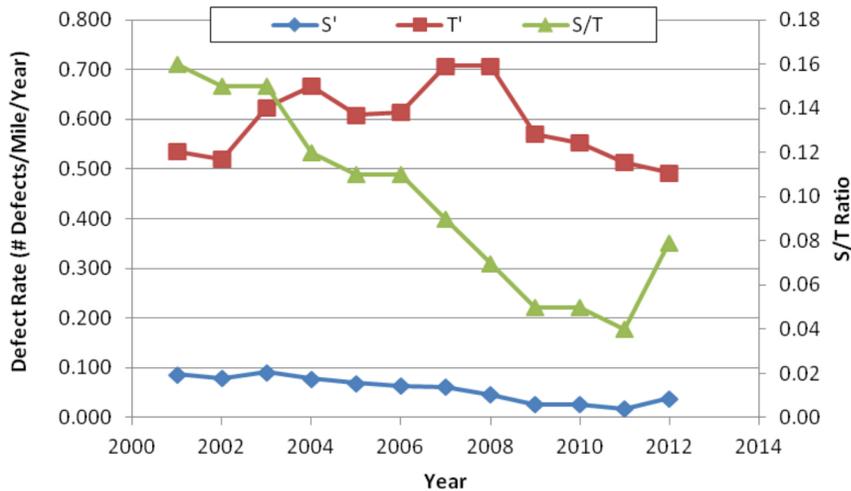
S' : Service defect occurrence rate (defect/mile/year)
T' : Total defect occurrence rate (defects/mile/year)
S/T : # Service defects / # Total Defects

Goal of RailTest - Manage Risk of Rail Breaks

• Evaluate fatigue condition of track segments
• Identify high-risk segments
• Determine optimal ultrasonic testing frequencies
• Allocate resources appropriately
• Regular review of system condition

Application of model results can lead to

• Reduction of actual risk
• Reduction of broken rails
• Reduction of rail-caused derailments
• Improved use of resources
• Improved rail condition awareness