

Analytical Support for Risk Reduction Programs

The National Inspection Plan (NIP)

NIP is a resource allocation program that uses predictive indicators to assist FRA in conducting inspection and enforcement activities within a specific geography or on a certain railroad. In essence, it helps FRA optimize existing inspection and accident data in such a way to identify potential safety “hot spots” so they can be examined before a serious safety hazard emerges.

Government Performance and Results Act (GPRA)

FRA forecasts key railroad safety performance measures and sets GPRA goals annually based on the latest safety data, available resources, and safety regulations and initiatives. The process establishes realistic expectations on what is likely to happen, given industry safety records and FRA’s efforts to make railroad operations safer.

Staffing Allocation Model (SAM)

SAM is a spreadsheet-based model that provides guidance on redistributing FRA’s inspection resources across regions and disciplines, using consequences such as damages and casualties as the basis of comparison.

Outside Normal Shift (ONS) Inspection Information

ONS hour’s inspection information is a summary of the allocations of the inspectors’ resources (the inspection time) on outside normal shifts to provide an update for inspectors to adjust their inspection activities. The purpose of providing this information is to encourage the inspectors to perform unexpected inspections, so that the railroad employees will be in a state of higher vigilance regarding railroad safety outside normal shift hours.

Inspector Activity Report (IAR)

IAR is a presentation of bar and pie charts to provide the inspectors’ activities allocating their time during their 80-hour pay periods. The report shows the percentages of time on railroad inspection and other activities, such as annual/sick leave, accident investigations, railroad system oversight, etc. The report is used by management to allocate the resources (inspectors) within their regions.

Ad Hoc Statistical Modeling and Analysis

Railroad safety data are numbers after the facts, such as accidents, defects, or violations. They need to be processed to become valuable information of reducing railroad safety risk. The statistical modeling and analysis is a powerful tool to provide such information.

Operations Research is the application of advanced analytical methods to help make better decisions. The Risk Reduction Program has a staff of Operations Research Analysts (ORAs) that provide this support throughout the Office of Safety, as well as the entire FRA. These analysts are “on-call” to assist in such fields as statistics, optimization, data mining, and simulation. Examples of the types of ad hoc analyses performed include time series analysis predict train-miles for the next 5 years in support of the GPRA calculation, Bayesian analysis of accident precursors, and determination of appropriate sample size to understand the patterns behind non-accident releases of hazardous materials.

Data Compilation & Verification

Statistical reports and spreadsheets that support various NPRM and other project efforts will be developed. Developing these reports and spreadsheets involves the integration of accident, traffic, signal systems and other data sources as required, and verification of that data for veracity and consistency. GIS tools are the common framework within which the data is integrated and verified.

Risk Mitigation Team support

RMTs are intended to follow a formal problem-solving process in order to deliver data-driven results to mitigate risks within the railroad industry. The expertise of the ORAs is often solicited to provide analytical services and products to these teams. When appropriate, RRP staff provide assistance in data collection and analysis, to help the teams understand the problem, and to evaluate the effects of mitigation efforts.