

Risk & Liability Management

Increasing Rail Safety by Prioritizing Risk Based on High Consequence Areas

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The transportation of hazardous materials by rail includes the possibility of accidents resulting in the release of hazardous materials that could potentially result in environmental damage, loss of shareholder value and corporate reputation. Federal safety regulations (49 CFR 172.820) focus on a suite of hazardous materials that could pose a Homeland Security threat, whether through public safety, security, or system reliability at specific locations, known as high consequence targets. In contrast, the pipeline industry has a broader mandate to protect the environment from releases of hazardous materials. The Pipeline and Hazardous Materials Safety Administration (PHMSA) requires pipeline operators to focus on the protection of a range of locations referred to as High Consequence Areas (HCAs). For natural gas and hazardous liquid pipelines, HCAs are defined as areas where a release of hazardous materials potentially can cause a greater magnitude of impacts, including populated areas, commercially navigable waterways, municipal drinking water intakes, and environmentally sensitive areas (49 CFR 192 and 195). For every segment of PHMSA-regulated pipeline, operators are required to determine what HCAs might be affected, accounting for aerial dispersal, overland flow, downstream transport, and subsurface flow. PHMSA provides HCA location data and provides general guidance for the use of these data by pipeline operators. Using geospatial GIS analyses, flow paths are evaluated to identify pipeline segments that could affect HCAs, and prioritize pipeline segments in terms of the magnitude of potential risk. Identification and prioritization of pipeline segments allows pipeline companies to knowledgably and strategically allocate resources to reduce risk throughout their entire system.

While rail transport can involve a more diverse set of hazardous materials compared to pipelines, the environmental behavior, transport within the environment, and potential for damage of hazardous materials are generally comparable between these modes of transportation. Consequently, the use of PHMSA HCA data and risk analysis for rail transportation may increase public safety and environmental protection by:

- Uniformly identifying HCAs across North America for all rail segments;
- Providing supplemental HCA data at no additional cost for routing analyses required for certain hazmat shipments subject to 49 CFR 172.820;
- Combining engineering and environmental data to better understand where significant accidents have the potential to occur;
- Providing a proactive and strategic risk management system that ranks rail sections that have the potential to adversely impact HCAs; and
- Increasing overall rail safety by providing better information to rail integrity and emergency response programs.

Rail transports hazardous materials across the landscape of North America. Understanding risk through geospatial analysis allows companies to prioritize risk by rail segments, systematically and strategically repair or mitigate rail segments, and improves overall rail safety while simultaneously ensuring operational budgets can be effectively spent.

Pipeline companies currently utilize Stantec to prioritize risk on local, regional, or national scales, depending on the company's specific objectives. For example, pipeline companies may look to prioritize a specific subset of locations that are at risk either from external forces (e.g., stream scour, landslides) or from integrity concerns (e.g., corrosion). Other companies have incorporated risk management information to evaluate their portfolio to strategically guide corporate capital allocation decisions while reducing the possibility of a catastrophic accident, protecting both corporate reputation and shareholder value. This presentation will discuss the benefits of strategic risk management, focusing on technology and information management systems associated with ranking areas that can affect HCAs.