

Parsons Brinkerhoff Bridge Inspection Division use case

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Use case

The current state of the U.S. transportation infrastructure can be described as aging, inadequate and neglected. Throughout the country, highways are crumbling, bridges are in need of repair and railways remain inadequate. In the past 25 years, the miles traveled by automobiles has doubled, but total highway length has barely budged; explaining why the World Economic Forum ranked American infrastructure a troubling 24th out of 124 nations.

According to the Federal Highway Administration (FHWA), more than 20% of the nation's 600,000 bridges are rated as structurally deficient or functionally obsolete. Additionally, more than 30% of existing bridges have exceeded their 50-year theoretical design life and are in need of varying degrees of repairs, rehabilitation or replacement. These circumstances has led state departments of transportation and other bridge owners to become more reactive than proactive in their approach to managing and addressing the Nation's highway bridge preservation and replacement needs.

As one of the world's leading engineering professional services and consulting firms, WSP | Parsons Brinckerhoff (WSP|PB) continually strives to develop and provide innovative solutions for their clients and in turn, challenges in which our nation's infrastructure faces. In conjunction with MAP-21 Act (Moving Ahead for Progress in the 21st Century Act), a \$105 billion Federal policy geared towards streamlined and performance based surface transportation programs; WSP|PB has been pursuing solutions to aid state and local governments in aging infrastructure challenges by exploring technology in order to streamline their ability to inventory, track, inspect and manage the life-cycle of all infrastructure assets.

WSP|PB has explored a variety of both internal and external technologies for life-cycle asset management before partnering with Raxar Technology Corporation and their highly configurable, contextual awareness driven platform referred to as the GRAiT™ System (Graphical Real-Time Asset Inspection and Tracking System). In October 2015, WSP|PB and Raxar Technology executed the configuration of the GRAiT™ System into a comprehensive bridge management system that would enable:

- Field inspections on a mobile device

- Access to planned views and as-built information in the field
- Geo-spatial reference of bridge assets and attribute information in the field
- Collection of standardized data required by local, state and federal guidelines
- Generation of automatic reports and metrics from current and historical inspections
- Create the foundation of an “existing conditions” database for bridge and bridge element inventory and inspection data

The first major success was demonstrated through Raxar’s service and the GRAiT System’s easy configurability and intuitive user interface. Within only one week after the project kick-off, members of WSP|PB and Raxar had:

- Developed and gathered business and functional requirements
- Configured, reviewed and tested the GRAiT System as a complete bridge management system
- Installed the system on multiple devices and trained several users on the GRAiT Application and console

After a quick and successful implementation, member of WSP|PB and Raxar held weekly progress meeting and performed bridge inspections, collected data and further refined the system and process.

The next major success was demonstrated through the GRAiT System’s configurable report generator. Once the inspection data was collected, the GRAiT System’s report generator automatically obtained and formatted the applicable data into the local and state required bridge project report automatically. Historically, it would take WSP|PB administrators, inspectors and engineers an average of 8 hours per bridge inspection to generate the report. This was completely eliminated due to the fact that reports were now auto-populated once field data was collected. Rather than spending hours consolidating data; a single engineer was able to quickly review for quality control purposes the integrity of the auto-generated reports.

In addition to automatically generating the equivalent data and format of the existing bridge report, Raxar exceeded expectations by developing additional formats for displaying and consuming the data to enhance the comprehension of content.

The GRAiT System enabled the Bridge Specialty Group at WSP|PB, Chicago, IL to reduce their bridge management, inspection and reporting processing time by 65% (i.e. 13 to 4.5 hours per bridge) while improving the quality of information obtained and reported. This time saving totals over 1,600 hours per year for strictly the 387 bridges within Chicago’s city limits.

The combination of Raxar’s highly configurable GRAiT System and WSP|PB’s expertise resulted in a scalable, end-to-end solution of one of America’s most important, yet deficient infrastructure assets. The proven, differentiating

technology of the GRAiT System enables WSP|PB to offer a highly configurable data collection tool that is exceptionally easy to use; requires minimal data entry due to the systems native contextual awareness properties and provides a repository to store and quickly access aging infrastructure asset and attribute information.

Relevance to the Army National Guard

The bridge inspection reports generated by WSP|PB for annual bridge inspections is long, tedious and cumbersome process. Narrative field data, photo's, documents, measurements and elemental condition assessments must be consolidated and formatted in multiple ways in order to ensure that the designated stakeholders can process the information according to their organizational policies. This typically involves formatting collected field data to satisfy city/country, state and federal reporting guidelines; as well as a detailed overall condition assessment report to maintain legacy information for subsequent inspection processes.

This process of documenting specific elemental condition assessments for bridges as dictated by the Federal Highway Administration (FHWA), is similar to the Installation Status Report-Infrastructure (ISR-I) conditional assessment that must be carried out by the Pennsylvania Army National Guard. Similar to the ISR-I reports, once elemental bridge assests are assessed, scoring is tabulated to provide a quntitative overview of elemental assets and the overall status and condition. Raxar will work closly with PAARNG in determining how specific field data collected in reference to ISR-I inspections can be consolidated in an automated fashion to populate the relevant fields for the various reporting needs. Furthermore, by leveraging a mobile tool that can quickly access legacy inspection information, new inspections will be able to provide an overall better assessment to the current state of that particular asset; this will standardize the inspection process and ensure that subjective bias is not introduced as new inspectors are involved in the assessment process.