Tools for Communicating Railroad-DOT Mitigation Strategies

DETAILS

0 pages | 8.5 x 11 | PAPERBACK
ISBN 978-0-309-43294-8 | DOI 10.17226/22250

AUTHORS

SHRP 2 Renewal Project R16B

Tools for Communicating Railroad–DOT Mitigation Strategies

SHRP 2
STRATEGIC HIGHWAY RESEARCH PROGRAM
Accelerating solutions for highway safety, renewal, reliability, and capacity

TRANSPORTATION RESEARCH BOARD
OF THE NATIONAL ACADEMIES

SHRP 2 Renewal Project R16B

Tools for Communicating Railroad–DOT Mitigation Strategies

Shobna Varma
StarIsis Corporation
Lewis Center, Ohio

with

Gordon Proctor & Associates
Michael L. Bradley & Associates, LLC

TRANSPORTATION RESEARCH BOARD
Washington, D.C.
2015
www.TRB.org

ACKNOWLEDGMENTS

This work was sponsored by the second Strategic Highway Research Program. The project was managed by Monica Starnes, Senior Program Officer, Renewal; Jerry DiMaggio, Implementation Coordinator; and Andy Horosko, Special Consultant, all for SHRP 2.

The research was performed by Shobna Varma of StarIsis Corporation, supported by Gordon Proctor of Gordon Proctor and Associates and Michael Bradley of Michael L. Bradley and Associates, LLC. Shobna Varma of StarIsis Corporation was the principal investigator.

The research team acknowledges with great appreciation the active engagement of Lyn Hartley, Kamie Young, and Melvin Thomas of Burlington Northern Santa Fe; Chuck Gullakson, Tony Bellamy, and Cassandra DeCesare of CSX Transportation; David Wyatt, Leon Jackson, and Thomas Bracey of Norfolk Southern; Steve Grosse Rhode and Chris Keckeisen of Union Pacific; Larry Romaine of Genesee & Wyoming Inc.; Paul Worley, Jahmal Pullen, and David Hinnat of the North Carolina Department of Transportation (DOT); Darin Kosmak of Texas DOT; Ananth Prasad, Fred Wise, Scott Allbritton, and Annette Lapkowski of Florida DOT; Ahmer Nizam and Connie Raezer of Washington State DOT; James Morris of Illinois DOT; Gregory Vaughn of Pennsylvania DOT; Kirk Steudle, Tim Hoeffner, and Bradley Wieferich of Michigan DOT; Mary Jo Key and Maria Hobbs of Iowa DOT; Jill Frank of Georgia DOT; Todd First of New Jersey DOT; and Diana Emerson and Lance Vigfusson of Manitoba Infrastructure and Transportation. The team also acknowledges the participation of Ron Ries and Frank Frey of the Federal Railroad Administration and Stephen Gaj and Joseph Taylor of the Federal Highway Administration.

NOTICE

The project that is the subject of this document was a part of the second Strategic Highway Research Program, conducted by the Transportation Research Board with the approval of the Governing Board of the National Research Council.

The Transportation Research Board of the National Academies, the National Research Council, and the sponsors of the second Strategic Highway Research Program do not endorse products or manufacturers. Trade or manufacturers' names appear herein solely because they are considered essential to the object of the report.

DISCLAIMER

The opinions and conclusions expressed or implied in this document are those of the researchers who performed the research. They are not necessarily those of the second Strategic Highway Research Program, the Transportation Research Board, the National Research Council, or the program sponsors. The information contained in this document was taken directly from the submission of the authors. This material has not been edited by the Transportation Research Board.

SPECIAL NOTE: This document IS NOT an official publication of the second Strategic Highway Research Program, the Transportation Research Board, the National Research Council, or the National Academies.

THE NATIONAL ACADEMIES
Advisers to the Nation on Science, Engineering, and Medicine

The **National Academy of Sciences** is a private, nonprofit, self-perpetuating society of distinguished scholars engaged in scientific and engineering research, dedicated to the furtherance of science and technology and to their use for the general welfare. On the authority of the charter granted to it by Congress in 1863, the Academy has a mandate that requires it to advise the federal government on scientific and technical matters. Dr. Ralph J. Cicerone is president of the National Academy of Sciences.

The **National Academy of Engineering** was established in 1964, under the charter of the National Academy of Sciences, as a parallel organization of outstanding engineers. It is autonomous in its administration and in the selection of its members, sharing with the National Academy of Sciences the responsibility for advising the federal government. The National Academy of Engineering also sponsors engineering programs aimed at meeting national needs, encourages education and research, and recognizes the superior achievements of engineers. Dr. C. D. (Dan) Mote, Jr., is president of the National Academy of Engineering.

The **Institute of Medicine** was established in 1970 by the National Academy of Sciences to secure the services of eminent members of appropriate professions in the examination of policy matters pertaining to the health of the public. The Institute acts under the responsibility given to the National Academy of Sciences by its congressional charter to be an adviser to the federal government and, upon its own initiative, to identify issues of medical care, research, and education. Dr. Victor J. Dzau is president of the Institute of Medicine.

The **National Research Council** was organized by the National Academy of Sciences in 1916 to associate the broad community of science and technology with the Academy's purposes of furthering knowledge and advising the federal government. Functioning in accordance with general policies determined by the Academy, the Council has become the principal operating agency of both the National Academy of Sciences and the National Academy of Engineering in providing services to the government, the public, and the scientific and engineering communities. The Council is administered jointly by both Academies and the Institute of Medicine. Dr. Ralph J. Cicerone and Dr. C.D. (Dan) Mote, Jr., are chair and vice chair, respectively, of the National Research Council.

The **Transportation Research Board** is one of six major divisions of the National Research Council. The mission of the Transportation Research Board is to provide leadership in transportation innovation and progress through research and information exchange, conducted within a setting that is objective, interdisciplinary, and multimodal. The Board's varied activities annually engage about 7,000 engineers, scientists, and other transportation researchers and practitioners from the public and private sectors and academia, all of whom contribute their expertise in the public interest. The program is supported by state transportation departments, federal agencies including the component administrations of the U.S. Department of Transportation, and other organizations and individuals interested in the development of transportation. **www.TRB.org**

www.national-academies.org

Contents

Executive Summary

This report for SHRP 2 Renewal Project R16B, Tools for Communicating Railroad–DOT Mitigation Strategies, documents the third phase of a research effort. The project consisted of developing web-based tools to support the nationwide adoption of various innovations identified or developed during the first two phases to mitigate the numerous challenges faced by transportation agencies and railroad companies on projects involving the two entities. A primary goal of the three-part research effort was to move the innovations from an early adoption stage to a tipping point that would trigger their widespread adoption.

The entire research effort preceding this project used a cooperative approach by engaging key stakeholders nationwide through an advisory panel and a community of interest to identify challenges and various successfully implemented solutions and best practices and to disseminate this information nationwide.

A key challenge identified during the initial research effort was the loss of institutional knowledge within transportation agencies and railroad companies. With the recent expansion of railroad business activity and the projected growth of the road network, mitigating this loss has become important for both organizations. Further, many of the innovations and best practices have been implemented in discrete, isolated pockets across the country, and the information is not available to a wider national audience who could take advantage of it. The tools developed through the R16B project aim to promote knowledge sharing and mitigation of the various challenges identified. The primary objectives included the following:

1. Development of training modules; and
2. Creation, maintenance, and delivery of a web-based virtual library of various best practices, including model agreements, contracts, standard guidelines, and provisions.

The web suite of products with the training lessons and the library make it convenient for stakeholders to access a wealth of useful information via the Internet. In addition, the training has been designed to allow users to quickly locate topics of interest to them. They can access practices used by peers and adopt them as they are or customize them to meet their specific needs.

These tools were developed using an iterative approach with continuous feedback from a community of stakeholder experts on content and design representing both railroad companies and transportation agencies. The tools were reviewed by the experts and rigorously tested before deployment. The lessons are self-paced and incorporate peer testimony, practical solutions, and functionality. The library provides many useful resources with quick and easy access for a variety of users through multiple devices. The web suite is also designed to provide seamless access between the training lessons and the library.

Six lessons are provided, each containing a variety of subtopics:

1. A Primer for Executives;
2. Culture and Objectives;
3. Master Agreement and Partnering Memorandum;
4. Insight into the Railroad Operations and Concerns;
5. Administrative Tactics for Managing Projects; and
6. Safety Orientation for Highway Personnel.

The resources in the virtual library include multiple documents in each of the following categories:

- Background materials;
- Examples of agreements;
- Examples of best practices;
- Links or lists of various personnel in the railroad companies and state transportation agencies who work on projects involving the two parties;
- Railroad resources, guidance, and design standards; and
- Website links to resources that will assist the railroad and transportation agencies as they work on projects involving the two parties.

One of the most significant outcomes of the project effort has been the establishment of an unprecedented and game-changing environment of collaboration and partnership among transportation agencies and railroad companies at a national level. To capitalize on this environment and to take advantage of the R16B products for the mutual benefit of the stakeholders, an iterative approach is suggested to systematically and incrementally address a few issues at a time.

The care and feeding of the products include keeping the lessons updated to reflect current issues and solutions. Future work will also include keeping the contents in the library updated and ensuring that the community of interest is active and collaboratively engaged in healthy discussions and in finding win-win solutions to issues.

The relationship between transportation agencies and railroads is similar to relationships between other organizations that have different objectives. In this case, the business differences are prominent because one organization is a public agency and the other a private entity. The partnering and collaboration that have been established will need to be nurtured for a few years until the majority of the practices are integrated into daily activities and become routine, and partnering and collaboration become second nature to both parties. Specific steps that can be adopted to achieve this goal are detailed in the report.

CHAPTER 1
Introduction

Project R16B, Tools for Communicating Railroad–DOT Mitigation Strategies, is the third in a series of three research projects identified as R16 and completed under the auspices of the second Strategic Highway Research Program (SHRP 2) of the National Academies. Project R16B was completed by a research team led by StarIsis Corporation and supported by Gordon Proctor and Associates, Inc.; Michael L. Bradley and Associates Consulting, LLC; and Transcordia, LLC. The three-part research effort consisted of identifying the myriad challenges faced by transportation agencies and railroad companies on projects involving both entities on a national scale; identifying best practices and developing new strategies to successfully combat these challenges; disseminating information on the innovative practices identified to mitigate the challenges on a national scale, with the goal of moving the innovations from an early adoption stage to a tipping point that would trigger their widespread national adoption; and developing web-based tools to support the nationwide adoption of these innovations. This report summarizes the project background, approach, and activities conducted along with the tools developed during the final phase of the project.

CHAPTER 2
Project Background

Project R16B was preceded by two other projects, both completed under the SHRP 2 initiative. The first research project involved the identification of the major challenges faced by stakeholders working on rail and road projects and the best practices implemented by them to address these challenges. The challenges often relate to project delays, scope changes, cost increases, delays and issues in agreement processing, lack of streamlined processes, coordination, communication, safety, and many others. Activities included surveying and interviewing many of the stakeholders involving railroad companies and transportation agencies from all states and many local jurisdictions. The team worked with an advisory panel consisting of representatives from federal and state transportation agencies and railroads to vet the best practices that were identified or developed during the project. The findings were summarized in the SHRP2 R16 report, *Strategies for Improving the Project Agreement Process Between Highway Agencies and Railroads*, published in 2010. The report includes several practices that had been successfully implemented in isolated pockets across the United States and new strategies that were developed during the research project to streamline processes and address challenges on projects involving transportation agencies and railroads. Collectively, the innovative practices and strategies are referred to as project innovations. In conjunction with an appropriate strategy for dissemination and national adoption, these project innovations have the potential to address on a national scale many of the challenges that transportation agencies and railroads face on projects involving both organizations. This project was the first time that a research effort was able to engage the participation and collaboration of transportation agencies and railroads in finding solutions to challenges faced by them in their work together.

The objective of the second phase of the project, communication and dissemination, was to disseminate the research findings nationally. The dissemination was to be done in a manner that would generate sufficient interest in the project innovations to start the adoption of these innovations by other peers across the country. To set the stage for adoption, the StarIsis team created a collaborative forum of stakeholders called the community of interest (COI). This COI consisted of four of the nation's largest Class I railroads [Norfolk Southern Railway, Burlington Northern Santa Fe Railway (BNSF), CSX Transportation, and Union Pacific], one short line railroad (Genesee & Wyoming), two federal agencies [Federal Highway Administration (FHWA) and Federal Railroad Administration (FRA)], eight U.S. state departments of transportation (DOTs) (from Texas, Florida, Washington, Illinois, North Carolina, Michigan, Pennsylvania, and Iowa), and one Canadian transportation agency (Manitoba Infrastructure and Transportation).

Meetings of the COI served as a forum for brainstorming innovations and refining strategies to address project challenges in ways that could be beneficial to both transportation agencies and railroads. The team was able to create an environment conducive for members to share ideas and perspectives in a noncontentious way and involve the stakeholders productively.

The resulting environment was conducive to creating a better understanding among members about the differences in objectives and business perspectives of transportation agencies and railroads. By focusing on collaboration and establishing win-win strategies, the team was able to successfully encourage member participation in panel discussions, conferences, webinar presentations, workshops, and other dissemination activities. The research team and the COI members worked collaboratively, and their effective communication of the benefits of the project innovations on a national scale triggered significant interest in their adoption.

In the second phase of the project, the team conducted five dissemination sessions, mostly at American Association of State Highway and Transportation Officials' (AASHTO) conferences. In collaboration with COI members, the team successfully disseminated information about the project innovations at 12 outreach events, including the AASHTO meetings. The outreach sessions were strategically planned and conducted at venues to reach audiences from transportation agencies and railroads involved in project activities. These sessions thus were more effective in getting the information to potential users of the innovations. This phase of the project achieved four major milestones: (1) successful dissemination of the information about the project innovations, (2) enhanced collaboration between railroads and transportation agencies in the community, (3) engagement of members of both communities in the dissemination of the innovations, and (4) collaborative implementation of a project innovation by transportation agency and railroad pairs. These strategic activities set the stage for moving forward with activities to catalyze the national adoption of the project innovations.

The third phase of the project, reported here, involved the development of web-based tools to support nationwide adoption of the project innovations.

CHAPTER 3
Project Objective

Why R16B, Tools for Communicating Railroad–DOT Mitigation Strategies?

Transportation agencies and railroad companies nationwide have been struggling with the loss of institutional knowledge. This loss has resulted from downsizing over the past decade and the large-scale retirement of experienced personnel from the baby boom generation. Although these organizations are attempting to mitigate this loss through promotions and new hiring, many transportation agency personnel are unfamiliar with best practices, streamlined processes, and mitigation strategies that can help expedite agreement processing and the successful delivery of projects. The suite of products developed during this phase of the project, including six training lessons and a virtual library of resources, is intended to augment the efforts of transportation agencies and railroad companies at bridging the knowledge gap and also to provide them access to information from a nationwide successful experience that they can customize for their individual needs.

The need for such tools becomes all the more relevant when one considers that railroad companies are now in an expansion mode. They are important partners to fulfilling the new U.S. freight objectives that address national economic growth and increasing commerce globally while also mitigating road congestion. Nationwide, the road network is also growing, albeit at a slower pace. Moreover, the existing transportation infrastructure is aging; for example, more than 25% of the nation's bridges are beyond their useful life or are structurally or functionally deficient. Many such structures cross or abut railroads and will require maintenance, preservation, rehabilitation, or replacement. These factors show that the interaction between transportation agencies and railroads will continue and in most states will increase. Therefore, there is a need to proactively mitigate the observed challenges on projects involving transportation agencies and railroads, and tools such as those developed during this project serve to promote such mitigation efforts.

The following two project objectives were intended to expedite knowledge sharing and provide access to resources that could help promote the mitigation of challenges on projects involving transportation agencies and railroads:

1. Creation, maintenance, and delivery of a web-based virtual library of various model agreements, contracts, standard guidelines, and provisions; and
2. Development of training modules and other related materials on streamlined permitting procedures and model agreements.

What Does R16B, Tools for Communicating Railroad–DOT Mitigation Strategies, Hope to Achieve?

The intent of this project was to allow users online access to details of successful existing practices so they could adopt them or customize them to meet their specific needs instead of starting from scratch to create and test them. Accessing the training lessons and library will help transportation agencies and railroad companies bridge the gap in knowledge and resources. Transportation agencies adopting project innovations as they are or customizing them for adoption will be able to fast-track the streamlining of various processes, which will save time and money and release the limited resources assigned to process activities to work on other priorities. Recognition of these benefits will expedite the nationwide adoption of these tried and tested best practices, which will result in significant savings of limited resources, as well as allowing for faster project delivery.

An example of a best practice pertaining to process improvements is the streamlining of agreement processing to reduce the time from start to approval of an agreement. The clarity of work flow from the process improvements can minimize the number of unnecessary follow-up activities and revisions. The timely fulfillment of requirements detailed in the work flow for various steps can also minimize wasteful follow-up and reduce delays. Shaving a few months off each of the various steps through the use of such process improvements can add up to saving many months on each project. With 52 state and district transportation agencies working on numerous road–rail projects every year, the national impact from the adoption of this project innovation on project delivery and resource savings could be significant.

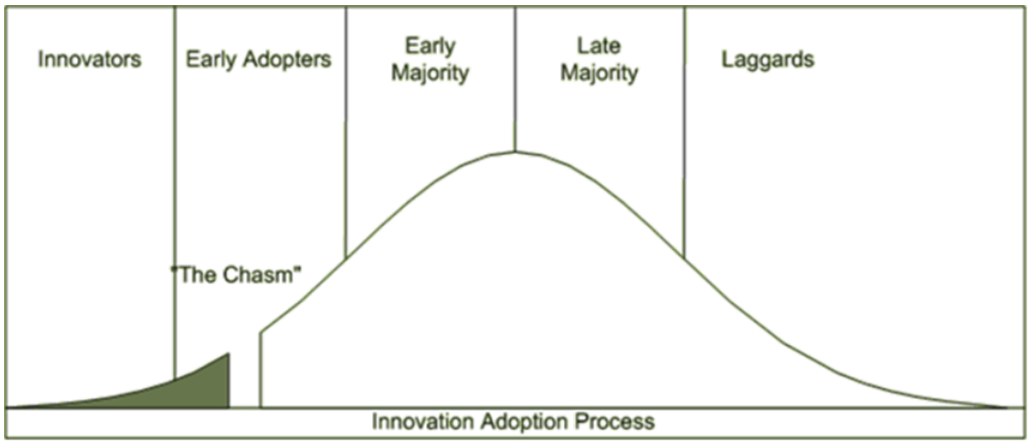


Figure 3.1. Innovation adoption process.

Great value and savings nationally will be achieved if even a handful of these innovations and process improvements are adopted by peer organizations nationwide. Each transportation agency adopting an innovation will save time and will be able to make better use of available limited resources. For example, even adopting a simple process improvement such as on flagging can result in significant cost savings, better use of resources for the railroads, fewer flagging costs for agencies, and less contentious relationships between the parties involved. When enough

transportation agencies use an innovation, it will reach its tipping point and become routine practice, as illustrated in Figure 3.1. As more agencies use the best practices and make refinements they will contribute to the library of resources, making it even more robust.

In working on the first two phases of the project (initial research and communication and dissemination), the team became familiar with many of the common challenges faced on projects involving transportation agencies and railroads. The team also became familiar with the innovative practices, strategies, guidelines, and process improvements that have been used successfully to address many of these challenges, albeit in isolated pockets nationally. All the information gathered during the various phases of the project has been captured in the training lessons or uploaded to the virtual library. The web suite of products with the training lessons and the library make it convenient and easy for stakeholders to access a wealth of useful information from across the United States via the Internet. This easy online access can serve to expedite knowledge transfer. The training has been designed to allow users to quickly locate topics of interest to them. Users can access practices used by peers and adopt them as they are or customize them to meet their specific needs.

CHAPTER 4
Project Approach

In this phase the project team addressed the development of tools to provide access to best practices to mitigate challenges faced on projects involving transportation agencies and railroads. Having both the railroad and transportation agencies involved was important to the success and final objective of the R16 project. To ensure this goal was met, the project team worked at engaging both parties from the initial stage of the project.

The project team took into consideration that transportation agencies as public agencies and railroads as private organizations have very different business objectives. They differ in their perspectives on project timelines and in how they approach the planning and delivery of projects. In addition, with downsizing, retirement, promotions, and new hires, the subject matter expertise and knowledge of personnel working on projects varied across states.

The team took an iterative approach to working on the project, engaging the stakeholders and building each step on the previous step. The first step was conducting a survey to obtain input from transportation agencies and railroads about the topics to consider in developing the training and the types of material to include in the virtual library. Feedback from the survey provided valuable information about the interests, priorities, and expectations of the stakeholders. The team analyzed and summarized the survey information, which was then shared with the members of the community of interest (COI).

The next phase of the project was to outline the lessons and identify major categories of library resources. A review group was created that consisted of some new members from transportation agencies along with members from the established COI. Additional representatives from the railroads that were already part of the COI were also included in this review group. The group thus had representation from multiple tiers of stakeholder types. The steps and considerations taken to delineate the lessons and establish the virtual library are outlined below.

Balancing obtaining stakeholder input with time constraints. With the intent of creating a balance between the need for feedback and respecting the time constraints of the senior executives in the review group, two documents with course information were developed. One was a high-level outline and the second had additional details. Both documents were circulated to members of the review group. This practice allowed the senior executives to review the outline and forward the more detailed information to other personnel in the organization for input.

Input to content. The feedback was incorporated, and detailed content was developed for the web-based training lessons. The content considered the diversity and the differing interests of the users and categorized lessons to make it easy for users to locate topics of interest to them.

Peer testimony. One of the goals of the training was to disseminate information and catalyze the adoption and implementation of the project innovations for DOT–railroad projects.

Studies have shown that peer testimony is important to the adoption and implementation of innovations. Using the strategy of advancing practices through peer-to-peer communication, the team included video clips of discussions and perspectives on best practices shared by various transportation agency and railroad personnel in the lessons and the library. The training and library include examples of innovations implemented by peer DOTs that should expedite the propagation and adoption of various best practices.

Practical solutions from peers. The content focused on practical solutions that could be adopted and implemented by stakeholders to solve problems and make improvements. Most of the examples cited and the lessons emphasized are based on actual examples from the transportation agencies and railroads. The experiences and perspectives of experts from the federal and state transportation agencies and railroads have been tapped and translated into lessons and video clips so that peers can relate to the experience and understand the reasoning behind the approaches discussed in the lessons and resources provided in the library. These sources of information focus on the nature of various challenges and practical ways to tackle them.

Functionality focus. Functionality was an important aspect of the lesson design. The intent was to allow users to have multiple ways to access the materials from multiple devices over the Internet.

Clarity of content. Each lesson shows clearly the topics covered and the targeted audience. This information allows those new to the field of railroad and agency projects to engage in the basic foundational training important for understanding the issues, while a veteran with limited time can skip such lessons. Users can easily and quickly locate topics of critical interest to them.

Lessons designed to be self-paced. The lessons are flexible to allow learners to pursue specific areas of interest, and they are designed to allow learners to access content and work at their own pace. The training considers different approaches to adult learning. When appropriate, it includes conversational styles to convey the different perspectives of the DOTs and the railroads. Links and suggestions at the end of each lesson allow users to access additional materials pertinent to the lesson topic.

Quick access to materials. The training was developed in a modular fashion covering topics that range from introductory information to detailed agreements. The training was compartmentalized to allow busy users to choose topics of interest to them. The design and presentation of materials in the web suite (also referred to as the Collaborative Solutions Suite) developed during this phase of the project make it easy for users to access lessons of interest without having to go through materials that are not of interest to them. The design of the library provides users multiple ways to search and access materials and then view them on the site or download them to their devices.

Product preview and product training. The project team conducted several GoToMeeting sessions with members of the review group to provide a preview of the products and explain the components, structure, and content addressed in each of the products.

Web product testing and feedback. The project team engaged the review group in reviewing the products and providing feedback on the content, design, and overall experience of the library and the lessons in the Collaborative Solutions Suite. To make it easy for reviewers to provide feedback, the team included plugins at the end of each lesson and on the main page of the library. For internal facilitation purposes, the team developed an early form of an agreement builder. A discussion forum was also established for reviewers to participate in, brainstorm, and provide feedback. Users were also provided the ability to provide feedback on the preliminary version of the agreement, as well as on the library and lessons.

Feedback incorporated. The feedback received from the review group was reviewed, and appropriate changes were made to the products.

Heterogeneous users. The virtual library designs considered the needs of a variety of users with varying levels of expertise. Several access options, including text search, selecting categories on a category navigation tree, and use of a tag cloud, are available to provide ease of access to library materials.

Seamless access between lessons and library. The design of the Collaborative Solutions Suite was intended to make navigation between the library and the lessons seamless to the user. Many of the lessons have links that will take users to the library. This feature allows users to access additional material from the library and learn additional details on topics of interest to them.

The project team worked closely with all the stakeholders to gather examples of practices, agreements, and other pertinent resources for inclusion in the virtual library. Through all phases of the project, care was taken to ensure that both transportation agencies and railroads were involved and both sides contributed productively and felt that their perspectives and interests were represented in the products. Overall, the review group had representation from multiple tiers of the stakeholder groups. Over 45 users from transportation agencies and railroads reviewed the Collaborative Solutions Suite products (library and the lessons) and provided feedback.

CHAPTER 5
Products

One of the main outcomes of the R16 project has been the successful creation of an environment that is conducive for DOTs and railroads to collaboratively work on resolving roadblocks to the progress of projects. This phase of the project built on the momentum, collaboration, and trust that were developed in the earlier phases to capture the best practices and develop them into lessons. Collaboration included many joint panel discussions, presentations, workshops, and other project outreach activities. The two planned deliverables of the product suite were

1. Lessons, and
2. A virtual library of resources.

The lessons and library have been designed and implemented to be available through a web-based application called the Collaborative Solutions Suite.

The Lessons

Reasoning Behind Lesson Design

Over the last decade, both transportation agencies and railroads have downsized. With this downsizing, combined with retirements and promotions, both organizations have lost experts knowledgeable in working on projects involving the two parties. The exodus of knowledge is continuing in both DOTs and railroads as experienced staff continue to retire. Further, a large number of aging structures that cross or abut railroad tracks need maintenance and rehabilitation, and with recent expansion activity among the railroads, the number of projects and related interactions involving the two parties will continue to increase. DOT personnel who worked with or on projects involving the railroads had to learn on the job. Over time, these personnel developed a technical knowledge and understanding of the railroad culture and governance that enabled them to work successfully with the railroads and mitigate issues on projects. Transfer of such knowledge has become a critical part of ensuring success in implementing DOT–railroad projects.

The intent of the Collaborative Solutions Suite of web tools is that the training lessons and library should expedite the knowledge transfer and also catalyze the adoption and implementation of the project innovations. Because studies have shown that peer testimony is important to the adoption and implementation of innovations, the training includes video clips of peers conveying, in conversational style, the different perspectives of the DOTs and the railroads and their implications on how both parties work on projects. The lessons also include additional peer testimony and examples of innovations successfully implemented by other transportation agencies and railroads.

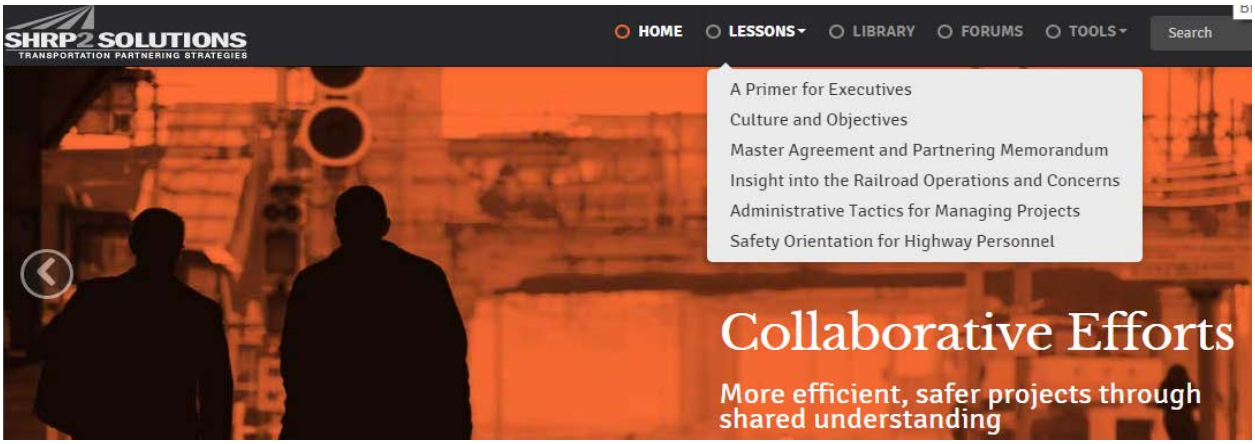


Figure 5.1. The six lessons as they appear on the Collaborative Solutions Suite website.

As shown in Figure 5.1, the Collaborative Solutions Suite has six lessons:

1. A Primer for Executives;
2. Culture and Objectives;
3. Master Agreement and Partnering Memorandum;
4. Insight into the Railroad Operations and Concerns;
5. Administrative Tactics for Managing Projects; and
6. Safety Orientation for Highway Personnel.

The six lessons incorporate enhancements to the findings of the 2010 SHRP 2 R16 report *Strategies for Improving the Project Agreement Process Between Highway Agencies and Railroads*. These enhancements are the result of two years of collaborative meetings and discussions by a community of interest (COI) of stakeholders involving 10 DOTs, five railroads, FHWA, and FRA.

Research into the nationwide experience has shown that project agreements between highway agencies and railroads are routinely delayed because of a lack of common partnering and project management practices. The strategies for success, overwhelmingly supported by the stakeholders from transportation agencies and railroads, drew from practices common in partnering, environmental streamlining, and project management. Working with the COI of stakeholders, these strategies have been customized to streamline the review, approval, and development processes and are presented in the form of the six lessons.

Public projects are not the primary business for the railroads, and for most transportation agencies, projects involving the railroads are a small fraction of the overall annual program of projects. The survey of transportation agencies indicated that with the numerous challenges senior transportation agency executives must routinely address, the projects involving railroads get less executive attention. Therefore, one lesson is devoted to providing an overview for executives, and the other lessons delve more deeply into various aspects of the project

innovations. The Executive Primer also serves to provide an introduction to the employee new to DOT–railroad projects.

Lesson 1. A Primer for Executives

The first lesson is a primer for the senior transportation agency or railroad executive on partnering and streamlining processes that can be used to expedite agreements and delivery of projects between highway agencies and railroads. This lesson arms busy executives with a high-level understanding of the various successful strategies, best practices, and tools that can be used to work collaboratively with each other for a successful and expedited execution of projects. The examples in the lessons demonstrate that many of the challenges faced during delivery of projects involving the two organizations can be successfully addressed through partnering and streamlining processes.

Lesson 1 accomplishes two things. First, it briefly summarizes the topics discussed in the five subsequent lessons and focuses on innovations that can help a decision maker understand the project innovations and prepare to streamline the agency's or railroad's agreement process, project planning, and coordination to expedite the delivery of projects. Second, this lesson summarizes practices that can help an organization establish administrative processes and address organizational issues to expedite the DOT–railroad agreement process.

Senior executives with railroads or transportation agencies, whether or not they are new to the DOT–railroad process, would benefit from this training. Lesson 1 will also benefit other personnel, including employees new to the DOT–railroad process who know little about working on such projects and those who have knowledge of the engineering aspects of project agreements but are not aware of the background or differences between the two organizations.

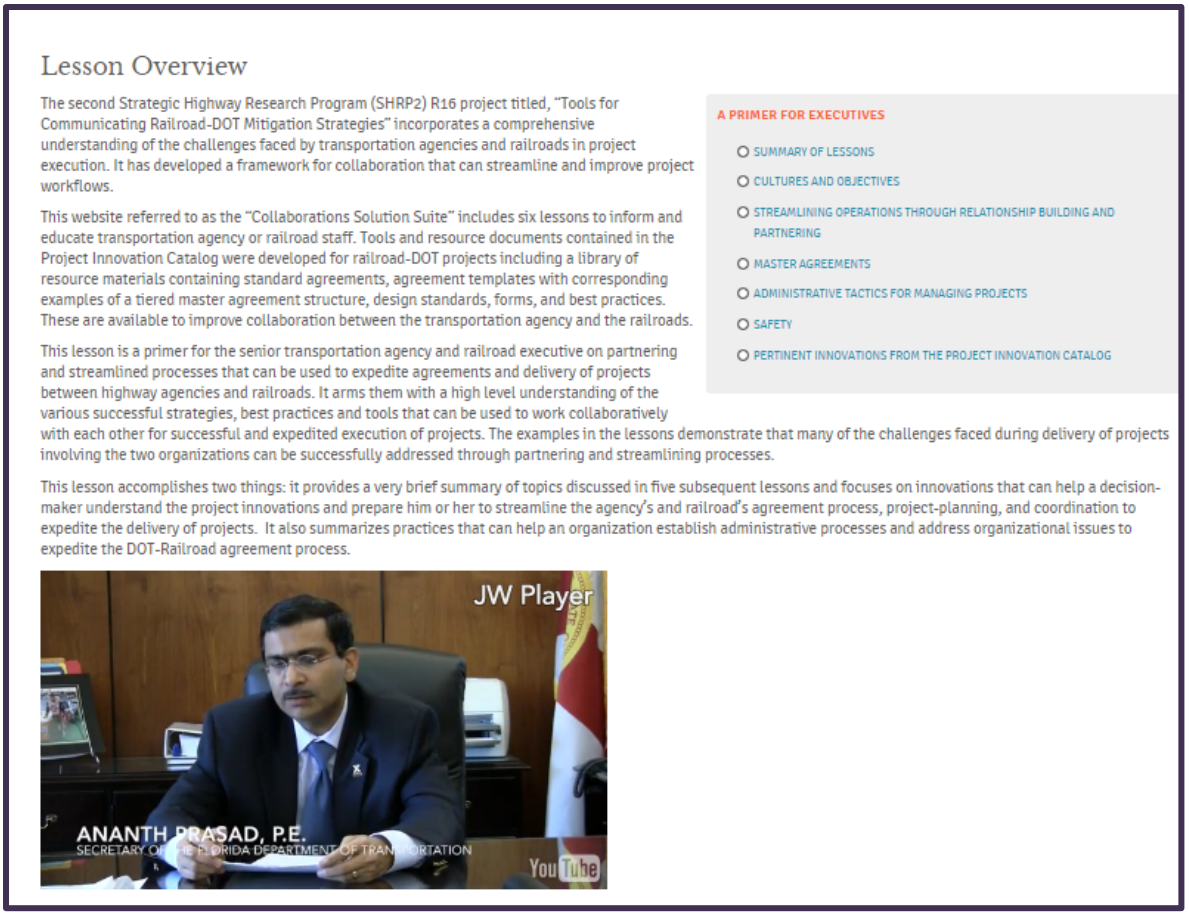


Figure 5.2. Florida DOT Secretary Ananth Prasad on the benefits of the R16 Partnering on the Collaborative Solutions Suite.

Figure 5.2 shows the overview for Lesson 1, which provides a quick synopsis of the following seven topics:

1. Summary of lessons;
2. Cultures and objectives;
3. Streamlining operations through relationship building and partnering;
4. Master agreements;
5. Administrative tactics for managing projects;
6. Safety; and
7. Pertinent innovations from the Project Innovation catalog.

The seven topics in Lesson 1 include perspectives from DOT and railroad executives. In the summary lesson discussing the topic of partnering and its implications for working with DOTs, Tony Bellamy, Director of Project Management, Public Projects, at CSX Transportation (CSXT) notes, "The use of partnering improves communication and understanding between the

two parties and results in win-win strategies that help expedite agreement processing and project delivery."

Users from DOTs and railroads noted that one of the challenges in identifying the degree and impact of issues is the lack of measures. In discussing the importance of partnering, Carlos Braceras, Executive Director of the Utah DOT, explains the Utah experience: "Measuring performance allows us to identify roadblocks, make improvements, and proactively address problems. Doing so routinely helps us to control costs, minimize delays, and maximize the use of taxpayer dollars."

Paul Worley, Director of the Rail Division at the North Carolina DOT, appears in a video clip to talk about the cultural differences between the North Carolina DOT and railroads and how understanding the differences has enabled the DOT to understand the railroads' perspective and convey the DOT's perspective to the railroads in a manner that facilitates better understanding between both parties. Improved understanding, Director Worley notes, helps both parties come up with acceptable solutions that work for each other.

The lesson discusses many of the challenges, including financial considerations, which agencies need to consider when working on projects involving railroads. The topic on streamlining operations through relationship building and partnering discusses how streamlining processes helps partnering. It also discusses the outcomes of partnering and the benefits of successful partnering techniques.

Providing an executive's perspective, Kirk Steudle, Director of the Michigan DOT, notes that in the agency's experience, "The simple process of partnering leads to relationship building and streamlining of processes and decision making, resulting in invaluable savings in time and project costs."

Lesson 1 provides an overview of the successful strategies that are discussed in more detail in other lessons. The lesson also provides a cautionary note to users expecting immediate success. The lesson explains that partnerships evolve progressively and open doors for continuing collaboration, thereby providing new opportunities for all parties. Partnership takes time to build and is iterative. The lesson touches on the steps that are critical for stakeholders to consider as they move forward with building partnerships.

The topic on master agreements provides an overview of the benefits of developing and implementing master agreements. Tamara Nicholson, Director of the Office of Rail Transportation at the Iowa DOT, explains the DOT's success with a master agreement that addresses developmental specifications: "With a signed master developmental agreement in place, new project agreements between Iowa DOT and Union Pacific Railway only take a few weeks for preparation, review, and approval. This is a big saving in overall time between concept and agreement, as well as resource utilization for both organizations."

The topic on master agreements also discusses category-specific agreements, their benefits, and factors that facilitate successful outcomes from the use of such agreements.

The topic on administrative tactics for managing projects briefly summarizes various administrative best practices successfully used by transportation agencies and railroads

nationwide. It describes two of the key tactics (and their benefits) discussed in detail in another lesson: formal escalation processes and performance measures.

Discussing the benefits of implementing a formal escalation process in the Washington State DOT (WSDOT), Ahmer Nizam, Manager of Utilities, Railroad, and Agreements at WSDOT, notes, "The implementation of a streamlined formal escalation process between WSDOT and BNSF resulted in over 98% of issues between 2006 and 2011 getting resolved in normal project meetings without getting escalated."

The section on performance measures addresses one of the challenges raised by both parties on the inability to identify the impact of various issues. This topic touches on the fact that what is measured gets the attention and action needed.

Figure 5.3. Illustration of performance measures on the Collaborative Solutions Suite.

As shown in Figure 5.3, this lesson touches on examples of measures that help with managing project cost overruns, safety issues, and delays in agreement processing.

The last topic in the Executive Primer addresses safety. With the responsibility to carry hazardous materials and to travel through cities and communities, safety has always been at the forefront of the railroads' business model. With the vision of "zero deaths," DOTs have an increased emphasis on safety. Incidents and accidents around railroad tracks can have serious consequences. Work around the tracks can cause unintended drainage issues that can cause problems with the roadbed. Any change in the track integrity can cause derailment. The lesson touches on the safety emphasis that railroads have on projects involving them and the reasons for some of the requirements they insist on.

Lesson 2. Culture and Objectives

Lesson 2 goes into greater detail on the cultures of the organizations. It compares the common approaches taken by the railroads and highway agencies with the intent of providing each group with insights into the other group's goals, cultures, and approach to the agreement process. Lesson 2 also highlights some of the process innovations uncovered during the project work that are elaborated in later lessons. This lesson touches on the fact that problems are not uncommon in the highway–railroad agreement process. Often these problems are due to the varying cultures, perspectives, and goals of the two groups. Transportation agencies cannot commit funds without agreements, and all projects between transportation agencies and railroads require agreements. Acknowledging this reality and understanding the cultural differences and accounting for them in discussions and negotiations help avoid unnecessary and contentious discussions.

This lesson can provide some perspective to employees new to projects involving railroad companies and transportation agencies. The employee who knows nothing to very little about working on such projects would benefit most from this lesson. Other employees who have knowledge of the engineering aspects of such projects but are not aware of the background of the differences between the two organizations will also benefit. Lesson 2 would also be apt for a CEO or senior executive who may be pressed for time and not have the ability to get into the details, but needs to understand the critical factors driving the relationships between the two organizations.

The following topics are covered in Lesson 2:

1. Corporate culture of railroads;
2. Corporate culture of transportation agencies;
3. Railroad organization structure and approach to processing agreements;
4. Transportation agency organization structure and approach to processing agreements;
5. Partnering agreements; and
6. Master agreements overview.

Topic 1. Corporate Culture of Railroads

This topic discusses how the railroads approach their business operations and how their approach differs from the approach taken by transportation agencies. It provides some background on the financial and moral obligations that railroads have to their stakeholders and investors compared with the responsibilities of transportation agencies to taxpayers. The topic discusses the key financial concerns that railroads have in working on public projects. Topic 1 also touches on the operational goals of the railroads and how these goals influence their decisions on public projects. Understanding these differences helps the two parties work together collaboratively.

It is important to understand that in contrast to typical transportation agencies, which measure highway closures in days, railroads measure track closures in hours. Railroads routinely replace their own bridges in days, not in months or years as transportation agencies often do. They have specialized equipment that accommodates rapid activity in narrow windows of time.

Topic 2. Corporate Culture of Transportation Agencies

This topic highlights some of the key financial and operational concerns of public agencies when working on projects and the public scrutiny that agency executives experience concerning the decisions they make and funds they invest.

It is important to understand that transportation agencies experience public scrutiny on use of funds and costs incurred on projects. A railroad's insistence on longer spans and wider pier spacing for overhead bridges translates into increases in project costs that seemingly are focused on serving the railroad's purposes. Such practices are contrary to the thinking of transportation agencies.

With many demands on the limited funds that are available to transportation agencies, an agency's approach to highway projects must consider both federal and state funds and how to maximize the use of funds within asset classes and also across all the needs that compete for resources. Achieving this balance may not be in sync with the operational needs of railroads to keep tracks operational and provide for small windows of time for agency projects.

The topic also touches on some of the pertinent operational goals of agencies. The approach and timelines associated with the planning, design, and delivery of transportation projects differ from those of railroad projects.

The topics on the corporate cultures highlight the differences in the operational goals and financial concerns of both parties. The railroads build their tracks to be useful for 100 or more years. Historically, transportation agencies planned bridges to last close to 50 years. These expectations have associated implications in the design standards of structures. Understanding these differences will better prepare personnel from both parties as they work together on projects.

Topic 3. Railroad Organization Structure and Approach to Processing Agreements

Railroad Organization

This topic discusses how the organizational structure of the railroad focuses on its main operations, which is moving freight safely to various customer locations as cost effectively and efficiently as possible.

With a consolidation of operations, several railroads have streamlined work flow and downsized. The work flow process within each railroad and the parties involved throughout the process must be considered by agencies when coordinating activities for review and approvals on projects involving the railroads. The streamlining in many cases has resulted in outsourcing of noncore functions. In working with railroads, agency personnel need to consider that with few exceptions, public projects are not the focus of the railroads, and most of the reviews and processing of agreements on public projects have been outsourced by the railroads. Understanding the process that each railroad has implemented for review and approval of public projects will enable transportation agencies to be proactive in submissions. It will also help them ensure that changes and multiple reviews are minimized to keep costs down.

Railroad Approach to Processing Agreements

The Class 1 railroads have developed formal processes by which they review proposed highway projects that cross or abut railroad facilities. The process is intended to “matriculate” a proposed project through a variety of internal reviews, each of which reflects a major consideration of the railroad. The railroad’s review of a public project will consider impact to future railroad expansion plans, safety of construction means and methods, impacts to existing utilities in rights-of-way, and impediments to rail traffic movements during and after construction. Understanding the railroad’s expansion plans can help agencies to better plan public projects and start coordinating with the railroads early in the process.

The work outsourced by the railroad includes the review and approval of real-estate sales and acquisitions, processing of right-of-way agreements, and design reviews. Understanding the railroads’ process and accounting for the minimum time required for the outsourced work in the agency’s project schedule are important. Work done in-house by the railroads must compete for time with internal projects.

The completeness of the submittal and compliance with the recommended design standards are major considerations in the railroad's ability to provide timely feedback. Railroads often require different levels of indemnification from the transportation agencies, a provision that often involves long discussions and negotiations. Unless there is agreement between both parties on how to address indemnification, the railroad will request absolute indemnification. Another consideration is that unlike transportation agencies, which have requirements on how to use the funds to deliver projects detailed in their state's Transportation Improvement Plan, the railroads develop projects to meet their business growth needs.

Understanding the railroad review process enables public project sponsors to adopt practices and organize submittals that address the railroads' concerns and avoid delays.

An understanding of the railroads' approach through the topics discussed in Lesson 2 will help agency personnel expedite the work involved with the railroads on public projects.

Topic 4. Transportation Agency Organization Structure and Approach to Processing Agreements

TRANSPORTATION AGENCY ORGANIZATION

This topic discusses the organizational structure of the state transportation agencies. The majority of the agencies are decentralized. Traditionally, they have a central office with district offices that cover different regions of the state. In most models, all offices have to coordinate various activities with local sponsors. The central office mainly addresses strategic activities such as planning, policy, funding, review, approval, and other administrative tasks. The districts or regions are mostly responsible for implementing the projects across the state. They manage the operational aspects of the state's transportation infrastructure including the maintenance, preservation, and construction of the projects.

Like railroads, highway agencies have been significantly downsized in recent years and have outsourced many of their design functions. Highway traffic has increased, and agencies struggle to maintain their infrastructure with shrinking state and federal highway funds.

Transportation Agency Focus and Organizational Considerations

Funding is often a major source of concern for transportation agencies. Agencies often have to deal with uncertainty on project delivery schedules and severe budget constraints when they negotiate with railroads over projects. Understanding the highway agency culture, context, and project delivery process allows railroad personnel to better understand and address the issues they face when coordinating with highway agencies. Also, the number and complexity of projects that agencies have with various railroads differ. As a result of the erosion of institutional knowledge from loss of experienced personnel, the agencies and local sponsors have varying degrees of expertise in dealing with railroads. The topic discusses the organizational aspects that agencies routinely face that influence their approach to work and ability to control submittal schedules. Often accommodating the railroad's needs has to be balanced with other considerations. Once funding is secured on a project, it may have strict timelines requiring expenditure of funds. Bid letting deadlines may necessitate expedited reviews with the railroads. These and other organizational aspects of a transportation agency are summarized in the topic, and an understanding of these factors can ease the discussion between the two parties.

> *"A centralized rail department within a transportation agency allows for much better coordination and efficient handling of projects with the railroads."*—Thomas Bracey, Senior Engineer, Public Improvements, Norfolk Southern Corporation

Topic 5. Partnering Agreements

This topic discusses the differences in perspectives, goals, and responsibilities between transportation agencies and railroads. Clearly, each type of organization has its own objectives and must act according to its own self-interest. However, given the proximity of highways and railroads and overlapping construction projects, some common ground for working together must be attained. This topic discusses how this can be achieved through partnering agreements.

Benefits of Partnering

This topic discusses the benefits of partnering and how a framework can be used to achieve this objective. The elements of such a framework include identifying areas of success for ongoing collaboration, the need for agreement streamlining, and iterative and continuous processes for improvements at multiple levels in both organizations. It discusses a memorandum of understanding (MOU) as a tool that outlines such a framework, formalizes the process, and

describes how the agency and the railroad liaisons will operate and interact with each other for mutual benefit.

Create Common Understanding and Collaborative Approach

This topic discusses the need to have win-win strategies to make partnering work. A common understanding helps create a better appreciation of the perspective of the other party. The partnering process results in both parties having a common understanding of expected outcomes. The topic discusses how partnering allows both parties to initiate small steps for success and iteratively build the partnership. It provides the opportunity to evolve and progressively build on areas of collaboration. It opens doors for continuing the collaboration by providing new opportunities to enhance the areas of partnership for both parties.

This topic discusses five steps that are involved in an effective partnering process:

1. The earnest commitment of both parties;
2. Defining what success is to both parties;
3. Identifying the areas of collaboration;
4. Agreeing to regular consistent communication; and
5. Developing a continuous process-improvement mechanism.

Topic 6. Master Agreements Overview

This topic discusses the reality that public agencies are required to have a contract before entering into commitments or making payments to other entities. Therefore agencies have to execute agreements with railroads before the latter can provide any services, such as preliminary engineering reviews and flagging services, or need to be compensated for easements or other expenses related to highway–railroad projects. These agreements are legally binding mechanisms that allow the payment of fees for various services performed by the railroads. Streamlining the development and processing of such service contracts is a logical initial step to expediting the processing of project agreements between the two entities.

> *"Master agreements are much more complex and take more time to develop. However, once signed, they streamline the processing of agreements, creating significant savings that benefit both the DOT and the railroad."*—Thomas Bracey, Senior Engineer, Public Improvements, Norfolk Southern Corporation

Agreements Vary in Complexity

Projects vary in complexity from routine maintenance to complex new construction of structures. Accordingly, agreements vary in complexity based on the project. They have project-specific provisions and various nonproject provisions, such as how to address standard terms in construction contracts, insurance limits, personnel training, and other clauses that are universal to all projects. They discuss the obligations and responsibilities of both parties. The agreements are reviewed and approved by multiple people in both organizations before they are signed.

Overview and Benefits of Master Agreement

The topic provides an overview of the use of master agreements to expedite agreement processing by minimizing the material that needs to be reviewed for project agreements. It discusses the approach to developing a master agreement and the benefits of a master agreement. The process involves taking the common elements from detailed project-specific agreements and consolidating them into a master agreement. This consolidation eliminates the need for review of routine items from individual agreements. With a master agreement in place, project-specific details can be addressed through a short addendum.

Addressing projects by using a master agreement and project-specific addenda eliminates the need for review of almost 75% of an otherwise all-inclusive agreement.

Having a master agreement allows both parties to focus on specific aspects of the project being addressed during agreement reviews. This ability eliminates multiple reviews of previously reviewed provisions, expedites the review process, and enables earlier start of project work. A variant to this approach is to have an overall master agreement and then individual master agreements for standard categories of projects that capture provisions that are common to specific project categories.

Lesson 3. Master Agreement and Partnering Memorandum

Lesson 3 addresses the intent of the overall master agreement (OMA) and a series of project-category master agreements to streamline the agreement process. Master agreements included in the Project Innovation catalog have been used by highway agencies and railroads around the country to simplify the agreement process while meeting the needs of both parties.

This lesson expands on the objectives and major components of the master agreements. It discusses the streamlined framework of master agreements and how their successful implementation can expedite the review and approval of project agreements. It illustrates how the master agreement structure reduces the number of components that need to be covered in a project-specific or supplemental agreement. It goes over the common provisions and requirements that can be consolidated in an OMA.

> *"Partnering triggers discussions that focus agency and railroad personnel on win-win outcomes."*—Ananth Prasad, Secretary, Florida DOT

Lesson 3 also discusses how a partnering approach memorialized in the form of an MOU can be successfully implemented between a DOT and a railroad to facilitate collaboration and streamlining. The MOU is intentionally designed to stand apart from the OMA. The partnering MOU generally describes how the agency and railroad liaisons operate and interact with each other. The activities covered by the MOU often do not require legally binding contracts, exchange of payments, or incurring of obligations by either party. The partnering activities in the MOU express the means by which the parties intend to interact for their mutual benefit.

The primary goal of the topics covered in Lesson 3 is to offer users a better understanding of the benefits of master agreements, whether they are OMAs or project-specific (master) agreements. This understanding will enable users to customize agreements to address specific state and railroad requirements. Different levels of agency personnel involved in developing, approving, and implementing the different types of agreements on DOT–railroad projects can benefit from this lesson.

One of the Lesson 3 topics discusses the master agreement framework and the benefits of consolidating common provisions into a master agreement (see Figure 5.4). It highlights the difference between a traditional agreement and a master agreement. Signing a master agreement streamlines and expedites the processing of subsequent project agreements.

The acceptance of a master agreement by both parties allows its provisions to be incorporated by reference into all subsequent project-specific agreements, thereby minimizing resources (time and effort) required when processing project agreements. This streamlining expedites the processing of subsequent project agreements. By signing the OMA, both parties agree that the requirements detailed in the OMA will apply to all project agreements between them. The OMA is also a legal mechanism to allow for the expenditure of funds and the imposition of binding provisions on each project agreement that is tied to the master agreement. The OMA can be the legal mechanism to pay for railroad expenses related to programmatic streamlining of the review process. The programmatic streamlining costs are not limited to only one project, and thus cannot be covered by a narrow project agreement.

> *"Overall master agreements eliminate the need to repeatedly review the common standard provisions for each new project agreement."*—Darin Kosmak, Rail Director, Texas DOT

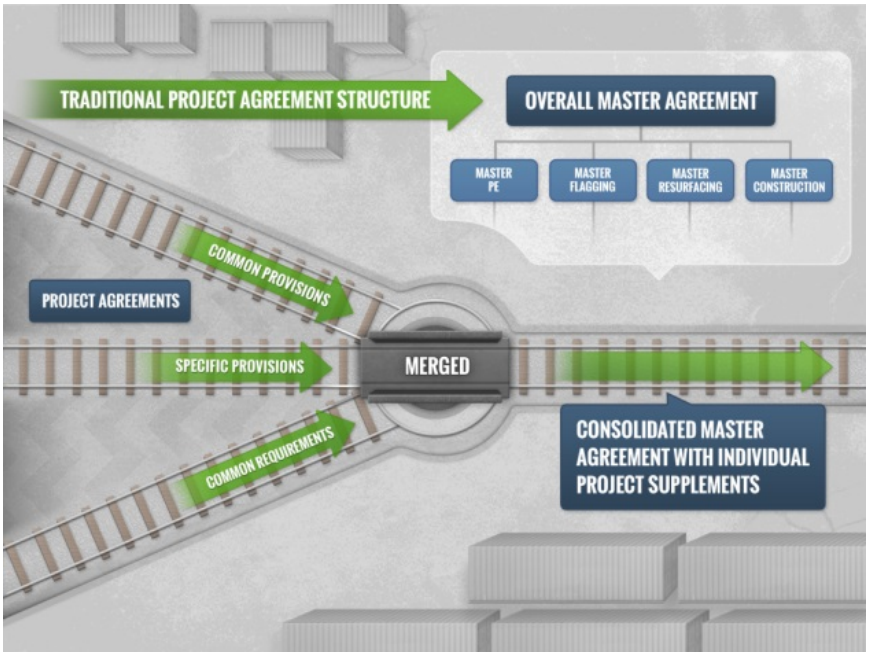


Figure 5.4. Master agreement structure: Consolidation of common provisions at two levels.

Lesson 3 also discusses a tiered approach to developing master agreements. The simplest structure for consolidation may involve having an OMA with supplemental agreements or project-specific addenda that cover provisions specific to individual projects. However, many agencies have discovered that a three-tiered structure provides greater efficiency. In this structure, the OMA addresses provisions that are common to all projects, regardless of category. There may be many provisions that are common to categories of activities and/or projects, such as preliminary engineering, resurfacing, right-of-way, pipe and wire, grade separation, grade-crossing safety, and so on. These provisions are handled through category-specific master agreements that fall in a second tier between the OMA and project-specific agreements and addenda.

Though most of the standard legal requirements are common across railroads, there may be some slight differences in the details of requirements between railroads. Therefore, an agency may have a slightly different master agreement with each of the railroads. After a transportation agency has created a master agreement with one railroad, it can use that agreement to serve as a template for creating new master agreements with others.

The lesson also discusses the MOU and the common provisions in category-specific agreements, including the following:

1. Preliminary engineering,
2. Resurfacing,
3. Structures,
4. Warning devices, and
5. Pipe and wire.

Lesson 4. Insight into the Railroad Operations and Concerns

This lesson discusses the railroads' concerns regarding transportation agency projects. When transportation agencies perform work on projects that abut or cross railroad tracks, due process must be followed with regard to railroad company agreements and notifications. This lesson explains that project work will have to be done in a manner that is acceptable to and least disruptive to the railroads. Transportation agencies wishing to expedite any activity involving a railroad will need to ensure that issues that are of priority or concern are addressed to the railroad's satisfaction. Activities that negatively affect the priorities of the railroad company will either cause the railroad to stop the progress of work on the project or necessitate extensive and time-consuming negotiations that can cause project delays. Understanding the railroads' concerns will be useful to a wide range of transportation agency personnel, including decision makers and engineering, management, and maintenance personnel collaborating on projects with the railroads.

This lesson discusses many of the common issues that transportation agencies face when working on projects involving railroads. It provides a perspective that will help them be proactive in ensuring that delays in agreement processing and project delivery are avoided. The lesson covers tactics related to planning, scheduling, management, and engineering that have been successfully implemented in isolated pockets across the United States to expedite the agreement processing on projects involving railroads. It discusses the need to identify those cases for which extensive and time-consuming negotiations are required that result in project delays. Often, these delays can be mitigated once the transportation agency is aware of such cases. To help understand these scenarios, Lesson 4 provides some short case studies and a resolution strategy related to each scenario.

Lesson 4 covers the following topics:

1. Following railroad design standards,
2. Safety,
3. Minimizing disruptions to train traffic,
4. Temporary encroachment, and
5. Profitability.

Topic 1. Following Railroad Design Standards

This topic discusses the reality that design standards across railroads vary. Railroads operate in different parts of the country and deal with many geographical challenges. Standards include specifications relating to various parameters including vertical and horizontal clearances, drainage, slope stability, and so forth. Different geographical areas also have different requirements as they relate to track curvature and grading standards. This topic discusses the need for additional reviews requiring additional time for approval of deviations. Agencies cannot assume that railroads will automatically approve such deviations. Early coordination and reviews are essential as these deviations could result in multiple design reviews and a need to make changes to the design that could cause project delays and cost overruns.

To avoid unnecessary delays and cost overruns, some states specify the requirements in their design manuals. Their agreements require additional state-level approvals for deviations. Some states have administrative codes that address these requirements. This topic highlights the importance of agency personnel being aware of the design standards and proactive in getting the railroads engaged in early discussions in cases in which constraints necessitate deviations from the required railroad standards.

> *"Section 16 – For Improvements which require work on a structure carrying highway traffic over the Company's facilities, the temporary clearances, with references to the Company's track(s), of any necessary falsework, bracings or forms as required for the Improvement shall, unless otherwise approved by the Company's and/or the Illinois Commerce Commission, be not less than Vertical – 23' above the top of high rail and Lateral – 12' from the centerline of the track."*—Master agreement between State of Illinois and CSX Transportation

Topic 2. Safety

This topic provides the railroads' perspective on strict adherence to safety standards. Accidents resulting from unsafe operations caused by inadequate design considerations, construction activities, or unsafe practices during the engineering, investigation, or construction phases can all affect the credibility and profitability of the railroads. If railroad accidents involve fatalities or a release of hazardous materials, apart from the adverse consequences to people and property, significant additional financial liability can befall railroad companies. As the July 2013 railroad accident caused by a runaway train in Quebec, Canada, showed, safety issues can result in major impacts to the communities and people living in the vicinity of the tracks.

This topic provides perspective and highlights the need for these strict safety requirements. Transportation agency personnel or their contractors and representatives access the railroad right-of-way for a host of activities, including the need to access highway structures that are adjacent to, cross over, or are under railroad property for the purpose of studying the geology and environmental or hydrological aspects of adjacent highway properties. The implications of safety and need for a right-of-way access agreement may not be understood by all agency personnel involved in such activities. The topic explains that reviewing a structure that crosses a railroad track or taking a few core samples adjacent to a track may seem to an agency representative to be simple tasks that are complicated by unnecessary permitting procedures, with resulting increased costs and time delays. However, with tracks running for thousands of miles all across the country, it is often difficult for the railroads to be updated and current on activities around their tracks involving nonrailroad personnel. It is also difficult for railroads to ensure the safety of such personnel and of the trains plying those tracks. These challenges have led to railroads incorporating processes to trigger actions that inform them about a need by an external entity to access the railroad right-of-way. The topic also discusses resolution strategies, including the use of right-of-way access permits as one mechanism to trigger the attention of railroads to activity around the tracks.

RECOMMENDED STRATEGY

Focusing on win-win strategies between transportation agencies and railroads helps minimize delays.

Topic 3. Minimizing Disruptions to Train Traffic

The topic on minimizing disruptions discusses the differences between working on roadway projects versus working around the railroad tracks. It explains how, unlike roads where vehicles can use alternate routes to a destination, most rail tracks do not have similar levels of redundancy. Roadways have, at the minimum, two lanes for vehicles to move in the onward and opposite (two) directions. Though not desirable, when essential repairs have to be made at short notice, transportation agencies can close a section of one lane and manage the use of the other lane to keep the traffic moving in both directions. With trains running in both directions on the same track, such options are often not available to railroads.

"The Iowa DOT's collaboration with the railroads on grade-crossing projects has led to the use of better-quality materials and extended the life of the projects by threefold while minimizing disruption to both train and vehicular traffic."—Tamara Nicholson, Director, Office of Rail, Iowa DOT

Topic 3 explains that construction necessitating closure of tracks has to be well coordinated with the operation of trains. Closure of a section of a track can affect the timely movement of multiple trains in multiple regions. A delay can have a ripple effect on movement of trains on other connected tracks. The railroads also have to coordinate and obtain buy-in internally when track closures are involved. They have to consider the impact of delays caused by the track closure from the highway project on their clients and on their contractual obligations to customers.

This topic includes a case study on the repaving of at-grade crossings in Iowa (see Figure 5.5). The case study highlights the benefits of streamlining processes and having good coordination and collaboration between the Iowa DOT and the railroad. It shows how both parties can work to minimize the disruption to traffic and collaborate to use good materials and construction techniques to extend the useful life of the crossing, from three years to 13 years. The practices described save money and minimize disruption to both rail and vehicular traffic.

Figure 5.5. Repaving at-grade crossings: Iowa DOT.

Topic 4. Temporary Encroachment

Temporary encroachment onto railroad property by transportation agencies often occurs when agency representatives are doing work on property adjacent to the railroad right-of-way. Such encroachment may not be intentional but can cause safety concerns for the railroads. Though agency activities are not a common cause of derailments, construction activities adjacent or close to the track can potentially cause derailment. Railroads are therefore cautious about construction projects by transportation agencies adjacent to railroads tracks.

Of particular concern to the railroad is the potential loosening of the soils around the rail track during or after project work. Loosening could be caused by driving heavy vehicles or moving heavy equipment along the tracks or doing any construction work that could cause undermining or settlement of the rail bed, resulting in elevation changes to the tracks. Similar concerns exist about heavy equipment operation too close to the track or the boring of casing pipes beneath the right-of-way. Concerns also arise from the potential for construction equipment falling on the track. Other concerns relate to project work leaving debris on or adjacent to tracks or fouling the tracks as a result of loosening the soil around the track.

The slightest change in the elevation of the track can cause derailment that can have catastrophic consequences. Apart from damage to the trains and their cargo, derailments can result in human injury or death. Derailment can also result in spills of hazardous substances that may necessitate evacuation of nearby areas. If a derailed shipment contains hazardous materials, then the consequences can be severe in both lives and business losses. It can also result in many days of track closure, which have a ripple effect on the timely movement of freight, thereby affecting the railroad's business. Any of these consequences can result in costly penalties and loss of business to railroads.

RECOMMENDED STRATEGY

Create a checklist and have a process to review activities and items with the railroads that address temporary encroachment and ensure that issues related to safety and fouling of the tracks are addressed proactively.

This topic explains that some transportation agencies and railroads have incorporated in their master agreement a checklist of items relating to activities involving heavy equipment, coring for samples, or other activities in the vicinity of the tracks that could potentially cause any undercutting, fouling of track, or changes to the elevations of the rail beds. For example, CSX Transportation (CSXT) and Illinois DOT have identified provisions to address temporary encroachment on projects. These provisions address

- Preventing interference with railroad operations;
- Providing notice before commencing work;
- Making temporary or permanent changes to wirelines on railroad property;
- Hauling across the railroad property or tracks;
- Storing of materials and equipment on railroad property during project work;
- Procedures for blasting and other construction work;
- Maintenance of ditches adjacent to railroad tracks;
- Flagging protection; and
- Cleanup after work.

The topic also discusses the importance of bringing railroads into the planning process early and initiating early and proper coordination of resources to address and minimize delays. For example, flagging resources are limited and used for internal railroad project activities, as well as public projects. Early coordination enables the railroads to plan and coordinate the availability of flagging resources to minimize impact on agency project schedules.

Topic 5. Profitability

This topic provides perspective on the importance of profitability. It discusses the expectations of stakeholders and investors from private companies. It explains why railroads cannot afford to provide free services to agencies.

> ***RECOMMENDED STRATEGY***
>
> *If documentation and administrative requirements of using federal funds will delay reimbursements of professional engineer costs incurred by railroads, then use state funds to make timely reimbursements of costs for preliminary engineering work.*

To improve efficiency of operations, the railroads have streamlined operations over the past years and have become more lean and efficient. As part of this streamlining, many railroads have also outsourced several areas of operations that are not part of their core business, including review and monitoring of activities on transportation agency projects. These activities are often just pass-through activities for which the railroads incur costs. Railroads expect to be compensated for service that is provided. If a railroad company does not charge the agency for the costs incurred, it will have to either pass the cost on to its customers or write it off as a loss. Adding such costs to administrative overhead will increase the cost of services provided to

customers without adding any value and cause the railroad to be less competitive. Neither of these are acceptable options for railroads. Most private companies will eliminate products and services that cause them to lose money. Understanding the business model and stakeholder expectations of private companies enables the agencies to work collaboratively and use win-win strategies that benefit both parties.

Case Study – Compensation and Balancing Public and Private Obligations

CSX Public Projects Manual – Why we must charge for reviews:
"CSXT's shareholders ultimately own CSXT's assets. Fair compensation for their use and for the company's resources is necessary and reasonable. Moreover, the types of projects being addressed in this manual usually do not directly benefit and, in some cases, create hurdles for, CSXT's core business of providing transportation service vital to its customers and the American economy. For these reasons, CSXT seeks payment for its costs and expenses incurred in connection with project review, construction and other related activities."

The topic includes a case study to explain the railroads' approach and balancing of public and private obligations and why it is important for a railroad to be compensated for services provided.

Lesson 5. Administrative Tactics for Managing Projects

This lesson covers administrative tactics that have been successfully used by transportation agencies and railroads across the United States to streamline and supplement the agreement process. Though administrative in nature, the topics in the lesson cover, at a summary level, the performance measures and project management techniques implemented by peers and the benefits of such implementation. The overview should provide the necessary information to help agency decision makers provide direction, support, and guidance to internal teams on the project management techniques and performance measures that are the most pertinent to implement.

All levels of railroad and transportation agency personnel involved in negotiating, preparing, approving, and implementing different types of DOT–railroad projects will benefit from this lesson. It will be especially beneficial to executive-level personnel seeking to improve their overall project management process and streamline their interaction with their railroad or agency counterparts.

Topic 1. Formalizing Communication

Effective project management practices involve detailed project planning efforts, including the preparation of detailed schedules, identifying items critical to the successful delivery of the project, incorporating provisions in the plans and schedules, and ensuring that all project members understand and follow through on the plan. Proper and timely communication and follow-up action are essential to good coordination and project management. Miscommunication and misinterpretation were identified by both parties as one of the challenges faced on projects. Railroad and agency personnel shared with the project team many instances of delays resulting from lack of clarity and delayed communication and coordination.

The most successful transportation agencies and railroads consistently formalized their communication process.

Project management practices focus on the close monitoring of all critical items to ensure they are completed as scheduled. Essential to good project management is the effective coordination of the various related tasks and activities to ensure that errors in one activity can be rectified and do not adversely affect related activities. For those items on a critical path, this coordination becomes very important. For projects involving multiple disciplines in various organizations, having regularly scheduled meetings ensures that the communication and coordination necessary to support good project management actually occur. The approaches adopted by successful agencies vary. Some use simple spreadsheets, and others use a range of software varying in complexity, either built in-house or bought off-the-shelf. The key is to understand that formal communication and project planning help the internal and external coordination of activities necessary for successful on-time, on-schedule, and on-scope delivery of projects.

The format of the scheduled meetings, which include project updates, issue identification, issue resolution, and issue assignment for resolution, keeps both parties focused on achieving outcomes that they collaborate to define.

A principal challenge identified by both parties as a reason for delays are plan and design differences that are difficult and time-consuming to reconcile. Joint scoping meetings have been used successfully to address such challenges. This lesson discusses the benefits of early and regular communication, such as project kickoff meetings at the start of projects, pre- and postconstruction meetings, or formal points of concurrence at important milestones.

At a minimum, it is important to have concurrence at the preliminary planning stage, at 30% plan completion, at 60% plan completion, and at 90% plan completion. The time frame from the start of the project planning process to completion of the project depends on many factors, including funding, and can vary from a few years to 30 years. Formalizing these concurrence points ensures that all parties coordinate and communicate clearly through the project development and delivery process. Agencies such as North Carolina DOT and Florida DOT have been successful in using formal points of concurrence to ensure that all parties involved have a common understanding of project plans, designs, deliverables, and schedules.

> *"Having formal concurrence points during the project development process improves communication between the parties, enhances collaboration, and keeps the stakeholders abreast of changes that may impact the project. This in turn facilitates early response and action."* — Paul Worley, Rail Division Director, North Carolina DOT

Annual meetings provide an excellent opportunity for both parties to share short- and long-term plans for their respective organizations. Learning about these plans helps each party understand the annual priorities and important projects that the other has and provides some perspective on resource availability. The annual meeting is also a forum to discuss existing and projected challenges. For example, knowing that a railroad has a major expansion project will enable the agency to better plan for the use of railroad resources and, if required, collaborate on strategies to fill resource gaps.

RECOMMENDED STRATEGY

There is general consensus by stakeholders that conducting annual meetings with participation from both the railroads and the transportation agencies helps bring together the pertinent groups and build partnership.

Many of these formal communication techniques require some planning, but they are not difficult to implement. These proactive measures can minimize or sometimes eliminate angst as well as expensive delays.

Topic 2. Escalation Process

This topic discusses how to minimize delays when issues between the agencies and railroads reach an impasse. It discusses a formal process that is approved collaboratively by both parties to trigger communication about issues that reach an impasse up the chain of command in both organizations with decision points along the path to expedite resolution. Often escalation, which requires that issues be resolved by personnel with greater decision-making authority, is perceived by personnel who work on project issues as a reflection of their ineffectiveness. The reality is that personnel in the chain of command at different levels in an organization have different levels of authority to commit organizational resources. Beyond a given level, someone higher in the chain of command has to approve the commitment. The issue therefore requires escalation.

This topic discusses how escalation processes can be effective when used constructively to deliver products or projects on time and within scope and budget. It lists the following as common reasons for escalating beyond the personnel who routinely make decisions:

- Limitation in technical expertise;
- Limitation in authority to approve changes to the project scope, schedule, or budget;
- Need to commit additional resources to the project that are beyond the authority of those currently involved in the process;
- Schedules of personnel involved may not permit timely resolution of issues;
- Legislative, policy, and other regulatory changes required for issue resolution are beyond the charge or authority of personnel involved; and
- Need to get other internal and/or external parties involved in the decision.

Escalation procedures are effective if used constructively to deliver products or projects on time and within scope and budget.

The topic also discusses side benefits to developing an escalation process. Often the act of implementing a formal escalation process forces both organizations to focus on the common causes of delays. The effort also serves to bring attention to public projects involving the railroads and the agencies that otherwise may not be a big area of focus at senior executive levels in either organization. This recognition often results in greater appreciation and support from senior decision makers for the staff working on these projects.

An unintended but valuable outcome of this effort is process streamlining that highlights inefficiencies and redundant steps that can be eliminated. It also reveals missing activities that need to be included. The outcome is improved processes and practices in both organizations, which by itself results in fewer issues being escalated and the majority of the issues getting resolved at the lowest level of decision making. Agencies have successfully used escalation processes to resolve issues and expedite the achievement of important milestones.

"Setting up escalation procedures streamlines and expedites the resolution of issues."—Ahmer Nizam, Manager, Utilities, Railroad and Agreements, WSDOT

A formal escalation process requires personnel at each level of the escalation chain to either make decisions or move the issue up the chain of command for resolution.

The topic discusses the following steps in the escalation process:

1. **Activity identification.** The types of activities that will use the escalation process are identified. These are often major activities that are important to either party and for which delays can cause disruption to services, inconvenience the public, or prove costly. Examples are agreement processing, project reviews, plan and design approvals, project construction, and reimbursement of costs.
2. **Work flow detailing.** This step involves detailing the work flow for each of the activities identified for escalation. The work flow will show the process and people from both

organizations involved in making decisions in the work flow process. It requires the two organizations to think through and assign responsibility and authority appropriately at each level of the escalation process to ensure timely action.

3. **Escalation triggers defined.** The factors and actions (or lack of actions) that will trigger the escalation to the next step in the escalation chain are defined. The period of time after which escalation to the next steps will occur are also defined in this step.
4. **Actions at each escalation level.** This step details the actions that persons at each level of the escalation chain are required to take when they receive the issue for resolution. It will include the process for communicating the resolution down the chain of command and for moving unresolved issues up the chain of command.
5. **Continuous improvement.** Both parties will review and update the overall escalation process regularly. This review often occurs annually at the end of the construction season. The time for review and update is decided by the two parties involved.

The success of this strategy depends on both the transportation agency and the railroad agreeing to have higher-level managers available for meetings and discussions to resolve issues expeditiously.

The topic includes a case study that discusses the escalation process implemented by WSDOT and BNSF in 2006. A review of this escalation process showed that between 2006 and 2011 the streamlining implemented by WSDOT and BNSF worked very well, resulting in less than 1% of issues requiring escalation. The formal escalation process was developed to address issues between WSDOT's Environmental and Engineering Programs Division and BNSF. The process defines various activities and steps beginning with the identification of the need for a construction and maintenance agreement to obtaining approvals and signatures. The process also includes the expected time for each activity to occur before it gets escalated to the next step.

Figure 5.6. Escalation process with four levels of resolution.

The four levels of escalation described in the WSDOT–BNSF case study and illustrated in Figure 5.6 are as follows:

Level 1 of resolution. This level involves the railroad liaison at WSDOT headquarters and the BNSF public projects manager. They work to resolve all issues on agreement processing that routinely come up between the agency and BNSF. In the event that an issue does not get resolved, the agency headquarters liaison and/or the BNSF public project manager can resort to a formal defined escalation procedure that moves the issue to the next level in the escalation process. This escalation to Level 2 normally occurs if issue resolution does not occur within 21 days of submission of the first draft of the agreement to the railroad.

Level 2 of resolution. This level involves review and action by the assistant director of public projects in BNSF and the state design engineer in WSDOT. If progress is not made after 14 days of escalation to Level 2, the issue is escalated to Level 3.

Level 3 of resolution. Level 3 involves the director of environmental engineering programs in WSDOT and the general director of commuter construction in BNSF. Issues not resolved at this level in 10 days are escalated to Level 4.

Level 4 of resolution. This level of resolution involves the assistant vice-president of engineering in BNSF and the assistant secretary of transportation in WSDOT.

The formal escalation process adopted by BNSF and WSDOT resulted in frequent and open communications between the two organizations. It led to efficient processes and improvements in routine practices that resulted in the escalation of only issues with agreements that required higher levels of authority to make decisions. WSDOT attributes this formal escalation process to reducing the time to process complex agreements from several years to 31 weeks. The implications of the improvements are significant due to the fact that close to 75% of the WSDOT railroad projects are with BNSF. WSDOT notes that from 2006 to 2011, because of the streamlining that occurred in the implementation of the escalation process, less than 1% of issues were escalated.

> *"The engagement and approval of the CEO or senior leadership provides the support and buy-in necessary for the successful implementation of effective escalation."*—Kamie Young, Public Projects Manager, BNSF Railroad

Topic 3. Dedicated Project Manager

This topic discusses how a railroad project manager, dedicated to an agency and paid for by the agency, can facilitate the timely communication, coordination, and resolution of issues on projects involving the agency and the railroad. Earlier lessons discuss the business models of railroads and agencies and touch on the fact that railroads are private, for-profit entities for which the primary focus is on the business of moving freight. The organizational structure of the railroad companies is optimized to do railroad projects. Depending on the type and complexity of the highway projects that involve the railroads, several (if not all) divisions of a railroad company may have some involvement with public projects.

The requirements and interactions between the agencies and the railroads vary based on the number of projects and the stage of projects. Railroad public project managers do not devote all their time to one project or one state; they handle multiple public projects in multiple states at the same time.

From the railroad's perspective, receiving and responding to communications and coordinating requests for input on projects and services from multiple states, and sometimes from multiple persons from one state agency, can be time-consuming. Transportation agency personnel working on projects involving the railroads have attributed the busy schedules of the

railroad public project manager as one of the reasons for long turnaround times on the review of project submittals. Often delays can result in excessive cost overruns on projects. The railroads understand the agency perspective that sometimes review backlogs delay transportation agency efforts. However, often the agency requirements are fluid. Projects that were active are put on the shelf after months of review. Similarly, projects are pulled off the shelf after years of inactivity. Prompt action and follow-up on agency needs require dedicating railroad resources, but railroads cannot add temporary workers to address these unplanned ebbs and flows in resource requirements.

Decision to Have a Dedicated Railroad Project Manager

Understanding the complexities and resource limitations faced by the railroads, some transportation agencies have created the position of a dedicated railroad project manager (DRPM) to work for an agreed-on period of time on their projects only. Having an objective methodology to assess the benefit and justify the need for a DRPM can help the decision-making process for a transportation agency. It is easier to see the benefit when a transportation agency is dealing with one railroad on multiple projects and the assigned railroad public projects manager is simultaneously handling projects in other regions and states and cannot devote the attention needed for timely actions. In other circumstances, such a benefit might not be as easy to recognize.

The savings from expediting reviews and delivering projects on time and avoiding cost overruns often more than pays for the cost of a dedicated railroad project manager.

Analyzing the cost of paying for a resource to dedicate time to the agency's projects versus the cost of delays is one way to help decide whether to have a DRPM. Another factor to consider is the savings achieved by reducing the consulting and staff time spent on the internal coordination required for the multiple reviews and extended communication often needed for the agreement processing and plan and design reviews. When projects critical for the state and the community are involved, total costs including savings to the public, the impact on state commerce, and other intangible benefits can be considered in the decision.

When opting to have a DRPM, it is important to explicitly define his or her roles and responsibilities. The topic highlights the following as responsibilities that should be considered for a DRPM:

- Oversee public agency construction and maintenance agreement processes;
- Plan and schedule meetings between the railroad and transportation agency;
- Act as a liaison between the agency and the railroad attorneys;
- Manage the escalation process and expedite issue resolution;
- Maintain the project plan and ensure key milestones are being achieved to keep the project on track;
- Develop and distribute status reports on a regular basis to keep the agency and railroad management informed; and
- Ensure that the proper sign-off of key documents, approvals, and agreements is being performed.

Sharing a Dedicated Railroad Project Manager Between Agencies

Financial or other constraints may not make it feasible for a transportation agency to pay for a DRPM. In other instances, the workload for assistance from such a resource may be sporadic, requiring significant activity from the DRPM only during certain periods of a project's life cycle. In some cases, multiple transportation agencies collaborate to pay for a DRPM. Two nearby state agencies working with the same railroad, for example, could collaborate and fund a DRPM position. This arrangement can reduce, if not eliminate, the delays and long turnaround times associated with a railroad public project manager working with multiple agency personnel within and among multiple states. The general responsibilities of the DRPM serving two agencies are similar to those discussed earlier; however, the authority to revise the responsibilities will rest with the agencies and the railroad involved.

A multiagency dedicated railroad project manager can be a cost-effective alternative for neighboring transportation agencies, especially when the number of railroad projects is sporadic and the project workload varies.

This topic discusses the following benefits of a shared DRPM arrangement:

- The partnering agencies can collaborate on developing standard agreements, processes, and practices for arrangements and work between their agency and the railroad;
- Information exchange between the agencies on successful practices and lessons learned can help them improve both internal processes and those with the railroad;
- The collaboration provides an opportunity for agencies to have time-saving similarity in negotiations, designs, and agreements on projects; and
- The partnering agencies can implement common templates or master agreements and adopt common processes that reduce the review time for the railroads.

The topic identifies the following steps that the parties will need to accomplish to maximize the benefits from a multiagency collaboration:

- The representatives of the partnering agencies and the railroad must identify, approve, and sign off on the responsibilities of the DRPM;
- An addendum for each agency must identify the project management strategies, progress of activities, and strategies for issue resolution for each of the agencies;
- The DRPM will meet with each of the collaborating agencies in rotation on an agreed schedule; and
- If serious issues require more DRPM attention in one agency for a short period, the collaborating agency liaisons can negotiate temporary schedule changes.

Topic 4. Leveraging Experienced Design Personnel

Agency designs deviating from the railroad's design standards are a major concern for railroads. Related discussions, negotiations, and design revisions can delay agreement sign-offs and project delivery. With a focus on expansion and safety, the railroads have established strict design guidelines as they relate to clearances, slopes, and piers on grade-separated structures, as well as on construction along the railroad right-of-way. Understanding these requirements and addressing them in a timely manner are important to ensure that designs are acceptable to both parties, or costly delays can occur.

Design firms with railroad experience understand the specific intricacies of working with railroad projects, which helps to ensure that designs are acceptable to both parties, avoiding costly delays.

Much of the engineering and design work on highway projects is done by qualified consultants, although in some cases, in-house agency personnel may be involved in these tasks. Though state- and federally funded projects generally require a qualifications-based selection process for consultants, a firm that is qualified for highway work may not have extensive experience with railroad coordination and design standards. In addition, local public agencies using local funds tend to select local firms that may have little experience in railroad design requirements and coordination.

To exacerbate this issue, there is no single reference that provides guidance on construction of projects involving highways and railroads. Most prequalified design firms are experienced with AASHTO's 2011 national highway design manual, *A Policy on Geometric Design of Highways and Streets*. But this reference, which is the national standard by which highway design engineers are trained, provides minimal guidance on projects involving railroads.

Firms with explicit experience working with railroad and highway designs are in a better position to understand the requirements of both parties and therefore are more likely to complete designs that are acceptable to both parties without having to undergo lengthy and repetitive reviews. Many railroad officials consulted for this project suggested that transportation agencies should select firms for project development based on their explicit experience with the railroad involved. They noted that such expertise can compensate for the lack of published design standards, as well as more nuanced design requirements that may be necessitated by the location of the project. Firms that have undergone repeated project reviews with specific railroads are more likely to have experience with the unique design requirements of an individual railroad.

Topic 5. Develop Manuals for Railroad Projects

Earlier lessons discuss transportation agencies' concerns about losing institutional knowledge through retirements, attrition, and promotions. This loss of knowledge can cause delays in all aspects of the processing of submittals and the delivery of projects. To address this problem, agencies have made a practice of developing design manuals and design policies. Some state highway agencies, such as the Texas, Washington State, and Ohio DOTs, have created sections in these design manuals that specifically address the necessary submittals and procedures for

railroad projects. These institutional practices are devised to ensure that most typical types of project impediments are clearly anticipated and addressed in each submittal to a railroad.

These manuals provide guidance, detailed processes, and the roles and responsibilities of all agency personnel working with railroads. When these manuals are predicated on the standards and provisions considered by the railroads in the routine conduct of business, they can reduce the time for reviews between the agency and railroads. By incorporating the appropriate sections of the state agency manual into the contracts of consulting engineers who are selected to produce plans for railroad–highway projects, the transportation agency can provide direction and ensure consistent compliance across projects, thereby further expediting reviews of submittals.

This topic highlights some of the key aspects covered in the Texas DOT's manual, which provides guidance to agency personnel working on railroad projects and is intended to improve the interaction with the railroads. On Union Pacific bridge projects, the Texas DOT has 91 paragraphs of instructions intended to ensure that DOT bridge projects are predicated on the railroad's unique requirements. Such internal guidance to agency personnel prepares them and provides a consistent approach to working on projects with the railroads.

> *"Developing agency manuals that fully document processes and expectations ensures that the most typical types of project impediments are clearly anticipated and addressed in each submittal to the railroad."*—Paul Worley, Rail Division Director, North Carolina DOT

Topic 6. Metrics to Support Process Improvements

This topic discusses a methodology for improving the process work flow used by transportation agencies by implementing performance measures to help them establish and achieve incremental targets. One of the challenges identified during the research phase of the project was the inability to quantitatively gauge the extent and impact of issues such as delays.

By collaboratively establishing performance goals and metrics, agencies are able to monitor their performance relative to their identified goals and make improvements continuously. This continuous quality improvement cycle can be applied to internal processes, as well as to improving the processes between railroads and agencies. This topic discusses one approach to identifying and streamlining processes that improves the working relationship between the two parties.

The steps for establishing metrics include the following:

- Identify areas to measure;
- Establish performance goals and metrics for the areas identified;
- Identify the major activities necessary to meet the goals;
- Identify the personnel and the roles and responsibilities of personnel involved in achieving the goals;
- Collaborate with the process owners to improve processes and implement mechanisms for monitoring and tracking the performance of each goal;
- Meet to review results;
- Incorporate lessons learned for continuous improvement of the process; and
- Update processes and revise goals and metrics appropriately for the next cycle.

This topic provides a case study of the Florida DOT's quality improvement process and discusses the following six major steps:

1. Quality assurance preparation,
2. On-site review,
3. Post-review feedback,
4. Development and implementation of improvement actions,
5. Dissemination of information, and
6. Monitoring of actions.

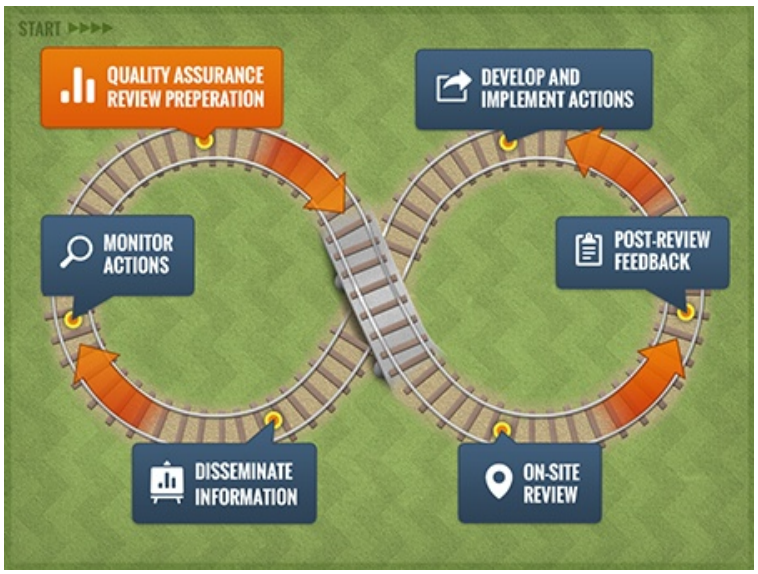


Figure 5.7. Continuous quality improvement process.

These continuous improvements steps, which are illustrated in Figure 5.7, can be applied to any process if both parties are willing to collaborate to implement them.

Topic 7. Railroad Project Review Process

Like transportation agencies, most railroads have a standard process for review and approval of plans and agreements from transportation agencies. Though each railroad may have slight variations in its process, having an understanding of the railroads' general review process can help the coordination and communication between the parties, at least at the critical points in the review process.

This topic discusses a 13-step general work flow. The work flow shows that after receiving an initial inquiry from a transportation agency, a railroad goes through several internal rounds of discussion, review, and feedback. If there is a need for preliminary engineering review, the agency will be given an estimate of the cost of the review. After receiving the sign-off to conduct the preliminary review, the railroad will approve an engineering firm that does such work for the railroad to complete the review. The engineering report is circulated for internal railroad review. Feedback received is incorporated, and an updated report is sent to the railroad. The feedback will include initial comments about project concept and scope and will seek clarifications on aspects that are unclear or are areas of concern.

RECOMMENDED STRATEGY

The key for most railroads is that a preliminary engineering agreement be fully executed to implement the professional engineer review process.

The 13 steps listed below reflect the general work flow for railroad project review, approval, and completion; the work flow will vary across railroads:

1. Railroad receives initial submittal or project inquiry from transportation agency.
2. Railroad is internally notified of preliminary project inquiry.
3. Railroad provides agency with a summary of internal comments and need for professional engineer work.
4. Agency provides a receipt of agency preliminary plan and agreement for railroad to proceed with professional engineer work.
5. Railroad provides agency with feedback based on engineering firm review and internal feedback.
6. Agency notifies railroad that final plan is received.
7. Railroad provides agency with an estimate of engineering firm review cost for approval.

8. On receiving agency approval, railroad authorizes engineering firm to review final plan, followed by submission of the reviewed and internally approved final plan to agency.
9. Railroad provides agency with the cost of force account work, other costs, insurance, and other provisions for inclusion in the project agreement.
10. Agency and railroad sign project agreement.
11. Agency awards project.
12. Project construction begins. Railroad provides agreed services, inspects work and safety, and monitors compliance.
13. Railroad provides agency with final inspection, compliance results, and final billing.

By understanding the overall processes that the railroads use in the review and approval of plans, transportation agencies can be prepared to act. Agency staff can make sure that the coordination, communication, and exchange of information is timely and that appropriate follow-up action is taken to address issues.

Understanding the railroads' project review process provides a better appreciation of the activities and internal coordination involved. It also reduces the expectation that impromptu requests for plan reviews and approvals are not feasible.

Topic 8. Standardizing Permitting Process for Access to Right-of-Way

As discussed in earlier lessons, safety around the tracks and in a railroad's right-of-way is one of the highest priorities for the railroads. To protect themselves and others, the railroads use right-of-way agreements to ensure the safety of personnel on and around the railroad right-of-way. Depending on the details of the access, a railroad may have to provide flaggers to direct railroad traffic and ensure the safety of the personnel at the site. The right-of-entry permits for projects enable the railroads to track the impact of project activity and manage the movement of trains in the vicinity of the project and as appropriate in the corridor. Right-of-way agreements also serve to meet the federal mandate that railroads track activities in and around the railroad tracks. This permitting mechanism ensures that all encroachments to the right-of-way are tracked and can be properly reported.

Railroads use right-of-way agreements to ensure the safe movement of trains and the safety of personnel on and around the railroad right-of-way.

RECOMMENDED STRATEGY

Having the right-of-entry permit, the insurance approved by the railroads, and appropriate flagging protections will expedite access to the railroad right-of-way.

This topic also lists situations for which CSX requires right-of-entry permits. These include

- Bridge inspection,
- Engineering,
- Ground water sampling,
- Remediation,
- Soil sampling,
- Staging areas,
- Surveying,
- Sediment sampling,
- Monitoring, and
- Geotechnical soil boring.

Most Class 1 railroads have developed procedures to facilitate emergency requests for right-of-entry permits. The lesson includes the steps for "rush processing" of permits for right-of-entry to Union Pacific property. These application forms can be downloaded from the railroad's website.

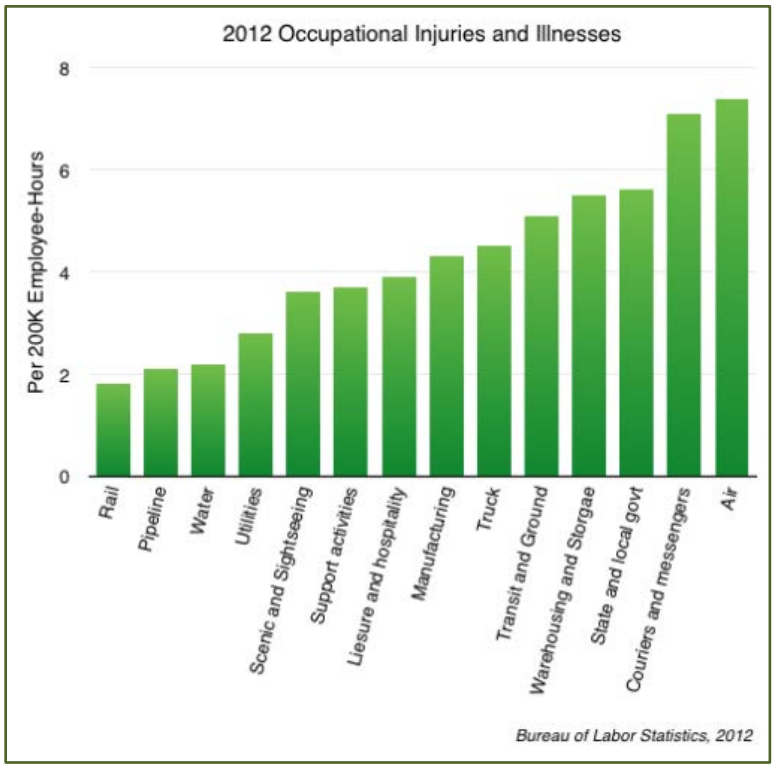
Lesson 6. Safety Orientation for Highway Personnel

Lesson 1, A Primer for Executives, provides a brief discussion on safety. Lesson 6 expands this discussion to safety practices pertaining to working around railroad tracks and provides an appreciation for some of the safety requirements established by railroads. By giving insight into railroad safety requirements and the reasoning behind them, this lesson is helpful to transportation agency personnel working on or close to railroad tracks. It provides the railroad

companies' perspective as to why permits are essential and why they insist on safety training for agency and contractor personnel. This lesson is an orientation rather than a comprehensive training program on railroad safety requirements or a substitute for formal railroad safety training. Readers are encouraged to refer to detailed safety manuals and specific safety requirements if they need formal safety training for working on or around railroad tracks. Highway construction and maintenance personnel will benefit most from this lesson, which covers important information to caution agency personnel working around railroad tracks and make them more vigilant.

Topic 1. The Need for Extra Safety in the Right-of-Way

This topic highlights the differences in the perspectives and approach of highway maintenance and construction personnel from those of corresponding railroad personnel. Routinely, while working on projects, highway and construction personnel move freely around the highway project site. They often drive on and off construction sites and onto adjacent rights-of-way around the project site. This topic highlights that a similar approach would be unsafe around a railroad track as the environment is significantly different with potential to cause a catastrophic accident.



Source: Bureau of Labor Statistics.

Figure 5.8. Occupational injuries and illnesses in 2012, by transportation sector.

Because trains use the same tracks to travel in both directions, railroads cannot allow construction in active rights-of-way without strict safety procedures and monitoring the

contractor's activities. This factor influences the approach that railroads use when dealing with highway construction and maintenance activities within or adjacent to their rights-of-way. When dealing with railroads, transportation agencies and their contractors face complex construction requirements, narrow construction windows, and absolute indemnification requirements. These requirements are generally more restrictive than the requirements highway agencies impose on themselves or their contractors. To highway officials unaccustomed to dealing with railroads, these requirements can seem onerous and expensive. However, imposing such restrictions is well within the rights of the railroad, and the restrictions are understandable when past construction catastrophes are analyzed. The safety measures taken by the railroads have resulted in a significant decrease in injuries.

Although the railroads transport a small percentage of all hazardous materials, individual train tanker cars can carry large volumes of chemicals, and when they crash they are subjected to intense forces and heat caused by sparks, friction, and impact.

A case study included in the topic shows that railroads are among the safest industries (see Figure 5.8). The case study states that train accidents fell 80% from 1980 to 2012, the rail employee injury rate fell by 85%, and the grade-crossing collision rate fell by 82%. The oversight provided by FRA ensures that every aspect of railroad operations is scrutinized, making railroads particularly sensitive to achieving excellence in safety performance.

The topic includes a video from FRA safety director Ron Reis on his perspective on safety around railroad tracks. It also discusses the risks that railroads take when carrying hazardous cargo and how these risks have led to railroads requiring liability limits of up to $25 million for some projects, particularly ones that could affect passengers or populated areas.

Understanding the implications of safety around railroad tracks, states such as Illinois, Ohio, and Florida routinely incorporate higher liability limits as a standard provision in specifications for contractors bidding on roadway projects associated with railroads. When appropriate, these and other states have reached accommodations with local FHWA division offices to routinely approve the higher limits, thereby providing the railroads the higher insurance protections their attorneys require. These steps increase the railroad's likelihood of more quickly accepting the insurance provisions within the project agreements. Both Kansas City Southern Railway and BNSF offer riders on their insurance coverage to contractors. The contractors can buy short-term coverage for projects that interact with these two railroads. This provision allows contractors to quickly identify an insurance carrier and to work with a carrier that is familiar with and acceptable to the railroads.

Topic 2. Permits and Coordinating the Access to the Right-of-Way

This topic discusses the safety aspects of working around railroads. Although to transportation agencies the railroad requirements can seem onerous and expensive, they have strong justification. The Accidents Report Act of 1910 required railroads to report accidents. Currently the FRA administers the reporting of accidents and incidents required by the law, along with regulations that require railroads to track and monitor activity around railroad tracks. Data from these reports indicate that the majority of the accidents and fatalities involved people not at highway–rail grade crossings but on or around other parts of the tracks. Because of these statistics and federal requirements, railroads are highly sensitive to people working on or near the railroad tracks. To minimize accidents, as well as to comply with FRA requirements, railroads require permits to access railroad rights-of-way. For the transportation agency, these statistics and requirements mean that the sense of safety and precautions taken by agency personnel and contractors working around the tracks need to be appropriately heightened.

The permits initiate the process the railroads use to analyze the impact of the project on the movement of trains and on the personnel working around the tracks. Permits allow them to coordinate activities of train movement at the project location with the railroad's roadmaster and to address safety concerns. The permit process also initiates action within the railroad to review and provide feedback on the locations and plans of utilities around the area of work that need to be considered.

The majority of railroad accidents and fatalities involve people who are walking or working on or around the track. To minimize accidents, as well as to comply with FRA requirements, railroads require permits to access railroad rights-of-way.

With railroads having to manage thousands of miles of railroad tracks, the request for a permit is also a mechanism for them to be aware that someone will be working on a project on or around a specific section of track. It serves as a cross-check to inform and make various railroad personnel aware of activity occurring on that segment of the track.

Topic 3. Role of Flagger

Flaggers are specially trained and certified personnel responsible for ensuring the safe movement of the trains and the safety of personnel working around, on, over, or under railroad tracks or property. Prior to approving an entry permit, the railroad analyzes the impact of the project activity and approves a schedule that will ensure the safe conduct of the project while

minimizing the impact on train movement. Flaggers play a key role in this coordination, as they allow for the safe passage of trains on the tracks while the project work is being conducted.

The role of a flagger is not to regulate trains but to ensure that personnel working around active tracks are safe and trains pass through work zones safely and without delays.

The flagger is critical to ensuring that proper communication takes place with the agency personnel around the work site during the time of construction. This topic discusses the roles and responsibilities of a flagger and the procedures that agency personnel have to follow when working around the tracks on activities that require the services of a flagger.

Topic 4. Protecting Against Derailment

Train derailment can have a significant impact not only on the safety of personnel and trains, but also on surrounding communities. This topic discusses some of the causes of derailments and the safety measures railroads take to mitigate such incidents. Derailments are a major area of safety concern for the railroads. Derailment can occur due to several reasons, and the railroads try to mitigate the root cause of each. Highway construction projects can result in debris on the tracks, rail bed slumping, impacts to track integrity due to undercutting, and fouling of tracks, any of which can cause derailments. The implications can be catastrophic to people, railroads, and surrounding communities if the train is carrying any hazardous materials.

The topic highlights the following as some of the common causes of train derailments:

- Track defects such as broken rails or bad cross-ties;
- Roadbed defects such as drainage issues;
- Debris on the railroad track;
- Improperly maintained, worn, or defective switches, guard rails, or frogs;
- Construction or other equipment obstructing the train in the railroad right-of-way;
- Railroad equipment defects, such as defective wheel flanges on the train’s railroad cars; and
- Collision with vehicles, people, or equipment around the tracks or at crossings.

Examples of train derailments show the operational issues related to these incidents. The topic also provides a brief summary of the operational impact, including the delays and the time it takes to reinstate the use of the track if a derailment occurs. The unavailability of the track affects the delivery of shipments. Derailments also cause bad publicity that can negatively affect

the company's reputation. These various consequences can result in penalties and loss of business for the railroads.

To prevent and proactively mitigate the causes of derailment accidents, the railroads take several measures, including strict safety control and frequent track inspections. When working with transportation agency projects, the railroads incorporate fairly detailed contractual provisions into agreements to mitigate the potential for derailments. This topic highlights some of the safety measures that are written into agreements with transportation agencies.

The emphasis on safety and the measures taken by the railroads to ensure the integrity of vast miles of tracks have limited the number of derailments over the past decade.

Topic 5. Construction Work Around the Railroad Tracks

This topic discusses aspects pertaining to the safety of construction personnel working around the railroad tracks. Highway construction projects typically involve the use of heavy equipment that, if not properly managed, can be a safety hazard to trains. Railroads are cautious and concerned about equipment being around the railroad property, and they want to ensure that heavy equipment is at a safe distance from the track so as to not undermine the integrity of the rail bed. They also want to make sure that equipment is being operated safely and does not compromise any safety requirements. A moving train may be unable to avoid equipment close to the rail track as a result of line-of-sight issues, the time it takes for a moving train to stop, or other reasons. Equipment left behind after the day's work can also pose problems for night trains. Flaggers are integral to making sure that equipment around the track is moved to a safe distance sufficiently in advance of an approaching train.

Railroads are also concerned about heavy equipment hanging high above the tracks. The possibility of a hanging crane falling on the track or on a train is real, making it important to place the cranes at a safe distance and manage the crane operations to avoid any accidents.

The topic highlights the provisions that railroads have included in agreements to address such safety concerns. These provisions include the following:

- Equipment shall not cross tracks without approval;
- Equipment and materials shall not be stored on railroad property without approval;
- Materials cannot be hauled across tracks without written permission;
- The railroad will inspect and approve construction on its property;

- Erection, demolition, and hoisting cannot impede the railroad operating envelopes and must be conducted with the approval of the railroad engineers; and
- Assurances must be provided that equipment, materials, and other items do not interfere with the operating envelope.

Railroad safety engineers must be assured that when project work occurs around active tracks, the track can be restored to service within minutes if necessary.

The topic includes a case study that demonstrates how demolition work above a railroad track could have resulted in train derailment.

Topic 6. Impact of Utilities in the Railroad Right-of-Way

Railroads interact with multiple organizations such as utility companies, telecommunication companies, and public agencies that lay underground high-pressure gas pipelines, fiber optic cables, and other pipes and cables. Working in and around the railroad right-of-way without detailed and up-to-date knowledge of these types of buried utilities is not safe. This topic discusses how the railroad and agencies have to routinely interact for maintenance, addition, or replacement of culverts and pipes on existing and new roads.

Agencies have large numbers of culverts and pipes that carry water beneath roads and integrate with adjacent private and public drainage systems. Many of these systems are on or around railroad rights-of-way. The topic touches on the impacts of cave-ins caused by borings or flooding of drainage systems on the integrity of the tracks.

The topic also discusses the guidelines and procedures that railroads have to address utilities in their right-of-ways.

The Virtual Library

The virtual library, the second major product in the web suite, was developed to provide users with seamless and easy access to its various resources (see Figure 5.9). The library houses examples of best practices, manuals, and agreements from both railroads and transportation agencies. It includes a range of resources that can assist transportation agencies and railroads to collaboratively work on projects. The intent of the library is to provide access to current information on best practices in the nation and thereby facilitate their adoption on a national scale.

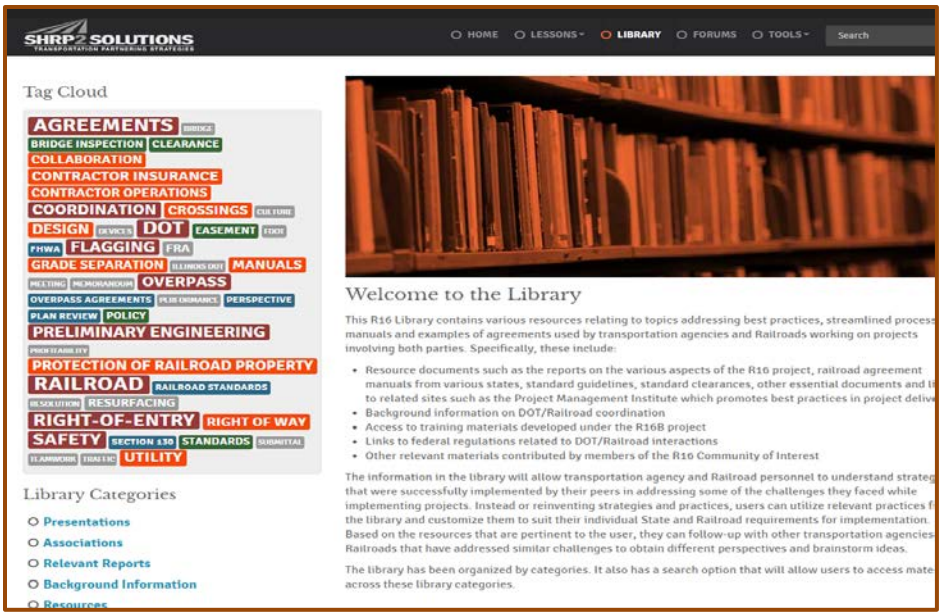


Figure 5.9. The virtual library home page on the Collaborative Solutions Suite.

The information in the library will allow transportation agency and railroad personnel to understand strategies that have been successfully adopted by their peers in addressing some of the challenges they faced while implementing projects. Instead of reinventing strategies and practices, users can customize relevant practices from the library to suit their individual state and railroad requirements for implementation. They can also follow up with other transportation agencies and railroads that have addressed similar challenges to obtain different perspectives and to brainstorm ideas.

Library Design

The design and navigation of the library take into consideration that users may be novices or experts and that the content being accessed is heterogeneous in nature. The material added to the library has been tagged to make it easy for users to access in multiple ways. Users have three options to search for topics: they can search (1) by the most tagged topic, (2) by categorization of the subject, and (3) by inputting text.

Library Content

The materials in the virtual library include various documents broadly separated into the following categories:

- Background materials;
- Examples of agreements;
- Examples of state best practices;
- Links to or lists of various personnel in the railroads and state transportation agencies who work on projects involving the two parties;

- Railroad resources, guidance, and design standards; and
- Website links to resources that will assist the railroad and transportation agencies as they work on projects involving the two parties.

The library contains multiple documents in each of the above-listed categories.

Accessing Library Resources

The resources in the library are categorized to make search and retrieval easy for users. The three access options available to users are by

1. Category tree,
2. Tag cloud, and
3. Word search.

Category Tree Selection

The left panel of the library home page shows all the categories of resources available in the library. These resources are grouped by major categories and presented in a tree structure with subcategories shown below main categories. The hierarchy of the categories is visible to make selecting categories easy for the user. To access resources related to a specific category, users select that category in the category tree. They can also view and select the specific resources available in the subcategories. A listing of resources within the DOT manual category is shown in Figure 5.10, and Figure 5.11 shows the category tree.

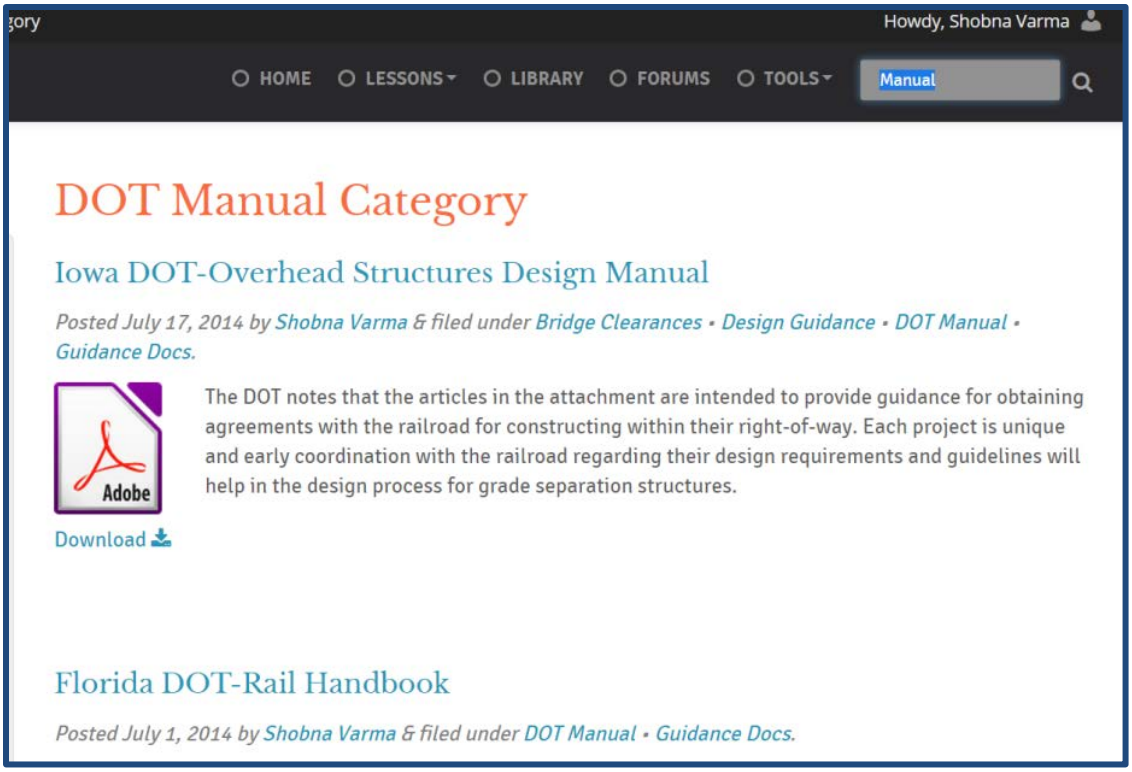


Figure 5.10. Listing of resources within the DOT manual category on the Collaborative Solutions Suite.

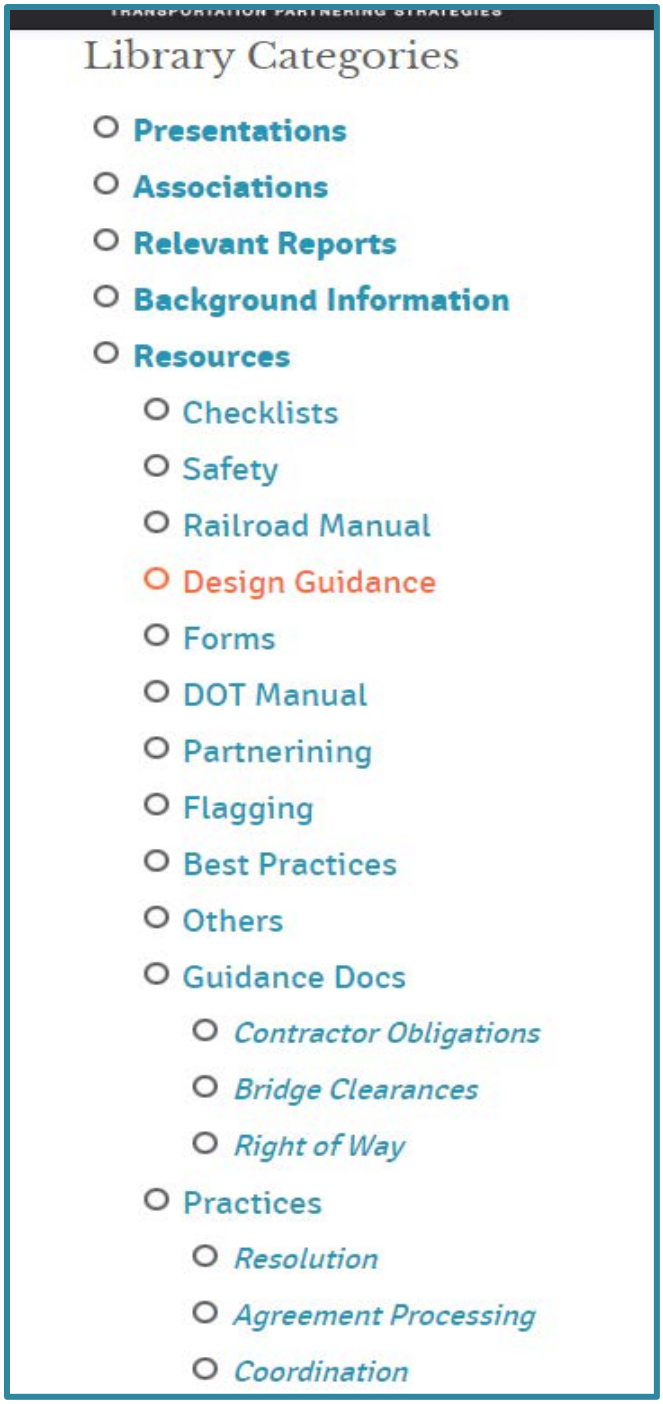


Figure 5.11. The category tree on the Collaborative Solutions Suite.

Tag Cloud

The resources in the library have been tagged in multiple ways to make the search and retrieval of documents across categories easy for users. The tag cloud shows the most common tags. The size of the tag in the tag cloud reflects how many resources are associated with that tag.

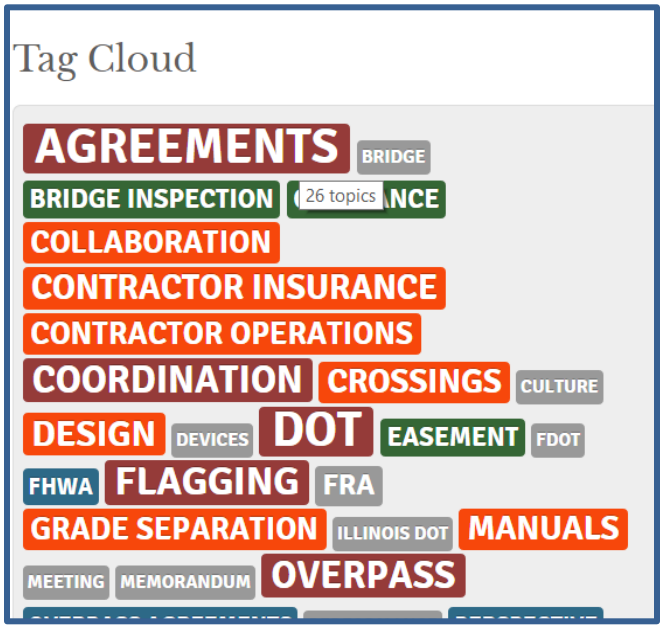


Figure 5.12. The tag cloud on the Collaborative Solutions Suite.

By hovering over a tag, a user can see the number of times a word is associated with resources in the library. For example, Figure 5.13 shows that 26 resources have been tagged with "agreements." By selecting a tag, a user can access the resources that are associated with that particular tag.

Text Search

Users can also enter text as part of their search criteria in the search box in the upper-right corner of the page. The text search option will present users with resources from the library and the lessons that meet the search criteria they have entered.

CHAPTER 6
Capitalizing on Products to Benefit DOTs and Railroads

Collaborative Environment

One of the most significant outcomes of the project effort has been the establishment of an unprecedented and game-changing environment of collaboration and partnering among transportation agencies and railroad companies. Since 2008, the project team has worked closely with both transportation agencies and railroad companies to develop win-win strategies. During the communication and collaboration phase of the project, the team made progress in fostering the creation of a collaborative environment through a community of interest (COI) of stakeholders. The COI had representation from one Canadian transportation agency, eight state transportation agencies, and federal agencies, as well as railroad companies that represent over 90% of the nation's freight movement. COI members actively participated in numerous discussions addressing areas of challenges and the successes achieved in addressing those challenges. Members participated in over 12 national efforts to communicate these successes, including making presentations and participating in panel discussions moderated by the project team.

The project innovations consist of proven strategies and practices that streamline the various activities involved in DOT–railroad projects. Many transportation agencies and their railroad partners have not been exposed to the innovations and opportunities for partnering to implement the solutions identified during the project. It is noteworthy that not one of these solutions has any negative impact on either of the parties, and in most cases the solutions benefit both parties.

DOTs and railroads alike have identified knowledge loss within their organizations resulting from retirements and attrition as a key problem. They have expressed the need to institutionalize the partnering approaches and streamlined processes identified in the project innovations as one of very high priority. They have unanimously expressed their opinion that doing so will help agencies to succeed in timely delivery of projects within scope and schedule.

Success begets more success.

The project team outlined the topics for training lessons based on discussions and input from COI members and survey feedback. The content was later expanded and validated through reviews and feedback from COI members and their representatives, railroad representatives managing activities with states not represented in the COI, and transportation agency representatives who were exposed to solutions at various outreach events. The lessons developed through these efforts (and detailed in earlier sections of this report) are now in a web-based suite

of products called the Collaborative Solutions Suite that includes project innovations lessons and a virtual library of resources compiled from participating transportation agencies and railroads.

Although the loss of experienced personnel has been expressed as a significant concern by transportation agencies and railroads, it also presents an opportunity for training personnel new to such projects in a collaborative way of doing business together. The Collaborative Solutions Suite can be used to capitalize on the unprecedented partnering environment that has been developed during the project by providing just such training so that new personnel may build from the collaborative environment that currently exists.

Suggested Approach

The challenges faced on projects vary across states depending on the state's regulations, the business climate, and the different railroads and their expansion plans within a state. The approach to enabling and expediting agencies and railroads to capitalize on the products for mutual benefit needs to be methodical. An iterative approach as illustrated in Figure 6.1 is suggested; the steps outlined in the figure are discussed below. The intent of this approach is to be systematic and to incrementally address a few issues at a time.

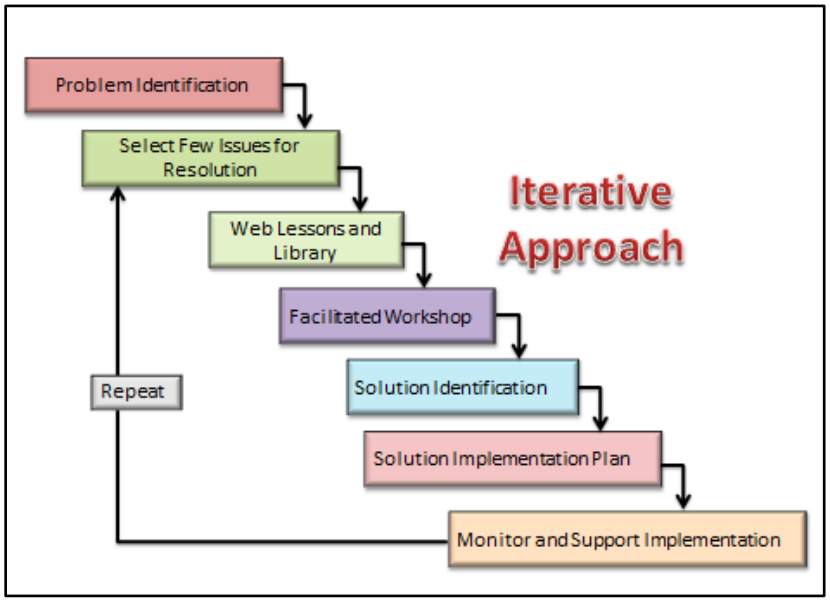


Figure 6.1. Illustration of suggested approach.

Problem identification. There are multiple strategies to identify challenges. A simple strategy is to interview one or two key personnel from the transportation agency and gather the information gained into a simple survey. Next, working with the transportation agency's point of contact, the survey can be deployed to a larger group of transportation agency personnel and to personnel from railroads that work with that agency. The results of the survey can then be analyzed and validated, and the issues that emerge can be prioritized.

Select few issues for resolution. In working with the agency point of contact and railroad, only a few priority issues are selected for resolution.

Web lessons and library. The teams are then directed to appropriate lessons in the Collaborative Solutions Suite and other resources in the library that address the issues selected. The data obtained will provide the necessary background material and allow the appropriate personnel from both the transportation agency and the railroad to understand each other's perspectives and be prepared for discussions.

Facilitated workshop. The facilitated workshop is a forum to discuss the issues and challenges and brainstorm potential solutions that could effectively address the issues and be acceptable to both parties. Options for implementation strategies can also be discussed at the workshop.

Solution identification. At the end of the facilitated workshop, the agreed-on solutions are documented and circulated to participants. Questions are addressed, feedback is incorporated, and the final document is circulated to participants.

Solution implementation plan. Based on implementation strategies discussed at the workshop and the solutions finalized and agreed on in the earlier steps, an implementation plan is developed. The plan is circulated, feedback from the stakeholders is incorporated, and a final implementation plan is delivered to the railroad and the state transportation agency.

Monitor and support implementation. The plan will have a schedule for various activities that need to be completed. Depending on the issue being addressed, the plan will have activities that each party will have to implement. The plan should be monitored and, as appropriate, additional support provided.

This approach will be repeated for all the high-priority activities. The phasing of addressing the next series of activities will vary. If appropriate, the next cycle can begin when significant progress has been made on the previous activities. Depending on the issue being addressed, some of the steps in the sequence can be skipped.

The advantage of this iterative approach is that it is methodical. It also provides flexibility by allowing each agency to choose to have success with simpler low-hanging fruit (for small wins) or to address more complex and important issues.

The implementation of the iterative approach described above can be improved by employing peer exchange sessions and in-person training. Peer exchanges in a facilitated forum that includes another transportation agency and/or railroad that has successfully implemented an innovation to address similar challenges can expedite the acceptance and implementation of a solution. Peer exchanges are most effective when they include parties that wish to address a challenge and another that has already addressed it. However, it is important to understand that solutions implemented by the successful peer participants in the session may need to be modified for application in another state. The role of an experienced and knowledgeable facilitator is the key to the success of peer exchanges and workshop sessions. Facilitators should be able to provide input that can help participants brainstorm alternatives and find hybrid versions of various implementations that will work for their state and railroad pair.

Both agency and railroad personnel are busy and often cannot take time to go over the training lessons. In addition, gaps in understanding may exist that require face-to-face discussions. A training strategy similar to that currently used in transportation agencies across the nation in developing asset management plans compliant with the requirements of Moving Ahead for Progress in the 21st Century will be helpful in addressing challenges presented by the objectives of this project. This strategy involves face-to-face to training on the major topics covered in the web-based training lessons. This face-to-face training creates a common understanding of the issues and potential solutions. The training can be stand-alone or can be in place of the web training discussed in the iterative strategy.

CHAPTER 7
Next Steps: Care and Feeding of the Products in the Future

The care and feeding of the products include keeping the lessons and the content updated to reflect current issues and solutions. It will also include keeping the contents in the library updated and ensuring that the COI is active and collaboratively engaged in healthy discussions and in finding win-win solutions to issues.

The relationship between transportation agencies and railroads is similar to the relationships between other organizations that have different objectives. In this case, the business differences are even more prominent because one is a public agency and the other is a private entity. The partnering and collaboration that have been established will need to be nurtured for a few years until the majority of the practices are integrated into daily activities and become routine, and partnering and collaboration become second nature to both parties.

The continuation and fostering of the collaborative environment are essential to facilitate and expedite the implementation of several of the project innovations to address most of the current issues being faced by the parties. Moving forward, one can realistically expect that (1) with the right support and facilitation, several of the common issues currently being faced by transportation agencies and railroads can be resolved, and the innovative practices addressing these issues can become part of routine activities; (2) some of the challenges may transform into other challenges; and (3) other new challenges will arise.

Keep Information Pertinent and Updated

Ensuring that the materials in the Collaborative Solutions Suite (lessons and library) remain pertinent is important. The contents in the virtual library will need to be regularly updated to reflect current solutions to the challenges faced by the transportation agency and railroad community.

Continuing the COI and supporting the continued collaboration and brainstorming of issues will help ensure that current successful solutions are included in the lessons and library. COI members should continue to be engaged in discussing issues and solutions. Resources should be allocated to facilitate the brainstorming of solutions to new challenges, and technical support and funding should be provided to championing and implementing these new solutions. The solutions can be improved through pilot testing and the incorporation of feedback from the results of such pilot testing and early adopter experiences. Using such feedback, existing training lessons can be updated, and new training lessons should be developed and shared nationally. Information and resources pertaining to the challenges and the related solutions should be added to the library. In-person training can be held to expose stakeholders to these new solutions. As appropriate, variations to the approach suggested in Chapter 6 can be adopted to meet specific needs and different situations.

Spread the Collaboration Systematically

To catalyze the successful adoption of best practices, the collaboration and partnering should be catapulted to the national level. Achieving a national scope will require that the collaboration that has been created between COI members is spread to a majority of states and to the major railroads in each of those states. The strategy proposed in the final report on communication and collaboration (*1*) can be very effective in spreading the environment of partnering and collaboration.

The report discusses establishing the COI that was formed as part of the present project as a central COI. With the right facilitation and support, this central COI could continue to keep alive the partnering and collaborative discussions between the stakeholders. The COI was created to intentionally include members from all AASHTO regions. The report recommends that new members be added to this group incrementally, in a way that will extend the collaboration to the new members. The report also recommends the creation of four regional COIs to represent the four AASHTO regions (or some variation of that model). These regional COIs would include members from the central COI that are part of that region. The regional COI discussions would allow for more states and regional representatives of railroads to participate.

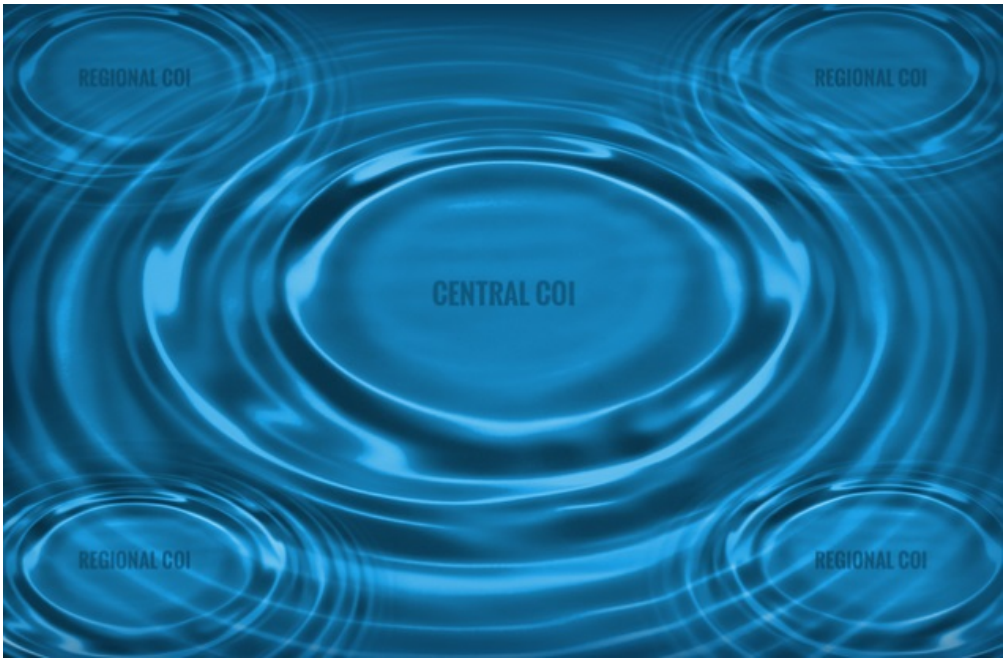


Figure 7.1. Central and regional COIs.

The interactive and collaborative model of central and regional COIs illustrated in Figure 7.1 will help create the necessary environment to discuss national issues, but it will also be conducive for the discussion of regional issues. One of the disadvantages of having a very large group is that having productive brainstorming discussions becomes difficult. The two-tiered approach ensures that all states get to participate in the conversations through regional COI discussions. Such regional groups will have fewer members, a situation which will allow for

more interaction and more members to contribute ideas and be heard. Successful ideas developed within these regional interactions can be recommended to the central COI for national dissemination and adoption.

When major issues are identified through the regional and central COI sessions, funding could be sought for technical support for identification and detailing of the problem and issue resolution. The solutions could then be incorporated as new lessons in the web suite of products, and materials addressing the new issues and all available resources on the topic could be added to the virtual library. The in-person training supported by the web lessons will accelerate the adoption of new solutions and help institutionalize the solutions.

FHWA has already considered the innovations identified by the R16 project as a candidate for support through its Every Day Counts initiative. If this initiative continues, a methodical process such as the iterative approach suggested in Chapter 6 should be considered. Rushing to get players engaged may not be the best strategy. The web suite of products should be treated like any other asset and be appropriately maintained, preserved, and enhanced.

Reference

Varma, Shobna, StarIsis Corporation, Gordon Proctor & Associates, Inc., and Michael L. Bradley & Associates, LLC. 2015. *SHRP 2 R16A Report: Communicating Railroad–DOT Mitigation Strategies*. Transportation Review Board of the National Academies, Washington, D.C.