

Using *Railroad-DOT Mitigation Strategies* Case Study



Photos courtesy: Arkansas State Highway & Transportation Department, Missouri DOT, Oregon DOT, and FHWA

Best Practices Developed through Implementing *Railroad-DOT Mitigation Strategies* (R16)

Implementation Has Led to Positive Results for Both DOTs and Railroads

Each year, transportation agencies construct hundreds of highway projects that cross over, under, or parallel to railroad rights-of-way, requiring extensive coordination between the organizations responsible for these structures. These types of projects can often add an extra layer of preconstruction reviews for safety, engineering, and operational impacts, increasing the time and adding costs to complete.

Both departments of transportation (DOT)s and railroads are facing challenges in bringing projects to completion within schedule and budget. Some of these challenges include limited funding to improve safety on millions of crossings; staff turnovers at both DOTs and railroads; and processes for delivery and training that need updates to meet the new realities, such as alternative contracting.

The implementation of the second Strategic Highway Research Program (SHRP2) product, *Railroad-DOT Mitigation Strategies* (R16), began in 2013 when seven state DOTs were selected to participate in Round 2 of the Implementation Assistance Program (IAP) sponsored by the Federal Highway Administration (FHWA) and Association of State Highway and Transportation Officials (AASHTO). Then, in 2015, another seven DOTs were added during Round 5; and in 2016, as part of Round 7, two additional state DOTs joined the effort. The FHWA Every Day Counts program also incorporated the product into its Round 3 effort.

Numerous workshops, webinars, and peer exchanges were held as part of the implementation, and various printed materials were developed and distributed. One of the most significant efforts was the development of a Community of Interest (COI), engaging 20 states DOTs, six Class 1 railroads, two large

What are *Railroad-DOT Mitigation Strategies* (R16)?

Thousands of highway projects intersect with railroad crossings. By using the tools included in *Railroad-DOT Mitigation Strategies* (R16), public agencies and railroads can identify and work through possible sources of conflict and develop agreements to advance these projects in a timely manner.

This product was developed through the second Strategic Highway Research Program (SHRP2) and takes a collaborative approach to identifying strategies to improve performance. The product includes case studies of best practices in developing master agreements, Section 130 program implementation, and working with railroads on design-build projects. An online Innovation Library houses examples from state departments of transportation and several Class 1 railroads of manuals, agreements, and other materials.

short-line railroads, representatives of the American Short Line and Regional Railroad Association (ASLRRRA), the Federal Railroad Administration (FRA), FHWA and AASHTO. The COI met by conference calls and in face-to-face meetings, shaping the program by suggesting specific topics and sharing their best practices to be included in webinars, meetings, and printed materials.

This case study documents many best practices shared and developed throughout the implementation. Generally, the best practices covered several topics all aimed at improving:

- Safety at railroad crossings,
- Project delivery through streamlined internal and scheduling practices, and
- Cost savings through smarter use of resources by all parties.

The best practices cover strategies to improve overall coordination, communication, and the project delivery processes, including alternative contracting methods; master agreements and documents; flagging; grade-crossing safety through use of Section 130 funds and new technologies; training and knowledge transfer; and administrative processes.

Strategies to Improve Coordination with Their Railroad Partners *(Related Full Report)*

- Coordinate at the project concept or early planning stages, particularly for any project that may create horizontal or vertical constraints on the railroad right-of-way or that may interfere, even briefly, with train operations. Initial coordination at the 30-percent plan-development stage may be too late.
- Establish basic project parameters at the earliest opportunity; railroads should provide comments at the preliminary design stage. In effect, the railroad will explain its standards in the form of a case-by-case project review. For example, overhead bridge structures may need to span beyond an expected two tracks to accommodate access roadways and these types of concerns must be identified as early in the process as possible.
- Identify the format and sequencing needed for internal reviews by the railroad to reduce the time needed for coordinated, fully considered comments. This review period may extend beyond 60 days unless carefully negotiated, clear processes are in place both within a DOT and a railroad.
- Identify one DOT and one railroad individual as the central point of contact, empowered to coordinate highway and railroad project issues. With them, establish ongoing formal communication channels between the highway agency and the railroad.
- Establish formal points of concurrence that include a formal escalation process to expedite agreement processing and project delivery, including agreed-upon regular points of coordination, review, and concurrence between the DOT and the railroad on projects.
- Provide dedicated personnel that are focused on reviews and agreements.
- Streamline DOT and railroad processes for construction projects by establishing which departments and/or agencies need to be involved and when they need to be involved.
- Schedule regular review meetings during which both sides review successes, challenges, and project status; hold preconstruction meetings so that the contractors, highway agencies, utilities, and railroads have common expectations for the construction project.

- To improve coordination with local officials, develop a simple presentation or overview that describes the approval process, and present it to city and/or county engineers.

Strategies to Improve the Project Delivery Process

- Use standard designs and legal agreements whenever possible (see Agreement section below).
- Require early predesign scoping on project concepts between the railroad and the DOT.
- If a project is delayed for any reason, review basic assumptions after initial coordination to ensure that conditions or railroad activities have not changed.
- Recognize and use the best indemnification scenario possible; options to consider are by transportation agency, by contractor, or by participation in existing railroad insurance pools or programs.
- Jointly develop standard plan notes or contract provisions that are minimum standards of performance on-the-job site to ensure safety and protect rail operations.
- Consider employing a Crossing Assessment Program Model developed by Union Pacific Railroad (UPRR) and available for use by other railroads.
- Schedule regular coordination meetings during which both sides review successes and issues.
- When hiring an engineering consulting firm, ensure their experience includes developing railroad project plans or coordinating with railroads on DOT projects.
- For railroads, develop and complete a checklist for any construction in their right-of-way.

Improve Delivery When Using Alternative Contracting Methods (Related Case Study)

- Gather information on project site specifics from the railroad, such as utilities within the right-of-way, flooding issues, existing signals, or existing agreements to include in the proposal package.
- Develop chapters in railroad or public project manuals on alternative contracting.
- Increase communications with the railroad, ensuring full disclosure of all risks so all proposers know the facts. Contractors may not always recognize that the railroad has specific rules and procedures that must be followed. The more information that can be provided to the prospective design/build contractors up front, the better.
- Develop a standard questionnaire or other similar document that can be used by the railroad to describe in detail its procedures relevant to a specific proposed project; include this completed document in the proposal package (see [Innovation Library](#) for an example).

Address Real Estate Easements

- Involve a dedicated real estate person early in the process.
- Include easement language in construction agreements, where appropriate.
- For railroads, develop a one-pager outlining the process for modifying a roadway in their rights-of-way and share this document with their respective DOTs.

Strategies to Streamline the Process of Reviewing and Signing Agreements

(Related Case Study)

- Establish preliminary engineering agreements and initiate formal agreements that allow railroads to be compensated for engineering support during preliminary development—even if a project is not eventually constructed.
- Adopt railroad-specific master agreements in which both parties agree to standard provisions for insurance, reimbursement, indemnification, flagging, and rights-of-entry to streamline the project agreement process (examples of master agreements can be found in the SHRP2 R16 Innovation Library).
- Streamline agreement processing of routine projects such as routine maintenance and bridge inspections that are less than \$25,000 (or an agreed upon amount) or routine maintenance and inspection activities that only require flagging services.
- Develop standardized agreements with common terms and conditions; individual projects can then be limited to scope amendments.
- Update standard bid specifications to be used when contractors are working in railroad rights-of-way. The contractor will be required to have proper insurance in place before entering the right of way.
- While the master agreement is being finalized, have the DOT issue a streamlined maintenance letter to the railroad in lieu of an agreement.
- For railroads specifically, hold a preconstruction meeting with all parties after executing the agreement.
- Facilitate meetings between legal personnel to negotiate indemnification language. Define what both parties agree upon, and engage legal counsel only for those issues where conflicts exist.
- Conduct joint reviews (DOT and railroad) of the DOT's three-to-five year project plans and coordinate preliminary engineering or Right-of-Entry agreements to perform that work.



Construction of crossing signalization with traffic signal preemption installed under NCDOT's master agreement with Norfolk Southern Railway as part of a roadway widening project along NC 42 in Clayton, Johnston County, North Carolina.

Photo courtesy NCDOT

Strategies to Improve Coordination of Flagging (Related Case Study)

- Simplify projects and separate those that railroads agree do not need regular flagging services and share the list of such projects six months or a year ahead to eliminate the review time and expedite project work.
- Include flagging requirements when on railroad property in master agreements.
- Write (or rewrite) general flagging provisions to be consistent with certain railroad union requirements. Use specific language in all construction contracts setting out criteria for payment (see Washington State DOT example and Flagging Case Study [here](#)).

- Issue a scope of work sheet to document flagging needs and reimbursement method.
- Identify one point of contact within the railroad who is responsible for flagging coordination.
- Examine other specific examples:
 - On bridge projects, CN has been involved in design teams with DOTs when they are developing their bid packages. This worked well to get feedback on projected costs and flagging needs. Other approaches include suggesting a reasonable timeframe and holding the contractor responsible for the additional costs if the work is not completed; and providing an at-risk allowance if the contractor completes the work within the given timeframe. This would incentivize the contractor to work as efficiently as possible.
 - CSX has consolidated its territories into four single points of contact for flagging coordination. Regardless of the type of work, CSX will then be aware of the documentation needed and can connect with the project engineer or state through the public projects team.
 - The Texas DOT has one railroad flagging vendor for all three Class I railroads in its state, with specific contact information for the vendor. In addition, Texas DOT has standard specifications and a scope of work sheet that identifies the responsible party and/or person for scheduling, payment, and other issues.

Strategies to Improve Grade Crossing Safety and Funding of Crossing Projects

- Conduct formal crossing diagnostics on an annual basis with DOTs, regulators, and railroads. Do not program a crossing project without a formal diagnostic study.
- Conduct safety-related communications and outreach to communities.
- Where applicable, relocate signage for improved driver visibility and earlier warning; add “Do Not Stop” signs on tracks; refresh or add edge lines, pavement markings, and signage; and conduct more enforcement. Change the location of right-turn arrow pavement markings and replace delineators.
- Replace at-grade crossings with grade-separated structures; close crossings where appropriate.
- Develop a Highway-Railroad Safety Risk Management Plan, including training for agency personnel as part of normal training curriculum.
- Streamline processes for repairing and resurfacing highway-railroad crossings where the railroads manage the resurfacing of the crossings and the approaches to ensure quality of work while meeting schedules and operating timelines.

Colorado Specific Recommendations

- Add Do Not Stop On Tracks R8-8
- Refresh Edge Line Markings
- Refresh Median Line Markings
- Add Stop Line – RR Markings
- Add Vehicle Detection
- Relocate signage for improved driver visibility/earlier warning
- Crossing in Transition
- Target Enforcement
- Propose Intersection Reconfiguration
- No Recommendations-Previously Mitigated
- No Recommendations-Functioning as Intended



Example of recommendations made by UPRR after using its Crossing Assessment Program Model on a specific Colorado crossing where accidents were occurring.

- Consider developing a memorandum of understanding with appropriate agencies that will address programming crossings across an entire corridor.
- Consider implementing the use of a lump-sum payment to the railroad for reconstructing a grade crossing, eliminating administrative overhead and simplifying the audit process for the agency.
- Seek out grants for innovative technologies, such as four-quadrant, dynamic-gate detection systems, or other technologies to assess and improve grade crossing safety.
- Consider using unmanned aircraft systems (drones) for structure inspection, surveying and mapping, traffic monitoring, and incident management. Note that most Class 1 railroads still require a right-of-entry when a third-party drone is on or over railroad property. (A webinar on this topic was held in August 2018. Here is the [link](#) to the materials for more information.)

Implementing the Section 130 program (*Related Case Studies*)

A new FHWA guide with best practices for using Section 130 funds is now available. The *Highway-Grade Crossing Action Plan and Project Prioritization Noteworthy Practices* contains a model state action plan, identifies solutions for improving safety at crossings, and references several noteworthy practices used by states.

Many of the best practices noted in previous sections are critical for a strong Section 130 program. In addition, a few other strategies might be helpful:

- Develop a railroad project development guide and/or manual specifically for Section 130 programs, as well as a related training program for project managers and others engaged on a regular basis with railroads or DOTs.



Railroad crossing in Lakeland, FL.

Photo courtesy Michael Loehr

- Begin to coordinate at the project concept or early planning stage, particularly for any project that may create horizontal or vertical constraints on the railroad right-of-way or that may be contemplated to interfere even briefly with train operations.
- If a project is delayed for any reason, review basic assumptions after initial coordination to ensure that conditions or railroad activities have not changed.

Strategies to Improve Training and Knowledge Transfer

- Develop a railroad project development guide and/or manual and a related training program for project managers and others engaged regularly with railroads or DOTs. Include references and resources such as AASHTO's SHRP2 *Railroad-DOT Mitigation Strategies* webpage and its Innovation Library.

- Conduct training for staff, contractors, and consultants on railroad coordination regularly.
- Consider options to create flexibility and provide incentives to staff such as creating internship and mentoring programs focused on better railroad coordination and holding field trips and monthly project engineer meetings where training and best practices about DOT/railroad coordination can be shared.

Strategies to Improve Administration Processes

- Simplify administrative processes, such as payment by lump-sum amounts, which minimizes administrative costs and helps expedite agreement processing and project delivery.
- Adopt standard billing agreements that reduce the administrative costs of both railroads and DOTs.
- Improve data collection and storage related to railroad crossings and other grade-separated projects.
- Develop or use electronic-agreement processing whenever possible to keep all parties informed and updated on upcoming activities. The electronic workflow can also expedite agreement processing. The Kentucky Transportation Cabinet has built a system that is used with railroads and utilities. Information from a recent webinar on the Kentucky Utility and Rail Tracking System (KURTS) is available [here](#). Utah DOT has developed a similar type of electronic file sharing.
- Improve methods for collecting and storing data relating to railroad crossings and other grade-separated projects.
- Consider creating a common railroad electronic in-box that can be a central database and repository where document retention policies can be applied, archiving certain types of documents for a specified duration. Texas DOT has a system for doing this.
- Seek opportunities to implement electronic tracking systems, which can lead to time savings, reduced stress, transparency, and payment tracking.

For more Information

To learn more about *Railroad-DOT Mitigation Strategies* (R16), contact Julie Johnston at FHWA, julie.johnston@dot.gov.

[AASHTO SHRP2 Railroad-DOT Mitigation Strategies \(R16\) Webpage:](#)

AASHTO's product page offers case studies, training modules, presentations, factsheets, reference documents, the innovation library, and a list of other states implementing the R16 product. In September 2019, this material will also be housed at the AASHTO Rail Resource Center: <https://rail.transportation.org/aashto-rail-resource-center/>.