

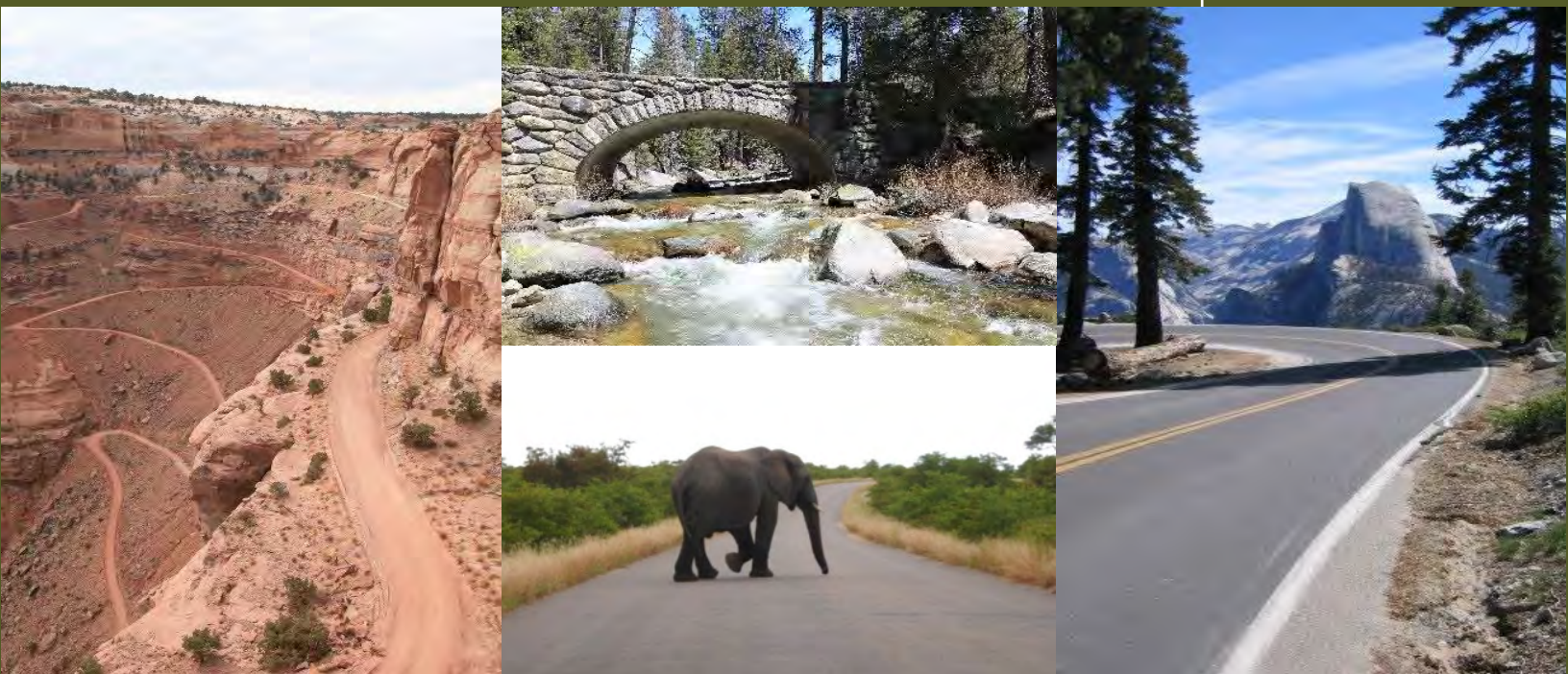
TRANSPORTATION RESEARCH
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**Technology
Exchange on
Local Roads
Bridge Programs**

September 17–18, 2019
Kalispell, Montana



The National Academies of
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Technology Exchange on Local Roads Bridge Programs

September 17–18, 2019
Kalispell, Montana

Organized by
Iowa Department of Transportation

Rapporteurs

David Veneziano
Iowa State University

Vanessa Goetz
Iowa Department of Transportation

Submitted
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Transportation Research Board
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Washington, D.C.
www.trb.org

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**Transportation Pooled Fund Project TPF-5(379):
Technology Exchange on Low-Volume Road Design, Construction, and Maintenance**

Dan Adamczak
Daryl Lester
*Alaska Department of Transportation
and Public Facilities*

Tim Peters
Stephane Seck-Birhame
Illinois Department of Transportation

Eric Cowles
Vanessa Goetz
Iowa Department of Transportation

Dawn Hueske
Tod Salfrank
Kansas Department of Transportation

David North
Steve Strength
*Louisiana Department of Transportation
and Development*

Mark Harrison
Kelly Crannell
Michigan Department of Transportation

Greg Bucher
Mark Eicher
Steve Luebbe
Ohio County Engineers

Michael Fitch
Ohio Department of Transportation

Jared Dastrup
Jason Simmons
Utah Department of Transportation

Ed Hoppe
Harikrishnan Nair
Virginia Department of Transportation

Justin Shell
Dave Stertz
Wisconsin Department of Transportation

TRB Staff

Nancy Whiting, *Senior Program Officer*
Joanice Johnson, *Associate Program Officer*

Preface

A Transportation Pooled Fund Program focused on low-volume road (LVR) design, construction, and maintenance activities held a bridge topics technology exchange in conjunction with 12th TRB International Conference on Low-Volume Roads, September 15–19, 2019, in Kalispell, Montana (referred henceforth as the Local Roads Bridge Programs). This technology exchange between representatives from Alaska, Illinois, Iowa, Kansas, Louisiana, Michigan, Ohio, Utah, Virginia, and Wisconsin, covered a variety of topics and produced useful results.

The Transportation Research Board (TRB) International Low-Volume Roads Conference brings together practitioners and researchers to discuss research, development, and technology transfer needs in the areas of design, construction, maintenance, and safety on LVRs.¹ This provided the opportunity for the pooled fund partners to collaborate and share best practices and strategies for overcoming certain challenges through an exchange forum session.² The exchange forum organized for the conference took the form of panel discussions and were focused on aspects of the local bridge programs at the 10 partner states.

The Local Roads Bridge Programs panel discussions took place over two conference sessions. Notes were taken to record the information and discussion points that occurred during the course of these sessions. Questions were posed by a moderator with panelists providing responses from the experience and viewpoint of their respective state. Some of these questions were developed in advance, and additional questions were facilitated through online polling of the audience using the website Menti.

The responses and feedback provided by the panelists to the different questions posed over the course of the sessions provided a good deal of information related to bridges on local roadways. Nearly all states represented on the panels have some level of oversight over bridges on the local roadways in their state. In 9 of the 10 panel states, local agencies had jurisdiction over local bridges, but when state and federal funds are used in construction, the state department of transportation (DOT) retains oversight over the project.

The first panel session was held September 17, 2019. State moderator and panelists in this session included

- Eric Cowles, Iowa DOT, moderator;
- Darryl Lester, Alaska Department of Transportation and Public Facilities (DOTPF);
- David North, Louisiana Department of Transportation and Development (DOTD);
- Mark Harrison, Michigan DOT;
- Edward Hoppe, Virginia DOT; and
- David Stertz; Wisconsin DOT.

The second session was held on September 18, 2018. State moderator and panelists in this session included

- Edward Hoppe, Virginia DOT, moderator;
- Stephane Seck-Birhame, Illinois DOT;
- Eric Cowles, Iowa DOT;
- Tod Salfrank, Kansas DOT;

- Steve Luebbe, Fayette County, Ohio, County Engineer; and
- Jason Simmons, Utah DOT.

The notes taken record the extensive amount of information and discussion points that occurred during the course of these two conference sessions. This document presents the summary of those sessions, including key takeaways from the panelists' remarks in Summary of Panel Sessions, Key Takeaways, and Concluding Thoughts. In addition, the participant states were asked to provide a short paragraph that describes each of their local roads/LVR programs or their DOT interacts with local and LVR agencies. The information provided by states is presented in Appendix A.

DISCLAIMER

This E-Circular contains summaries of the panel discussions and Q&A from the Local Roads Bridge Programs forum. No language should be construed as consensus findings or recommendations on the part of the forum; the planning committee; the rapporteurs; the National Academies of Science, Engineering, and Medicine; or TRB's Standing Committee on Low-Volume Roads.

ACKNOWLEDGMENT

The Technology Exchange on Low-Volume Road Design, Construction, and Maintenance Members thank the TRB staff, the rapporteurs, the TRB Standing Committee on Low-Volume Roads, U.S. Forest Service, and attendees for their contributions to the success of the panel sessions.

NOTES

1. 12th TRB International Conference on Low-Volume Roads Final Program. <http://onlinepubs.trb.org/onlinepubs/Conferences/2019/12LVR/Program.pdf>.
2. Transportation Pooled Fund Program. Technology Exchange on Low-Volume Road Design, Construction, and Maintenance. <https://pooledfund.org/Details/Study/631>.

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Summary of Panel Sessions

The panel sessions held on each respective day of the conference consisted of a variety of questions posed by a session moderator. These questions were developed in advance of the conference to allow panelists time to prepare their responses. Additional questions were posed by audience facilitated through online polling. Voting took place through the website Menti.com, which provided real-time feedback on the questions that were of interest to the audience. The questions were posed by the moderator, and panelists provided their responses as applicable to their respective state.

The following sections summarize the questions and responses provided by each state that participated on the panels. When possible, information and responses are summarized graphically or in another condensed format, while retaining important details. While many of the same questions were posed to panelists in both conference sessions, there were instances where only one panel was asked a particular question and provided responses. Those cases will be noted when applicable. For questions presented on both days, all responses are presented together in the same section. The question/responses have been organized in a different order than they occurred during the course of each session to produce a logical flow in terms of the subjects covered.

JURISDICTION OVER LOCAL BRIDGES

The jurisdiction over bridges can vary from state to state. Therefore, participants were asked what agency had jurisdiction over local bridges in their state. Nine of the 10 state panelists said that their local agencies had jurisdiction over local bridges, with some specifics varying from case to case. The one state where local agencies did not have jurisdiction was Virginia. The Virginia DOT maintains the entire roadway network statewide, with the exception of two counties that maintain their own roadway network. There are some bridges owned by cities and towns in Virginia, but they are inspected and maintained in accordance with Virginia DOT standards.

In Louisiana, the local agencies have jurisdiction, and the state has oversight because of the federal funds involved on projects. Wisconsin is the same as Louisiana in that local agencies are responsible for their bridges, but the Wisconsin DOT has oversight. In Michigan, local agencies have ownership of bridges, but not all projects are funded through the Michigan DOT. The local bridge program is funded with a combination of state and federal funds and local agencies can utilize some of their own funding. In Alaska, local agencies are responsible for bridge maintenance, but the DOT inspects and places load limits on bridges.

Local agencies in Illinois have jurisdiction over their bridges, and the DOT has oversight. Local agencies are responsible for inspections, and the Illinois DOT hires a consulting firm to do any inspections local agencies fail to complete. In Iowa, the local agencies have jurisdiction over their bridges and set priorities. Similar to other states, local bridges can be funded with a combination of state and federal funds, of their own local funding. For Kansas, local agencies have complete responsibility for bridges, unless the bridge is on a state route. Local agencies are also responsible for maintenance, construction and inspections in Kansas. The Kansas DOT maintains an inspection database and does a quality assurance inspection on approximately 1% of the data in the database each year. Kansas also has a program for special inspections that are

more difficult for local agencies to perform, such as underwater and fracture critical. In Ohio, municipalities have responsibility for their bridges carrying local streets not over state routes, and counties have responsibility for their bridges carrying county routes and townships not over state routes. Finally, in Utah the DOT does inspections and load ratings for local bridges, and the local agency is responsible for construction and maintenance.

Individual members of the audience asked panelists follow-up questions related to this subject:

- On Day 1, panelists were asked what it meant when the state DOT had oversight. The panelists indicated this meant that the local agency owns the bridges, but state money is used to build them. Since state money is involved in construction, the DOT therefore has oversight. In those cases, each state has criteria that apply when its funds are used. Local agencies can use their own funds if they choose, and in such cases, state oversight does not apply. In the case of Wisconsin, if the local agency funds the bridge on their own, the DOT will still review plans.
- On both days, panelists were asked whether the American Association of State Highway Transportation Officials (AASHTO) guidelines are followed for bridge treatments, guardrails, rules, etc. Wisconsin said that these were followed, but on lower-volume roads, the DOT was willing to entertain exemptions. For instance, on lower-volume roads, a guardrail is not required (below 500 ADT), and that practice has been approved by the Federal Highway Administration (FHWA). In Michigan, the state has required end rail structures on LVRs, but are less stringent for this rail than what is used on state-owned roads. Finally, in Alaska, the use of bridge treatments, guardrails, etc. is site-specific.

FUNDING DISCUSSIONS

Local Bridges

The Day 1 and Day 2 panels were both asked how much funding in their state is applied to local bridges. The various funding figures provided by the panel are presented in Figure 1. The additional funding details provided by panelists are discussed in the text below.

Louisiana provides about \$12 million of state funds at an 80/20 split with the federal match that is \$48 million. The state of Virginia does not have local bridges, but does have a \$40 million per year bridge program. Michigan's \$48 million local bridge program is funded one-third by state funds and two-thirds by federal funds. Alaska has \$50 million available in a Community Transportation Program that solicited projects proposals in 2019 and previously in 2011. This program is for local agency projects that are federally funded, but that funding is not solely for bridges. Typically, these are for new community roads or modernization of existing roads and rarely replace bridges.

In Illinois, there are different ways that funding is done. This includes the distribution of federal funds to local agencies through block grants. State funding (approximately \$15 million per year) is another source for local agency bridges. The local agencies can also fund projects with fuel taxes. Finally, Illinois has a special bridge program with up to \$18 million per year of funding available (this amount varies each year). The \$33 million total presented in Figure 1 is the total of the dollars listed here and does not include block grant or local fuel tax funds.

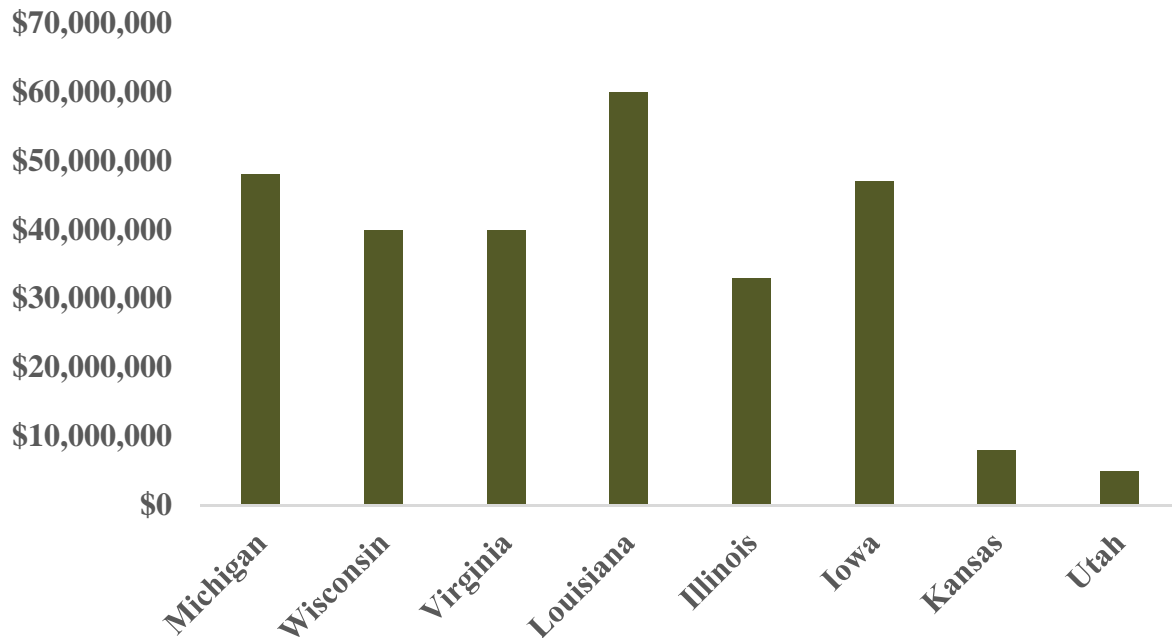


FIGURE 1 Local bridge funding by panelist state.

Iowa splits its \$47 million per year in federal bridge funds, allocated to local agencies, with \$36 million going to counties and \$11 million to cities. The state has implemented federal aid swap, with a dollar for dollar match, so most of these are part of Iowa's federal aid swap program. Iowa also has a special state county and city bridge program based on a priority points system. Farm-to-market (FM) funds can be used on FM route projects. Finally, local agencies can also use their own funds.

In Kansas, \$8 million in off-system federal funds is one approach that is used, with the funding being an 80/20 match. There is also the \$5 million Kansas local bridge program for fixing and replacing deficient bridges (from 20- to 50-ft long), which provides \$150,000 per bridge. The state also offers \$50,000 if an agency closes a deficient bridge. The Kansas DOT does load ratings of bridges on the local system and is using \$5 million per year of bridge program funding to do this over the span of 10 years. Finally, there is the federal aid swap at 90 cents on the dollar.

Ohio is a home-rule state and has a unique relationship with local communities. Recent data indicates that Ohio's locals own 28,676 bridges, accounting for 28% of total bridge deck area for all bridges. The approximate total funding in any given year is \$71 million. This funding represent a total of four capital-funding programs that provide both federal and state funds to repair and rehabilitate local bridges. These programs include the Ohio Bridge Partnership Program, the County Engineers Local Bridge Program (LBP), the Municipal Bridge Program, and the Local Major Bridge Program. The breakdown annually is Ohio Bridge Partnership Program at \$5 million, County Engineers Association of Ohio (CEAO) county bridges at \$35 million, Municipal Bridge Program at \$11 million, Local Major Bridge Program \$20 million. The state also uses general revenues to support general obligation bonds and much of that money is used for bridges, an approach all counties use. Local funds are also used for maintenance and replacement activities. A majority of bridges are owned by Ohio's county engineers, so they have increased responsibility to ensure the safety of bridges across the state. Ohio's county

engineers are publicly elected, dual-licensed professional engineers and professional surveyors. Each county is responsible for the county transportation system. Bridge and road projects on the county system are selected by the county engineer. Federal funds (\$35 million at an 80/20 split) are allocated by policies and procedures established by the CEAO on behalf of the Ohio DOT.

In Utah, any local bridge on a local aid route goes into the state pool, where \$100 million is allocated to bridge projects. About \$500,000 to \$5 million per year is allocated to local bridges. Utah does not have many bridges, especially not on local roads.

Funding Sources

The Day 1 moderator, Eric Cowles, asked about the sources of project funding and how the prioritization of interventions is done. Project funding in Alaska is from federal dollars, and is routed through the Community Transportation Program. Local agencies nominate the projects that they want funded, with the DOT verifying the cost. The process does not guarantee that all projects get funded, as the projects are prioritized. In Michigan, funds come from a half-cent gas tax (\$28 million annually) in addition to federal funds. Local agencies receive funding through regional bridge councils that make project selections based on the requests submitted. Wisconsin has a \$35- to \$40-million annual program, where \$10 million comes from state funding and the balance from federal funding. The remainder of funds come from local sources. Projects are prioritized on a statewide basis and selected by the Division of Infrastructure Management based on need.

Virginia does not fund bridges separately; the state funds projects that include bridges. The state's transportation board determines priorities throughout the state. The Smart Scale program allows localities to apply for state funding on projects. Congestion mitigation is a factor in urban areas. Louisiana has a fund of \$12 million per year from the state gas tax that is allocated to local bridges, but the bulk of LVR bridge funding comes from federal funds used as a match.

Maintenance, Rehabilitation, and Replacement Funding

Moderators on both days asked panelists what percentages of the preventative maintenance, rehabilitation, and replacement of bridges on LVRs are funded in their state. Panelists provided various responses based on the approaches that their state employed, but the metrics and terminology used differed between states, so the percentages of funding could not be compared and presented graphically. Therefore, the responses and discussions related to this question are summarized as follows:

In Alaska, each region has a preservation funding pot that is allocated to pavement and bridges. A few preservation or preventative maintenance techniques on bridges are completed each year and the state funds rehabilitation and replacement through the State Transportation Improvement Program. On local projects, Michigan funds 50% to 60% on replacement, while 30% to 40% is spent on maintenance. Wisconsin does not pay for maintenance, but the state does have a bridge strengthening program that could be termed maintenance. Otherwise, replacement is funded more than rehabilitation. In Virginia, the state provides localities with maintenance funds. Local agencies are responsible for maintenance in Louisiana, and the state does not fund rehabilitation of off-system bridges because such funding would require the bridge to be brought up to state standards. The bulk of funding in Louisiana is spent on replacement.

In Illinois, federal and state funds are distributed to the local groups and agencies that develop a scope of work to apply those funds. Most money in the state is spent on the

replacement of bridges. The Sufficiency Rating (SR) for bridges is 80 or less in order to use the funding for rehabilitation in Iowa, and the replacement rating is 60 or less, with most projects in the state being those for replacement. Almost 100% of funds in Kansas go to bridge replacement, but the state does not track how local money is used (i.e., local versus federal funds). Ohio funds are used mostly for replacement and rehabilitation. Local funds are spent on maintenance. On the local system in Utah, everything that is funded is for replacement. On the federal aid system, the Utah DOT uses funds on maintenance and rehabilitation.

As a follow-up question, a participant asked the Day 2 panelists whether their state provides guidance to locals on preventative maintenance or rehabilitation options. In Illinois, the role of the bridge bureau at the DOT is to provide such guidance. In Iowa, an agency can request a structural review from the DOT's bridge office. If a local agency asks a specific question of the Kansas DOT, the DOT will give advice. But as a general rule, the Kansas DOT does not do engineering work for local agencies; the local agency is directed to work with their consultant. The county engineer is an elected position in Ohio. Their office has the responsibility to maintain the bridges on the county and township highway system. The Ohio DOT often provides administrative assistance when requested. Counties do not generally go to the DOT with questions about preventative maintenance and rehabilitation. The Utah DOT provides facts and serves as a resource for local agencies.

Cost Sharing

The Day 1 moderator, Eric Cowles, asked how cost sharing is handled in their respective state. Only half of the panelists provided a response to this question. Alaska has a match policy with the local agencies where typically, the state and local agency match with federal funds. In Michigan, a combination of federal off-system funds and state funds are used. This could consist of 80% federal, 15% state, and 5% local, or 95% state and 5% local funds being used on projects. Michigan has \$28 million in state funds available for these local agency projects, but these funds do not cover construction engineering or design engineering costs.

Wisconsin uses 80% federal or state and 20% local funds for projects. Most of the LBPs in Wisconsin is federal funding, and approximately one-third of the funding comes from the state. Virginia uses \$40 million in state-of-good-repair funding for cost sharing. In addition, maintenance funding is provided. Finally, Louisiana has an 80% federal–20% state funding split. The local agency pays for the acquisition of right-of-way and does utility relocation. Design work in Louisiana is done by the local agency for some projects and the DOT for others.

A participant followed up with a question to the panel about whether the items covered were the only funding avenues for their states, or were there other alternatives? In response, the Louisiana panelist stated that it has had oil companies build bridges. The remaining panel states reported that there are no other funding avenues.

BRIDGE RATINGS

Panelists from all states were asked about the percentage of local bridges in their state that are rated as being in good, fair or poor condition. The results of this question are presented in [Figure 2](#).

In the figure, states that only provided data in a two-condition format (i.e., nondeficient–deficient) have bridge ratings only listed in the “Fair” and “Poor” categories. When interpreting the

data, all bridges rated in particular states as being in “Fair” condition could have been considered in “Good” condition if a different rating system were employed.

In Alaska, the lowest condition of the bridge’s deck, superstructure and substructure becomes the overall rating, and the condition is measured as the percentage of the bridge deck area. Louisiana presented information as being related to bridges being in serviceable condition versus ones that have a bad condition rating. The number of bridges in “good” and “fair” condition in Illinois were not expected to increase. Iowa stated that it has highest percentage of structurally deficient bridges in the nation. In Kansas, the current data is presented in the figure, but 2 or 3 years ago, 20% of bridges were considered to be deficient. Changes in FHWA definitions that have occurred since then do not necessarily mean that the bridge conditions in the state have improved. In Ohio, the specific figures provided are based on the fact that 1,100 of the 27,000 bridges statewide are posted. Finally, the Utah figures are based on non-Interstate National Highway System (NHS) data for state-owned roads and assumes that local bridge figures would be similar.

On Day 1, a participant asked a follow-up question about how the bridge rating percentages changed when FHWA changed the definition of deficient. For example, Kansas had a high number for deficient under the old definition, but after the definition changed, that percentage went down significantly. However, the structures themselves really did not improve. The other panelists were not sure how these figures had changed in their state following the FHWA revision.

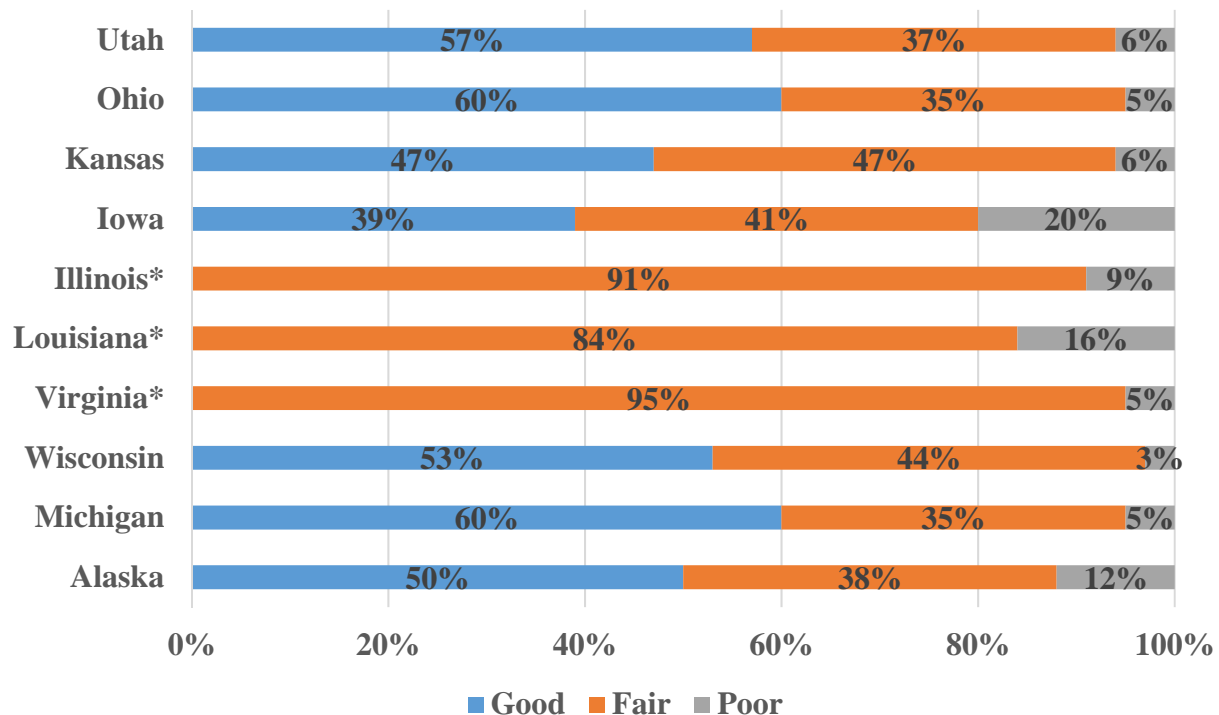


FIGURE 2 State bridge condition ratings, by percentage. (*State does not use good, fair, poor ratings, and the figures presented are based on serviceable–unserviceable or nondeficient–deficient information. Iowa figures are an average of county and city ratings.)

A participant asked the Day 1 panelists if each of their states required bridge ratings on local bridges. All state panelists said that yes, their state does require ratings on local agency bridges. Generally, these are done every 2 years, although some are inspected on a more frequent schedule because of condition. The DOTs in each panel state do not back charge the local agency for the cost of that inspection since the local agency has to handle their inspections, not the state.

NUMBER OF BRIDGES

The Day 1 moderator, Eric Cowles, asked what the total number of bridges in the state was. The number of bridges in each state were as follows:

- Louisiana: 18,000 statewide, 4,800 are local.
- Virginia: 21,000 statewide, and the DOT owns the local bridges.
- Wisconsin: 15,000 to 20,000 bridges statewide.
- Michigan: 11,000 bridges statewide, 6,600 are local.
- Alaska: 1,028 statewide bridges, 161 are local.

In Ohio there are 16,030 local agency bridges meeting the National Bridge Inventory's (NBI) bridge-length definition in the state. An additional 12,633 10- to 20-ft local agency structures meet the more stringent bridge definition in Ohio state law. There are 28,663 local agency bridges meeting the state bridge definition in Ohio.

Following the panelists' responses about the number of bridges in their states, the Louisiana panelist asked when the other panel states used box culverts. Alaska's panelist stated that box culverts are rarely used. In Michigan, box culverts are used and the state allows 24 ft maximum when four-sided boxes are used, or 60 ft maximum when three-sided boxes are used. Wisconsin allows box culverts of up to 20 ft, maximum; its Department of Natural Resources has problems with box culverts and prefers to see bottomless ones used. Virginia DOT also uses box culverts and there is guidance that the state follows in their design.

When the panel was asked if their state used multiple boxes of some culvert applications, all panelists responded yes. The panel was further asked whether the box culverts in their state are inspected like bridges. In Virginia, anything that has a 6- by 6-ft opening and larger are inspected. This would include a 4- by 9-ft box in the state, because the criteria are based on the square footage at the hydraulic opening. Michigan DOT inspects structures with a 20-ft or greater interior span (along the centerline).

PROJECT SELECTION

The panels on each day were asked by their moderators how project selection was handled in their state and, in the case of the Day 1 panel, whether an asset management approach was employed. The Louisiana panelist indicated that to some extent, an asset management approach was used and still is growing. Louisiana has extensive bridge repair needs so it is not hard to decide what needs to be replaced. Right now there is a 193-year replacement cycle for off-system bridges in the state. For state-maintained bridges in Louisiana, it is a 300-year cycle. The public

is convinced that there is funding available and that greater efficiency with construction is needed.

In Virginia, project selection is based on bridge condition ratings. Wisconsin does not have an asset management program for local bridges, but there is a Local Public Agency (LPA) requirement on inspections that goes into a database and is tracked. If a bridge rating drops below a certain level, action is taken to let the local agency know that they may need to do a replacement. At the state level, Wisconsin is on a 75-year replacement cycle. Michigan has an asset management system at the local level as well as training for local agencies to put that system into place for bridges for project selection. In Alaska, there is not an asset management program at the local level, but the DOT has a database of bridge element conditions from its inspections that is used for project selection.

Projects are selected by local agencies in Illinois, and the state just provides funding. The local agency decides its prioritization based on how much money they have been provided. Illinois DOT also has a program for projects with a cost above \$1 million that is competitive. In Iowa, the local agencies do their prioritization. The Kansas DOT employs an application process where local agencies decide their priorities and what to apply for. Then the Kansas DOT decides what to fund, with applications scored on criteria that includes importance to the local system. Ohio DOT has local agencies prioritize projects when using local funds. For federal funding, agencies apply and are then scored based on the merits of the project. There is also the Ohio Public Works Commission (OPWC) program that spends \$50 million on bridges. In that program, Ohio is divided into districts, and the OPWC board decides the projects to fund. Finally, Utah has a published ranking system that is used to select projects on the federal aid system. On the local system, the highway commission divides \$1.8 million for the different bridge projects submitted to it.

A participant on the Day 1 panel asked how bridges are selected on the NHS if there is not an asset management program in place. The Michigan panelist responded that most local roads are not on the NHS, but if they are, in Michigan they have to follow the same stringent requirements as a state-owned bridge. Alaska does not have an annual program but does a call for projects under the Community Transportation Program every few years. It is up to the community to put the bridge projects forward.

BRIDGE TEMPLATE DESIGNS

Panelists were asked whether their state has a template design for bridges in place or being used. Responses to this question said that six of the participating states used templates and four states did not use them. The breakdown of the states is as follows:

- **Uses Template**
 - Alaska (standard preferred structures but each bridge is individual design)
 - Michigan
 - Louisiana
 - Illinois
 - Iowa
 - Kansas
- **Does Not Use Template**
 - Wisconsin

- Virginia
- Ohio
- Utah

Among the states using templates, each panelist provided specific details. The Michigan panelist reported that their templates varied for bridges between 40 and 70 ft. In Louisiana, bridges are supposed to be an individual design, although there are standard plans available (for example, box culverts), and simple spans have standard plans. Illinois has standard designs that are used, and in the past there have been bridge templates. Iowa has had bridge templates for a while and these are posted online for designers to access. The standards go to approximately 240 ft in Iowa, and the contractors like them because it helps with knowing what to expect, thus being less risk from a contractor's perspective, which equates to lower costs/bids. Kansas has some standards for 20 to 50 ft bridges in steel or concrete, as well as a slab design for up to 90 ft. Kansas has a program that generates plans for reinforced concrete beams, but they are not load rated.

Among states that do not use templates, some still used some form of standard designs. In Alaska, bulb tee girders are the most cost effective at sites where they are feasible. The Wisconsin panelist indicated that the state does have templates that are in disuse, but is looking at using them again in the future for cost savings. However, Wisconsin's local agencies are responsible for designs, and their design consultants may not use the state templates. Virginia does not have templates, but does have structural details on how to design various structures. Ohio has standard drawings for different designs, but no templates available. Local agencies in Ohio will select bridge types based on what each county engineer feels are best for that location. Currently accepted state and federal design criteria is always used. Utah also does not have bridge templates, but there are working drawings for girder designs.

BRIDGE STANDARDS

The Day 1 moderator, Eric Cowles, asked if the bridge standards for the state were posted on the Internet and if they are updated when applicable. The panelists from all five panel states (Louisiana, Virginia, Wisconsin, Michigan, and Alaska) stated that their bridge standards are posted on the Internet. None of the panelists detailed how often these are updated. In Louisiana, all information on structures is posted online, except for inspection data, which is Section 409 protected information.

COMMON BRIDGE TYPES IN USE

The Day 1 moderator, Eric Cowles, asked what the most common types of bridges being used in their state are. In Alaska, the span limit for decked bulb tee girder bridges is 145 ft, with larger spans being comprised of steel. The cost to mobilize contributes to the type of structure that is selected, particularly with the use of concrete girders. Michigan's most frequently used structure on the local system is side-by-side box and beam structures, while timber bridges are used for one-lane structures. Wisconsin uses pre-stressed structures when possible, but will use slab spans in other cases. Wisconsin does not use wood and discourages steel beam use. In Virginia, steel beam with concrete deck or concrete beam structures are most commonly used. The state has

recently begun building jointless bridges (jointless abutments). Louisiana's most common bridge type is the 20-ft simple span, using a cast or precast panel.

The Day 1 moderator also asked panelists whether any agencies in their state use trusses. The Virginia DOT has tried to get rid of truss bridges, but there are also a few historic truss bridges that need replacement. The problem is that the public thinks that all truss bridges are historic and should be preserved or repaired instead of replaced, when in fact, most truss bridges are not historic and can be replaced by different types of bridges.

ALTERNATIVE SOLUTIONS AND DESIGNS

Each panel received questions related to design alternatives. The Day 1 panel was asked how much leeway is there for different solutions. The Louisiana panelist indicated that some of its local agencies have used tank cars for emergency repairs, but they cannot get a load rating on these when they are used as a culvert. There are groups in Louisiana's LVRs bridge program that are flexible and will work with the local agencies to accomplish different things. The local agency first has to show that a 20-ft flat deck span will not work for a particular site.

In Virginia, most local agencies default to its state DOT standards because of a lack of in-house staff. Towns that want to do different things will rely on consultants that then work with the Virginia DOT on alternatives. Wisconsin is similar to Virginia, with the consultants working on LVR projects coordinating with the DOT to do what the state does. Innovation in Wisconsin has come from the entities with an in-house engineering staff that may do a project or two per year.

Michigan does not require a standard type bridge be used. The state does have a couple of counties that try innovative projects. Michigan DOT works with FHWA if federal funds are going to be used on a local project to make sure FHWA is comfortable with what an agency wants to do. Alaska's Bridge Section requires that all bridges be designed in accordance with the *AASHTO Load and Resistance Factor Design Bridge Design Specifications* and the *Alaska Bridges and Structures Manual*. There is a strong hesitancy to allow leeway even on LVRs. If an alternative is allowed, a local agency would need to be convincing with what they want to do.

Cowles asked whether local agencies build their own bridges as well in the states where local agencies own bridges. In Michigan, local agency staff do not build their own bridges. In Louisiana, local agencies only do maintenance; they do not do replacement unless it is a temporary structure situation. Louisiana has an average bridge cost for small structures of \$750,000 for a five- to six-span bridge. Virginia has maintenance crews that can build bridges, but this is mainly after extreme events. At times, a Geosynthetic Reinforced Soil–Integrated Bridge System (GRS–IBS) has been used in Virginia as well, but it did not produce cost savings. Aside from the comments of the panel, participants in the audience reported that local agencies in other states also build their own bridges. For example, counties in Iowa build bridges, but first they must show that they are below bridge bid thresholds for labor.

Cowles also asked the panelists what could be built in their state for \$500,000. Most panelists stated that they were not sure of what could be built for that price. Louisiana indicated that agencies can use recycled parts from other projects where they have been removed. Those parts are not as good as a new build with quality control, but they are serviceable.

The Day 2 moderator, Edward Hoppe, asked the panel if their state allows design–build projects. The Illinois DOT is trying to go toward them, but has received pushback from industry.

In Iowa, design–build is prohibited by state code. Similarly, design–build is not allowed to be used by the DOT by statute in Kansas, but nothing prevents local agencies from doing design–build projects. The Kansas Contractor Association is against it though. Design–build is allowed in Ohio, and some counties like it, while others do not. Finally, design–build is allowed in Utah, but it is not a preferred alternative for local bridges.

In keeping with alternative designs and approaches, Hoppe asked the panel if local agencies are allowed to use railcar bridges. The panelist from Illinois was not sure if they were allowed in the state. The Iowa panelist mentioned that these are allowed and counties have used them, but local funds have to be employed to pay for the project. Iowa has also funded research on load rating these bridges. No local agencies in Kansas have asked to use them for bridges, but there are a couple out there in the state. Some counties have also used tank cars for culverts. Similarly, the Ohio panelist was aware of some railcar bridges in use throughout the state. The Utah panelist reported that there are no such structures in the state.

ECONOMICAL STRUCTURES

Hoppe asked what the most economical structures to construct in the state were. Responses to this question are summarized in Table 1.

PIPE CULVERTS

Use

The panels on both days were asked whether pipe culverts are used as substitutes for some structures in their state and whether these are a preferred alternative. All 10 states participating in the panel indicated that they were used as substitutes for structures in their state. Whether they were a preferred alternative produced slightly different results. Six states (Louisiana, Virginia, Wisconsin, Illinois, Iowa, and Utah) provided some indication that they were a preferred

TABLE 1 Most Economical Structures to Construct in Day 2 Panel States

State	Structure(s)
Illinois	Culverts for pipe Precast or concrete beams for bridges
Iowa	Single-span beam bridges
Kansas	Short spans–single-span steel stringer Long spans–reinforced concrete slab bridges
Ohio	Dependent on size, location, labor capabilities Pre-stressed box beam bridges Four-sided precast box culverts
Utah	Short span–box culvert Long span–concrete girders

alternative. The remaining states (Michigan, Alaska, Kansas, and Ohio) reported that the use of pipe culverts varied depending on the locale and situation. Specific feedback from each panelist related to the use of pipe culverts is summarized in the next paragraphs.

The Louisiana panelist considers pipe culverts to be substitutes for other structures, and the state is trying to use more of these in LVR settings because of their longer service life. The Virginia panelist has found the culverts to be a good substitute depending on the hydraulic situation at a site, with concrete or plastic being preferred to metal. In Wisconsin, local agencies prefer culverts because of cost, but in the southern half of the state, there is tension on the hydraulic capabilities because of flooding issues. Michigan DOT does not like to use multicell culverts because of debris issues. The state has not replaced an existing structure in the last two decades using a multicell culvert. In Alaska, other issues weigh in on the use of pipe culverts, such as fish passage and wildlife crossing needs. There is no tendency one way or another from a local standpoint on their use in Alaska.

A follow-up question for both panels was about whether states use plastic culverts in the right-of-way for crossing pipes. Seven states (Virginia, Wisconsin, Illinois, Iowa, Kansas, Ohio, and Utah) said that plastic pipe is used. The Virginia panelist stated that this is done, but the state has had some problems with polyethylene, but good experience with polypropylene. Illinois DOT has used plastic because it is cheap and allows for temporary repair to be left in place until funds are available. Iowa agencies use plastic culverts and most counties have crews that are experienced in using it. The Kansas and Ohio panelists both said that the decision to use plastic culverts is left to the local agencies and who is doing the engineering work associated with design. Utah uses plastic culverts because they are cheaper to do across the board (material, installation, etc.). The Alaska panelist indicated that plastic culverts have faced some challenges in the state. There have been some issues with acidic rock affecting durability. The use of concrete pipes in Alaska is nonexistent and plastic has not performed well in permafrost.

Hoppe asked whether there is a preference on the culvert material that is used. In Illinois' experience, the plastic industry is working to get more plastic into projects. In Iowa, the material used comes down to economics and what the crews can do. Kansas local agencies select the material they want to use. Similarly, Ohio agencies pick the material that fits best for a project. Agency experience in Ohio has found that metal does not hold up well in some types of soils. Ohio uses a lot of box culverts and has a few aluminum boxes too. Materials used in Utah also are based on the preference of the local agency. Panelists on Day 2 were asked by the moderator whether any of their agencies use bridge-length plastic culverts (i.e., a series of pipes lined up next to each other). No agencies report use of the plastic culverts, though the Ohio panelist responded that one county engineer installed a recycled thermoplastic composite bridge.

Failure

Hoppe asked whether culverts are failing before the end of their expected design life. In Ohio, the experience has been that if the excavation is backfilled properly, you get the expected life from the culvert. However, if there is a 6-ft diameter culvert that fails in under a certain number of years, then the agency (state or local) selects a different material type for replacement to avoid that failure in the future. An audience member from Washington said that their state sees failures under certain conditions, but did not specify those conditions. Another audience member from New Mexico said that state was seeing early failures for culverts that were placed in sand and was wondering what other states' experience was. The only thought offered from the panel is that abrasion may have taken the galvanization or aluminization off the pipe in that instance.

BRIDGE BUNDLING

Bridge bundling is a procurement process where a single contract is used for the replacement of multiple bridges. The moderator asked the Day 2 panel if their state is able to do bridge bundling. The Iowa and Utah panelists reported that bundling is used in their state, while Illinois is studying how bundling could be done at the state level. In Illinois, the state DOT has been encouraging local agencies to work among themselves to bundle, which can be done in quantities of up to 100 bridges per bundle. Bridge bundling in Iowa has been done for years, with bundles bid as one package for sites that are close to each other. The industry was against huge bundles (e.g., 100+ bridges), but 5 to 10 bridges is acceptable. More typically in Iowa, there are two to three bridges per bundle. Utah and Alaska do not have an official program, but do bundling when it makes sense.

Kansas does not have bridge bundling. In Kansas, getting the local agencies to work together can be difficult. The contractor's association in the state does not like bundling because smaller contractors could be left out of projects. One trial bundling project was tried with three to five sites, but became a politically contentious issue.

In 2013, Ohio established the Ohio Bridge Partnership Program, one of the earliest and largest bridge bundling programs in the nation. Ohio DOT was responsible for delivering over \$130-million worth of bundled bridge projects in a very short timeframe. Ohio's success with bridge bundling has been highlighted by FHWA in Every Day Counts programs, and today remains a vibrant program that supports the replacement of local bridges across the state.

As a follow-up question, Hoppe asked the panel if there are construction time limits for bundled projects. In Iowa, there are separate normal construction time limits for each bridge with a bundle. Iowa has only done bundling with multiple agencies for the Competitive Highway Bridge Program grant and there was prescreening to make sure there were no archeological issues at the sites before proceeding with the bundle.

A participant then asked whether the panel states had considered how replacement of bridges all at once in the future may be problematic from a funding perspective. Generally, the panel indicated that this has not been considered, with additional thoughts offered in the case of some states. The Illinois panelists said that this is something the state needs to be thinking about as they put together their bundling program. Utah DOT does not consider the future when doing bundles because it is hard to predict what will happen.

LOCAL BRIDGE PROGRAMS

Hoppe asked the panelists if their state has a LBP. Panelists from all five panel states (Illinois, Iowa, Kansas, Ohio, and Utah) indicated that yes, their state has a LBP. The Illinois and Kansas panelists both elaborated that their DOTs are there to provide local agencies with assistance. Finally, the Utah panelist added that the LBP funding in the state was \$1.8 million.

COORDINATION WITH LOCAL AGENCIES

Hoppe asked if their DOT helps to coordinate with the local agencies on bridge projects. In Illinois, the DOT is trying to determine how such coordination will work in the future. Iowa DOT has an open line of communication with the local agencies.

MINIMIZING RISK

Hoppe asked what strategies are implemented by the states to minimize risk with short-span bridges. In Iowa, the DOT maintains the bridge inventory data and bridge conditions, but each jurisdiction is responsible for determining how to manage their bridge. In Kansas, the panelist reported that the state does not have a policy, but monitors the NBI database to look for where ratings have changed. In Ohio, if a bridge is not replaced or posted, the owner will take corrective action to address the existing issue. For example, one problematic concrete beam on a bridge could have a slab poured to lock it in place and address the issue, with the rating of the bridge then being raised.

EMERGENCY REPAIRS

Eric Cowles asked about the strategy used in their respective state for emergency repairs. Alaska emergency operations are detailed in their Field Operations Guide. Alaska DOT bridge staff will inspect local bridges after an event if requested by the local community. In the recent Anchorage earthquake, the bridges fared well and the DOT inspected bridges immediately. In more isolated events, such as a strike from an oversized load, the bridge could get decommissioned if it is damaged. In Michigan, between 5% and 15% of the annual total funding allocation is set aside for emergency structures and repairs. However, using those funds has to be the result of a natural disaster affecting the bridge, not deterioration over time.

Wisconsin's strategy is to contract maintenance out to other entities. For example, the state would contract with county bridge crews since these crews already do maintenance on the state system. No emergency recovery funds are set aside; funding would come from the general maintenance fund. Additionally, Wisconsin does not stockpile temporary bridges, they rely on contractors. Conversely, Virginia has a stockpile of temporary bridges. Funding for emergency repairs in Virginia comes from DOT general funds. Louisiana also has a stockpile of bridges, cranes, etc., ready for emergency repairs, which are done immediately. Closure orders come from the state engineer unless in an emergency and that closure is absolute and not subject to political pressure.

FUTURE CONSIDERATIONS

With respect to the problems agencies have today, the Day 2 moderator, Hoppe, asked whether these were relevant 200 years ago or will be relevant in 200 years. Have the states discussed that it might be time to reduce the system?

Kansas DOT has been trying to reduce the number of bridges on the roadway system. The problem is that bridges were easy to build during the Works Progress Administration-era compared to now. The state also has one or two counties that have discussed going from 1- to 2-mi grids.

In Iowa, there are opportunities for reduction that have been discussed by counties. On the Interstate, the state owns the bridges, and the DOT maintains the overhead structures. There have been discussions of whether as many crossings in these cases are needed. The DOT would pay for the removal of those structures if the roadway were closed.

The Ohio panelist indicated that it is tough to vacate roadways regardless of the agency. Agencies would typically drop the size of a bridge down before closing off a road. There has not been any discussion of these questions in Illinois or Utah.

Key Takeaways

A bridge topics technology exchange was held in conjunction with 12th TRB International Conference on Low-Volume Roads in September 2019. The technology exchange between the 10 participating states covered a variety of topics and produced informative results. The key takeaways from the panels included the following:

- **Nearly all state DOTs have some level of oversight over local bridges.**

In 9 of the 10 panel states, local agencies had jurisdiction over local bridges, with some specifics varying from case to case. For instance, when state and federal funds are used in construction, then the DOT would still retain oversight over the project.

All state panelists on Day 2 reported that their states had some type of LBP.

- **Different funding mechanisms and approaches are in use in the states.**

The panel states employ different approaches to funding maintenance, rehabilitation, and replacement activities. Some states provide funds for all three activities, while others only funded one or two, which would typically be rehabilitation and/or replacement. The local entities fund the remaining activity or activities.

The funding sources for projects include federal funds, as well as state funds that come from different sources (e.g., a portion of state's gas tax). Prioritization for these projects is done by the local agencies.

Local bridge funding levels vary widely by state, ranging from \$5 to \$60 million. These figures were those offered by the panelists, who in some cases provided the best estimate they could. In some cases, the actual funding amounts for a particular state may be higher or lower than these figures.

The five panelists that provided feedback on whether cost-sharing processes were being used in their state indicated different approaches were in place, most commonly an 80% federal, 15% to 20% state approach.

The panel states have various strategies in place to address and fund emergency bridge repairs. In some states, a supply of temporary bridges is maintained by the state or contractors, and different funding sources are used to cover the costs that are incurred during emergency situations.

- **States share similar bridge condition ratings.**

Based on available data or panelist estimates, the bridge ratings in each state primarily fell in the "good" and "fair" categories, with smaller percentages being rated as "poor."

Louisiana, Virginia, Wisconsin, Michigan, and Alaska DOTs are required to do bridge ratings on local bridges, which are done every 2 years. Some bridges are inspected on a more frequent schedule because of condition.

Monitoring of bridge condition and ratings and corrective actions are approaches taken by states to minimize risks.

- **Project selection and ownership.**

Bridge condition ratings, asset management program information, and local agency identification and prioritization were all cited by the panel states for project selection.

The number of bridges statewide and owned at the local level varied significantly between states.

- **The use of bridge design templates and standards varied between the states.**

Six of 10 panelists reported that their states use bridge templates, while the remaining do not.

Those that use templates indicated that the length and type of the bridges varied. For those states that did not use templates, some still used some form of standard designs for bridges or specific elements.

Bridge standards are posted on the Internet by all states.

- **Pipe culverts were used in different ways and to different extents in each state.**

All 10 state panelists indicated that pipe culverts were used as substitutes for structures in their state. Six state panelists indicated pipe culverts were a preferred alternative, while the remaining panelists indicated that use of pipe culverts varied depending on the locale and situation.

- **The common types of bridges in use differ by state.**

The most common bridge types in use include bulb tee girder, side-by-side box and beam, pre-stressed, steel beam with concrete deck or concrete beam, and simple span using a cast or precast panel.

- **Alternative design approaches and designs are in use in the states.**

State panelists were mixed on the use of design–build at the local level. Iowa DOT is not allowed to use the design–build process by code, while Illinois, Kansas, Ohio, and Utah DOTs were able to use it, albeit with mixed results in terms of being useful and in some cases encountering industry reluctance or pushback.

Bridge bundling is done in Illinois (at the local level), Iowa, and Utah, with the number of bridge projects in the bundles varying state to state from two up to 100 bridges per bundle. Future replacement needs related to bundles are not a consideration for current programs.

Railcar bridges are in use in Iowa, Kansas, and Ohio at the local level.

The most economical structures constructed in states include culverts, precast or concrete beams, single-span steel stringers, concrete slab bridges, and box culverts.

Concluding Thoughts

Holding this technology exchange in the format of panel discussions in conjunction with an international conference was effective. Although the responses were focused on the 10 states that contributed to the panel makeup, enabling audience to participate expanded the exchange beyond those states.

The practices related to the funding, construction, maintenance, and rehabilitation vary from state to state. Additionally, the approaches for project prioritization and coordination also were detailed. The information provided by the panelists during the conference and summarized in this circular can serve as a guide for local and state agencies for understanding available alternatives.

A note of thanks is offered to all those who participated in the panel sessions and contributed to the discussions that have been documented here. Hopefully, this information will help in the management of bridge programs at the state and local level in the years to come.

APPENDIX A

Additional Local and Low-Volume Roads Program Descriptions

ALASKA

Alaska DOT bridge engineers inspect all bridges open to the public except those owned by federal agencies. Alaska DOT does not have a local bridge program but solicits community projects proposed through their Community Transportation Program. The last time there was a project solicitation was in 2019 and 2011. Alaska DOT awards \$50 million in each solicitation and it covers all projects not just bridges.

In Alaska a high percentage of low-volume and local roads are state owned. When it comes to bridges, the DOT's Bridge Design section inspects almost every bridge in the state. Alaska is different in that many boroughs do not have a road maintenance arm, so inspections and maintenance are not as segmented as other states. Even bridges in municipalities are inspected by the DOT's Bridge Design section out of Juneau. In short, bridges are centralized to state responsibility.

ILLINOIS

The Illinois DOT does not have a specific LVR program. The DOT supports the LVRs through their district local roads offices and in association with the county engineers in Illinois. District local roads offices provide routine technical support for all local agencies, including those with LVRs. Most LVRs in Illinois are under the jurisdiction of township road districts. Illinois' Local Technical Assistance Program (LTAP) also provides training and technical support for the township road districts. Both the LTAP and district local roads offices have access to specialized resources from all over the department to support agencies with LVRs. Illinois DOT also has a local bridge unit in their bridge office that provides technical support related to bridges. Financially, projects are supported with motor fuel tax funds, the Needy Township program, and other programs that provide financial aid.

IOWA

Iowa DOT inspects bridges owned by Iowa DOT, while the LPAs inspect their own bridges. Of the 99 counties, roughly 75% of them hire a consulting firm and the remainder have a certified inspector on their staff. Cities generally hire a consultant for their inspections; for the smaller cities, sometimes the county staff or county's consultant inspects them. Iowa DOT has a City Bridge Program and a County Bridge Program, which used to be federal aid and now use swapped funds. Combined with the state city and county bridge programs, the total funding available is around \$50 million annually. Iowa DOT's local systems bureau provides outreach and oversight to the LPAs in Iowa, as do other bureaus from the DOT. Iowa LTAP also provides training and support. For the State Road Use Tax Fund, the percentage splits are as follows: Iowa DOT 47.5%, Secondary Road Fund (SRF) for counties 24.5%, FM Fund for counties 8%, and

City Street Construction Fund 20%. Cities are allocated funding based on population. Counties have formulas to allocate the SRF and FM funds to each county. Iowa DOT also has various other funding programs for LPAs to apply.

KANSAS

Kansas DOT inspects or hires a consultant to inspect bridges owned by Kansas DOT, while the LPAs are responsible for having their own bridges inspected. Nearly all LPAs hire a consulting firm for these inspections. For underwater, fracture critical, and pin and hanger inspections Kansas DOT manages optional programs that allow LPAs to participate in order to provide scale of economy for those special and typically more expensive inspections. Kansas DOT has a federal aid Off-System Bridge Program with funding of about \$8 million annually to replace bridges on non-federal aid routes. Kansas DOT also has the Kansas Local Bridge Improvement Program, which provides funding focused on replacing small low-volume bridges and removing deficient bridges from the inventory. Funding is also made to available to every county and every city with a population over 5,000 not in a transportation management area through our Federal Fund Exchange Program. This typically provides about \$27 million in funding annually.

LOUISIANA

The Louisiana DOTD Off-System Bridge Program is funded by FHWA (80%) and the Parish Transportation Fund (20%). Each year the state legislature designates \$3 million as match to be administered by DOTD for the replacement of parish (county equivalent) bridges. For a parish to participate in the program, they must sign an intergovernmental agreement with the DOTD and be in compliance with DOTD bridge maintenance. The parish is responsible for maintaining, posting, and closing their bridges when necessary. DOTD bridge maintenance inspectors perform biennial inspections and review the parish's records to determine if the parish is in compliance. Currently, 62 of 64 parishes participate in the program and one parish is in noncompliance.

Every other year, each participating parish is sent a packet which includes a list of structures that are eligible for replacement, the estimated replacement cost for each structure, and the balance of their account for that 2-year programming cycle. The amount they have to spend is based on their allocation, which is determined by the percentage of surface area of deficient bridges in the parish divided by the total surface area of deficient bridges in the state times the program's total funds for those 2 years. All construction costs [including change orders and construction engineering and inspection (CE&I)] plus the estimated cost of programmed structures are subtracted from their allocation. If the parish has a positive balance, they may select a bridge to replace that is estimated within their budget. The selection must be approved by DOTD bridge maintenance and the parish is responsible for performing the Stage 0, getting a verbal agreement for right-of-way from the adjacent landowners, and pass a parish resolution accepting the project.

The Off-System Bridge Program then advertises the project and selects the design consultant. The consultant is contracted to provide the topographical survey, the hydraulic report, environmental submittal, and plans. DOTD provides the estimate, proposal, lets the project, and

provides construction oversight usually through the DOTD project engineer's office or by CE&I. The parish is responsible for acquiring right-of-way or servitude, all permits, utility relocation, and the acceptance of design waivers/exceptions by parish resolution. As per DOTD bridge design, no new timber structures are allowed, all new structures are to be concrete or steel.

MICHIGAN

Michigan does not have a specific program for LVRs. LVRs are applied for through the LBP, as are all locally owned bridges. Local agencies (counties, cities, and villages) own and inspect (in-house or consultants) their own bridges. The LBP has an annual budget of \$50 million with local agencies submitting bridge applications in the annual call for projects. Applications are rated and selected for funding by region, by regional bridge councils (RBCs). The Local Bridge Advisory Board (LBAB) oversees the seven RBCs and sets policy for Michigan's LBP. Members of the RBC and LBAB are county, city, and village employees appointed by their respective organizations. Michigan DOT administers the LBP and provides support for the RBCs and LBAB. Staff engineers review local agencies plans and bidding documents prior to bid letting.

Michigan's LBP accepts bridge applications for replacement, rehabilitation, and preventative maintenance. Michigan encourages asset management plans for all local agency networks including innovative and cost saving designs for bridges on LVRs. Michigan's LBP strives for the right fix at the right time for the right location.

OHIO

Ohio is a home-rule state and has a unique relationship with local communities. Recent data indicates that Ohio's locals own 28,676 bridges, accounting for 28% of total bridge deck area for all bridges. The funding levels for bridges alone total approximately \$71 million annually. Four capital-funding programs provide both federal and state funds to repair and rehabilitate local bridges. These programs include the Ohio Bridge Partnership Program, the County Engineers LBP, the Municipal Bridge Program, and the Local Major Bridge Program. The state also uses general revenues to support general obligation bonds and much of that money is used for bridges, an approach all counties use. Local funds are also used for maintenance and replacement activities.

A majority of bridges are owned by Ohio's county engineers, so they have increased responsibility to ensure the safety of bridges across the state. Ohio's county engineers are publicly elected, dual-licensed professional engineers and professional surveyors. Each county is responsible for the county transportation system. Bridge and road projects on the county system are selected by the county engineer; federal funds (\$35 million at an 80/20 split) are allocated by policies and procedures established by the CEAO on behalf of the Ohio DOT.

In an effort to support locals, seek feedback and promote information sharing, Ohio DOT established an LPA Advisory Group to ensure meaningful dialogue between locals, Ohio DOT and FHWA. It has been important to collaborate and share ideas as we continue to fund projects and support the locals.

UTAH

The Utah DOT performs in-service routine bridge inspections on all public vehicular bridges within the state (except for those that are federally owned) and on all nonvehicular (pedestrian, railroad) bridges over state routes. Utah DOT also manages a program for load rating all public vehicular bridges outside of federal jurisdiction. Utah DOT has two programs in which to assist in funding the rehabilitation or replacement of locally owned vehicular bridges. Locally owned bridges that are off the federal aid system are funded through an annual application process through the Joint Highway Committee, which is composed of county and city officials with representation from Utah DOT, FHWA, and metropolitan planning organizations. This program is limited to \$1.8 million annually. Locally owned bridges on federal aid highways can be funded through the state structures funding through an invitational annual application process. This program is limited to poor condition bridges and the applications are ranked against funding needs of state-owned bridges. This program does not have a set funding amount, but is typically around \$3 million annually depending on the state and local needs.

VIRGINIA

Virginia does not have a specific program to administer LVRs. LVRs are part of the overall statewide road network (Interstate, primary, and secondary) which Virginia DOT is responsible for maintaining. Decisions regarding prioritizing certain road construction and maintenance activities are made at the local level by the County Board of Supervisors. Funding for these projects is then administered by Virginia DOT.

There are some administrative guidelines for unpaved roads. Virginia DOT's goal is to support locality decisions to provide hard-surface on unpaved secondary roads. The Rural Rustic Road program allows the flexibility of allowing hard surfacing within the existing right-of-way or prescriptive easement. Roads can be paved without any requirements to adhere to a set design standard. The criteria for Rural Rustic Road participation include unpaved roads with less than 1,500 vehicles per day, predominantly local traffic, and a formal request (by resolution) from the local board of supervisors.

WISCONSIN

Wisconsin's Local Bridge Improvement Assistance Program was established to rehabilitate and replace, on a cost-shared basis, the most seriously deteriorating existing local bridges on Wisconsin's local highway and road systems. Local units of government are responsible for the maintenance and inspection of local bridges.

A local bridge project must be located on a locally owned public roadway and the structure must have a span of greater than 20 ft in length to be eligible for funding. In addition, the bridge must not have been constructed or reconstructed in the last 10 years regardless of the funding source. This requirement excludes routine maintenance work. Counties, cities, villages, and towns are eligible for rehabilitation funding on bridges with a SR of 80 or less, and replacement funding on bridges with a SR less than 50. Each county is responsible to review and prioritize eligible bridge projects within that county. Bridge deficiency is measured using the

federal bridge rating methodology, which establishes the relative adequacy of a bridge in terms of structural and safety aspects, serviceability and functional obsolescence, and suitability for public use.

Locals submit bridge inspection information to the Wisconsin DOT, which calculates the SR. Local units are notified which bridges are on the eligibility list. The decision on whether or not to apply for local bridge funds is the responsibility of the local unit of government. Both federal and state funds for local bridges are allocated by formula to each county based on its statewide proportional share of bridge replacement costs. Federal or state funds cover 80% of specific individual participating project costs and local funds provide the remaining 20% plus any federal or state nonparticipating items.

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