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After the Storm: Highway Reconstruction and Resilience

In the immediate aftermath of natural disasters, such as Hurricanes Harvey and Irma, the first road recovery efforts are focused on clearing roads, establishing detours, erecting temporary bridges, and other short-term measures to get the road network up and running. However, Congress and the U.S. Department of Transportation (DOT) have encouraged that the planning for permanent repairs consider ways to make damaged road infrastructure more resilient to reduce the risk of additional damage in future disasters.

DOT defines resilience as “the capability to anticipate, prepare for, respond to, and recover from significant multi-hazard threats with minimum damage to social well-being, the economy, and the environment.” DOT requires a risk-based analysis to be used when “designing and constructing repairs to ensure they are cost effective and reduce the potential for future losses.”

The Emergency Relief Program

Most major roads and bridges are part of the federal-aid highway system and are therefore eligible for disaster assistance under the Federal Highway Administration (FHWA) Emergency Relief (ER) program. (See CRS Report R43384, *Emergency Relief for Disaster-Damaged Roads and Transit Systems: In Brief*.) Only repairs to roads and bridges damaged during a declared disaster or catastrophic failure are eligible for ER assistance. For disaster-damaged roads not on the federal-aid highway system, states may request reimbursement for emergency road repairs from the Federal Emergency Management Agency (FEMA).

As is true with other FHWA programs, the ER program is administered through state departments of transportation in close coordination with FHWA’s division offices in each state. Although ER is a federal program, it is the state that makes the decision to seek financial assistance under the program, not the federal government. Local officials must work through state departments of transportation in seeking ER assistance.

Funding

Congress provides funding in two ways. The ER program has a permanent annual authorization of \$100 million from the Highway Trust Fund (HTF). Because the annual costs of road repair and reconstruction following disasters usually exceed the \$100 million annual authorization, the Fixing America’s Surface Transportation Act (FAST Act; P.L. 114-94) also authorizes the appropriation of additional funds on a “such sums as may be necessary” basis, generally accomplished in either annual or emergency supplemental appropriations legislation.

Emergency Repairs

Initially the program provides funds for emergency repairs to restore essential travel, minimize the extent of damage, and protect remaining facilities. Emergency repairs, if accomplished within 180 days of the declared disaster, may be reimbursed with a 100% federal share.

Permanent Repairs

Permanent repairs go beyond the restoration of essential traffic and are intended to restore damaged bridges and roads to conditions and capabilities comparable to those before the event. The federal share for permanent repairs on the Interstate System is 90%. For other federal-aid highways the federal share is 80%. The vast majority of ER funding is allocated for permanent repairs. Generally, where damaged parts of a road or bridge can be repaired without replacement or reconstruction, this is done.

When major reconstruction or replacement is necessary, federal funding may not exceed the cost of repair or reconstruction of a “comparable facility.” The program is not designed to increase road capacity by, for example, adding lane capacity or building new interchanges, or to raise the elevation of a road. Such changes, which modify the function or character of a highway from what existed prior to the disaster, are referred to in the regulations as “betterments.” Normally these improvements would be funded under other programs that provide highway funding by formula to the states. They are an eligible use of ER funds only when they are “clearly economically justified to prevent future recurring damage.” States are not to use ER funds to supplant other funds for correction of preexisting, non-disaster-related deficiencies.

Funding Resiliency Features

Despite the “comparable facility” limitation, the program does allow some ER spending on resiliency features. FHWA’s *Emergency Relief Manual* states that “while ER funds are primarily provided for repair activities following a disaster; design and construction of repairs should consider the long-term resilience of the facility.”

There are generally two ways that resiliency features can be added to permanent repairs without violating the comparable facility limitation or being an ineligible betterment:

- Resiliency features that are consistent with current standards may be added to ER projects. Roads and bridges that were built many years ago may be brought up to current “geometric and construction standards required for the types and volume of traffic that the facility will carry over its design life.” Rebuilding to current standards could mean, for example, the repaired

or replaced road or bridge could be built with better drainage or an improved waterway opening.

- Resiliency features that will save the ER program money over time may be eligible. Because it usually is inadvisable to restore a highway facility to its pre-disaster condition when this would leave it vulnerable to repeated damage, the ER program in some cases allows for funding of protective features. However, they must be clearly economically justified to prevent future recurring damage. Economic justification must weigh the cost of the protective feature to the ER program against the risk of eligible recurring damage and the cost of future repair. Among the protective changes that have been approved are projects that raised roadway grades, relocated roadways, lengthened bridges, deepened channels, raised bridges, replaced culverts with bridges, and stabilized slide areas.

The ER program funds only the damaged parts of a road or bridge facility. Also, it is only a disaster response program. It does not provide funding for resiliency measures on undamaged roads and bridges in preparation for possible future natural disasters.

Other FHWA Funding Sources for Resiliency Features

In the FAST Act, Congress authorized an average of \$45 billion annually (FY2016-FY2020) for federal-aid highways. Most of these funds are apportioned to the states by formula. If a state wishes, it can spend these funds to design and build projects intended to make highways more resilient in the face of future disasters. A state can also use formula funds to add protective features to ER program projects in cases where the features do not meet the ER program's required economic justification, but the state believes improving the roadway's resilience is economically justifiable based on other factors such as avoiding potential disruption of economic activity.

Current law and regulation (P.L. 112-141 §1315(b) as implemented in 23 C.F.R. §667) already require that states consider reasonable alternatives for road and bridge facilities that have required repair or reconstruction two or more times due to emergency events. Statewide surveys to identify these facilities on major roads are to be completed by November 23, 2018. State departments of transportation must consider the results of these evaluations during the development of transportation plans and during the environmental review process that precedes construction of federally funded projects.

Despite this attention to resiliency measures, no dedicated federal resiliency funding has been provided. Resiliency funding is to be drawn from existing programs.

Resiliency Policy Options

Resilience of U.S. highways has been an issue of growing interest both within the context of individual disasters, as well as in regard to concerns about potential future developments such as rising sea levels, earthquakes, or tsunamis. In general, the ER program is intended as a reactive program for disaster response rather than a program to improve infrastructure resilience nationwide. Congress could encourage more attention to the disaster resilience of U.S. highways and bridges in a number of ways.

Modify the Current Programs

- The economic justification requirement for protective features under the ER program could be broadened to consider benefits other than direct savings to the program, such as travel or economic disruption cost savings. Congress could fund this change by simply providing more funds through the periodic ER emergency appropriations and designating them for resilience.
- The ER program's mission could be expanded to make improvements to address predicted future damage due to future natural events, such as climate change, earthquakes, or tsunamis, available for funding. This could be funded by increasing the HTF authorization or by providing annual appropriations.
- Congress could encourage states to use more of their federal formula funds for resiliency measures by increasing the federal share of spending for such purposes or by mandating that a portion of formula funds be used in this way.

Create a Stand-Alone Resiliency Program

Congress could create a new stand-alone program dedicated to preventative retrofitting or rebuilding of at-risk federal-aid highways and bridges. This could be either a formula program run by state departments of transportation or a discretionary program under the auspices of DOT.

- The resiliency program could be a competitive grant program, perhaps designed to fund resiliency projects too expensive for many states to fund from their regular formula funding. Competitive grant programs could be subject to political pressure or, if the current earmark ban is lifted, earmarking.
- The resiliency program could be a new formula program with a separate authorization. The distribution formula could be based on risk factors in each state, perhaps relying on the statewide evaluation currently being done, or other factors.

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