Riverine Infrastructure Database (RIDB) for Rapid Assessment of Asset Vulnerability

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Abstract

During flood events, it can be difficult finding relevant hydrologic and hydraulic information for assessing the vulnerability of infrastructure. In many cases, information is not available or can be very time consuming to obtain and evaluate. Without good information regarding the hydraulic relationship between the infrastructure and flood discharges, it is difficult to be proactive with regard to the protection of lives, property and infrastructure. Too often DOTs, and other infrastructure owners, are reactive instead of proactive regarding flood events resulting in unnecessary damages and risks to public safety.

In 2008, an extreme flood event occurred along many large stream basins in the central and eastern part of Iowa, which impacted Interstate 80 and many other primary routes. During these flood events it was critical to assess and predict which highway locations had the potential for overtopping from flood waters so that safe detour routes could be identified for the traveling public. The effort to evaluate the vulnerability of the roadway to flooding required significant DOT staff time and resources to reconcile project datums and correlate hydraulic estimates to determine accurate stage vs. discharge relationships (rating curves) at specific bridge/highway locations.

The Iowa Department of Transportation was fortunate that a bridge replacement project was under construction on I-80 over the Cedar River at the time of the 2008 floods. Since the DOT had design information regarding the low roadway and detailed hydraulic data (a rating curve), the Interstate was closed before flood waters impacted the traveling public. Traffic was proactively detoured along other primary routes preventing significant traffic delays and diversion of traffic into the local roadway system. This event was the impetus for the development of an innovative Riverine Infrastructure Data Base (RIDB).