



**SPECIAL PROVISIONS
FOR
VIBRATION CONTROL DURING DEMOLITION**

**Scott County
IM-074-1(210)5-13-82
IM-074-1(214)5-13-82**

**Effective Date
June 21, 2022**

THE STANDARD SPECIFICATIONS, SERIES 2015, ARE AMENDED BY THE FOLLOWING MODIFICATIONS AND ADDITIONS. THESE ARE SPECIAL PROVISIONS AND THEY PREVAIL OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATIONS.

150858.01 DESCRIPTION.

This specification identifies the Contractor's responsibilities for control of vibrations to aid in protection of adjacent structures and utilities during conventional and blast demolition of the I-74 bridges over the Mississippi River between Bettendorf, Iowa and Moline, Illinois. Project IM-074-1(210)5--13-82 includes the removal of the eastbound and westbound suspension bridge, piers, and anchorage structures, and the removal of the Iowa viaduct and ramp north of the Illinois-bound bridge. Project IM-074-1(214)5--13-82 includes the removal of the eastbound and westbound truss bridge superstructures and piers.

Vibration monitoring shall be performed by a Vibration Consultant retained by the Engineer and will not be furnished by the Contractor; however, the Contractor shall perform work in a manner that keeps vibrations at each vibration monitoring location below levels required by this specification. Contractor responsibilities include:

- A.** Coordinate demolition and blasting activities with any ongoing work on the adjacent new bridges, the construction of the Bettendorf Letdown Structure (IM-074-1(255)5--13-82), and any other adjacent work that may be affected by the demolition and blasting activities. Determine demolition methods required to protect the new bridges, any structure under construction adjacent to demolition work, existing structures, and utilities.
- B.** Coordinate with applicable agencies and provide the necessary access for the Vibration Consultant to the selected monitored new I-74 bridge piers and City of Moline Water Department water intake structure by boat or barge for installation, deinstallation, and two interim visits for maintenance of the vibration monitoring systems.
- C.** Adjacent structures and utilities at which pre-demolition condition documentation surveys will be conducted by others due to their proximity to the work have been identified in Table 1. The Contractor will not be responsible for the conducting pre-demolition condition documentation surveys for these properties, however preconstruction condition documentation reports for these properties will be available for review prior to development of the Blasting Plan.

Table 1: Structures and utilities at which condition documentation surveys will be conducted by Others

	Property	Property Owner (Subject to Change)
1-	1 Montgomery Dr, Moline, IL 61265	BridgePointe 485 Community Center
2-	New I-74 Bridges	Iowa DOT / Illinois DOT
3-	Bettendorf Levee	City of Bettendorf / United States Army Corps of Engineers (USACE)
4-	Pier K of the truss bridge in Rock Island County, IL	Iowa DOT / Illinois DOT
5-	City of Moline Water Department Structures	City of Moline Water Department
6-	Concrete Box Storm Sewer (Government Interceptor Sewer)	City of Bettendorf
7-	66 inch Concrete Pipe Sanitary Sewer	City of Bettendorf

- D. Protect utilities adjacent to the site, as determined during an initial site assessment, from damage due to vibrations produced during conventional and blast demolition. Utilities to be protected include, but are not limited to:
- The 8.5 feet by 6.5 feet cast-in-place concrete sewer (government interceptor sewer), which runs beneath and approximately parallel to and north of the Bettendorf Levee.
 - 66 inch reinforced concrete pipe sanitary sewer north of the Bettendorf Levee, which runs east to west towards Gilbert Street.
 - MidAmerican Gas Line north of Gilbert Street, which runs east to west underneath the Iowa viaduct ramp.
 - Reinforced concrete pipe sanitary sewer along Gilbert Street, which runs directly under the Iowa viaduct and ramp.
 - Reinforced concrete pipe storm sewer south of Gilbert Street, which runs east to west underneath the Iowa viaduct ramp.
- E. If blast demolition is utilized, develop a Blasting Plan for each element type which minimizes the potential for vibration induced damage to the adjacent structures and utilities. The Blasting Plan, and any associated calculations to demonstrate the proposed Blasting Plan meets the vibration limits required by this specification, shall be submitted to the Engineer and Vibration Consultant within 30 days after the Notice to Proceed. At a minimum, the Blasting Plan shall include:
- List of at least three projects within the last 10 years where the Contractor has removed similar steel bridge superstructures over water and mass concrete substructure elements using explosive demolition methods. The list shall contain names and contact information of owner's representative who can verify the Contractor's participation on those projects.
 - Name and experience record of the Contractor's superintendent in charge of bridge removal and executing the Blasting Plan. If more than one person is involved in the design and execution of the Blasting Plan, qualifications of all members of the blasting team shall comply with the experience requirements and documentation described above.
 - Detailed plans showing how the structure will be prepared for demolition, including the type and amount of explosives to be used, blast design calculations, location of charges, and drill patterns. The Contractor shall provide coordinates defining the location of any blast planned at bridge piers or the ground, as well as the maximum lbs of explosive per delay at each blast location.
 - Description of members to be removed or pre-cut, including the sequence of removal or cutting, prior to explosive demolition.
 - Blasting sequence and any other applicable measures to achieve desired collapse direction and ensure bridge pylons fall outward, away from the navigation channel, as required by project IM-074-1(210)5--13-82.
 - Safety codes and procedures to inform and protect workers, public, and adjacent property.

- Plan for de-initiation and demolition in case of misfire.
- Provisions for transport, security, storage, and use of explosives including blast locations. Application of explosives for structure removal shall be identified as in accordance with explosive manufacturer's instructions.
- Secure any and all required permits.
- The Blasting Plan(s) shall include alternative demolition methods and equipment to be used if the vibration thresholds are reached or exceeded.

150858.02 MONITORING COORDINATION.

- A.** The Vibration Consultant retained by the Engineer will review all pre-demolition survey reports to evaluate the risk of damage to the surveyed adjacent structures and utilities from demolition-induced vibrations. Based on this review, the Vibration Consultant will provide maximum safe vibration limits (measured as peak particle velocity (PPV), inches per second (ips)) for each property. It shall be the Contractor's responsibility to determine the demolition methods required to protect the properties listed above based on the pre-demolition condition and the established safe vibration limits. Preliminary safe vibration limits are provided in this special provision; see Vibration Limits Section below.
- B.** Based on the blasting plan, the Vibration Consultant shall review and develop a Monitoring Plan to aid in the protection of the adjacent properties and utilities during demolition activities.

150858.03 PRE-DEMOLITION SITE PREPARATION.

At the structures and utilities designated in Article 1, Vibration monitoring shall be conducted by the Vibration Consultant and will not be furnished by the Contractor. The Contractor is responsible for providing access to the Vibration Consultant to the selected new I-74 bridge piers and City of Moline Water Department water intake structure by boat or barge for installation, deinstallation, and two interim visits for maintenance of the vibration monitoring systems. The Contractor is responsible for arranging with the City of Bettendorf, the City of Moline, the US Army Corps of Engineers, and the US Coast Guard the rights-of-access to the utilities and structures in order to engage in the vibration monitoring.

150858.04 VIBRATION LIMITS.

- A.** Unless revised by the Vibration Consultant based on the pre-demolition condition or documented through trial testing, do not exceed the following vibration limits:
- The frequency dependent US Bureau of Mines (USBM) RI8507 "Plaster" curve (max of 0.5 ips PPV at frequencies between 2.67 and 10 Hz, see Figure 1) at the 1 Montgomery Drive property in Moline, Illinois.
 - 2.0 ips PPV for the adjacent utilities, Bettendorf Levee, and City of Moline Water Department structures.
 - 5.0 ips for the new I-74 bridge piers.
- B.** To ensure that the vibration limits are not exceeded, implement a vibration alert threshold to signal any vibration event that equals or exceeds 80% of the PPV limit for each property. The alarm system shall provide email and/or text message alerts to Engineer and Contractor site personnel in the event of an exceedance

150858.05 DEMOLITION/CONSTRUCTION.

In the event that the vibration limits are exceeded at any monitor location, immediately cease demolition activities and provide a summary of the demolition activities occurring at the time of the exceedance to the Engineer. The work stoppage will remain in effect until, to the Engineer's satisfaction, the cause of the exceedance has been identified and the potential for another exceedance has been addressed by modifying the demolition processes. Do not resume work until approval is provided by the Engineer.

150858.06 POST-DEMOLITION SURVEY.

Post-demolition condition documentation surveys of the properties identified in Table 1 will be conducted by others. The Contractor will not be responsible for conducting the post-demolition condition documentation surveys. The Engineer will review the post-demolition survey reports to compare pre- and post-demolition structural conditions. The Contractor will be responsible for repairing any and all damage to the adjacent properties caused by the demolition to the satisfaction of the Engineer prior to contract acceptance.

150858.07 METHOD OF MEASUREMENT AND BASIS OF PAYMENT.

No separate payment will be made for costs incurred due to compliance with this Special Provision. There will be no compensation for added costs associated with delays as the result of exceeding the vibration alert threshold or vibration limits at the adjacent monitored properties. There will be no compensation for adjustment of demolition activities, additional engineering, or equipment needed to reduce the vibration levels to less than the vibration limits described above, should an exceedance occur.

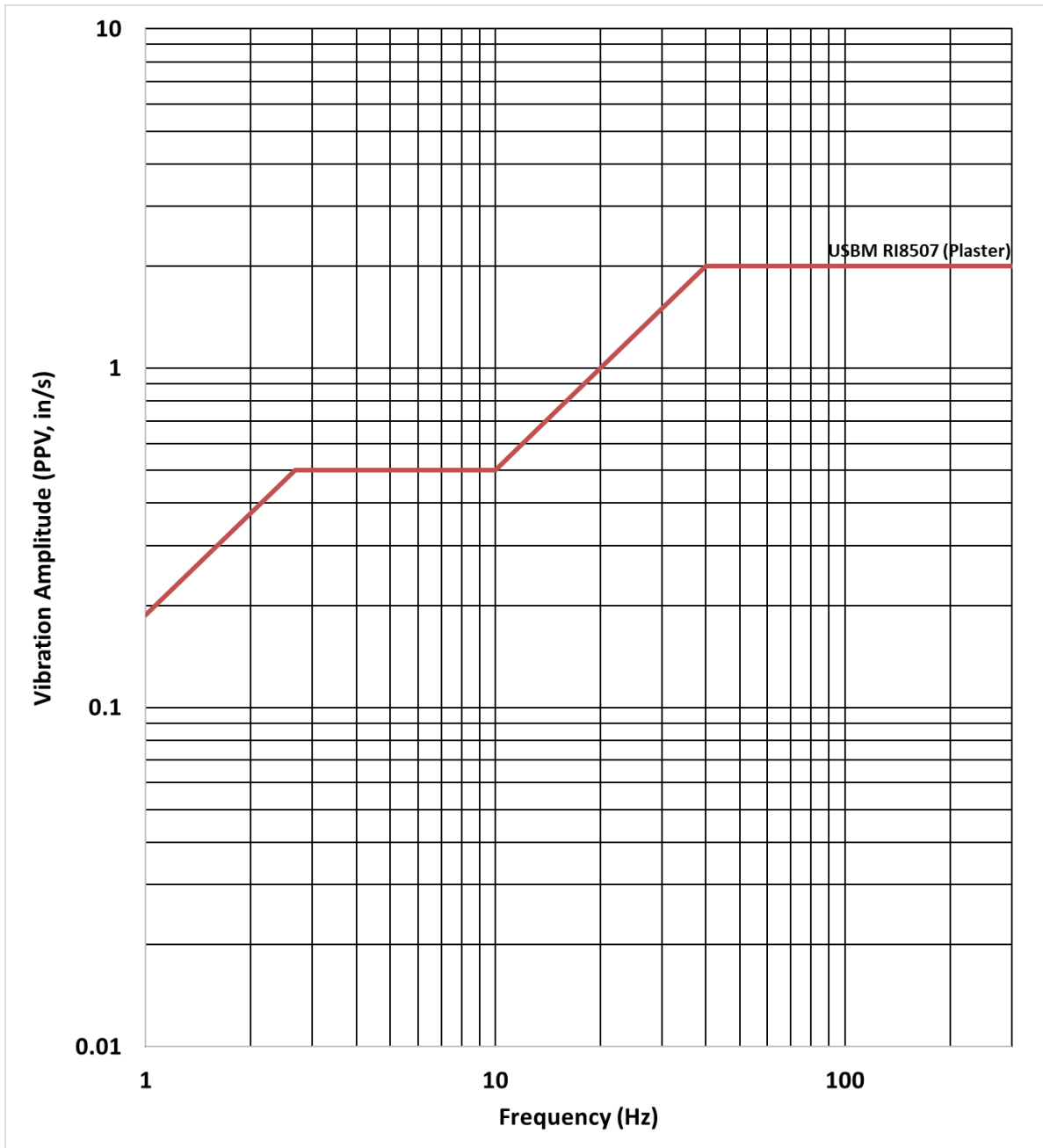


Figure 1. Frequency dependent US Bureau of Mines RI 8507 Vibration Limit (Plaster Curve).