

Facts about vibration during construction

Proximity to road construction, type of construction activity and the subsurface conditions of the ground where construction is taking place determine the vibration levels you may feel during the I-39/90 reconstruction work.

For most road projects, vibration from construction happens during:

- Pavement removal
- Pile installation or removal
- Road bed compaction
- Blasting of bedrock (No blasting is anticipated on this project)

Wisconsin Department of Transportation specifications require vibration monitoring to take place if:

- A dwelling is within 50 feet of general road construction activities; or
- Within a 100 foot minimum distance for pile driving activities.

Since no dwellings fall within the minimum distances of construction work, we do not anticipate vibration damage issues for this project.

As a precaution, some homes neighboring construction work may be inspected prior to and following construction. In addition, vibration monitoring equipment may also be utilized to monitor ground vibration levels during construction. Landowners will be notified by mail if an inspection is warranted.

If vibration monitoring is warranted, procedures will be in accordance with Wisconsin Department of Safety and Profession Services SPS 307.44 and conducted such that: A minimum of one seismograph is placed on stable ground within three feet of the building or structure and at a point of the building or structure that is closest to the vibration source. Vibration readings will be taken prior to construction activities to establish an ambient or background index. If more than one major construction activity per day take place, multiple seismographs may be used.

All pile driving operations shall be done in compliance with Wisconsin Department of Transportation Specifications (which are based on SPS 307.44) unless otherwise noted in the plan documents. Maximum allowable limits for ground vibration for structures are:

Structure Type	Maximum Peak Particle Velocity (PPV inches per second)
Reinforced Concrete Structures, Unoccupied	4.0
Steel Structures, Unoccupied	4.0
Buried Utilities	2.0
Wells and Aquifers	2.0
Green Concrete (less than 7 days)	1.0

(http://docs.legis.wisconsin.gov/code/admin_code/sps/safety_and_buildings_and_environment/301_319/307/IV/44)

For comparison, a transient vibration source (single isolated vibration) event at 0.04 Peak Particle Velocity (PPV) and continuous/frequent intermittent vibration sources at 0.01 PPV are barely perceptible to humans and reach severe levels to human response at 2.0 PPV for transient and 0.4 PPV for continuous/frequent sources. Most equipment used during construction create vibration levels ranging from 0.003 PPV up to 0.201 PPV with some heavier equipment ranging from 0.644 PPV to 1.518 PPV (Source: Federal Transit Administration, 2006).

