

Three different pile driving methods are used on the West Toronto Diamond grade separation site:

1. **GIKEN** press: The preferred method – hydraulically pressing in the pile with the least noise and virtually no vibration. Currently in use near Old Weston Road. This is the piece of equipment with the highest crane mast.
2. **The PTC Vibro**: A computer controlled vibratory hammer that minimizes ground vibration. It hangs from a crane mast, is mounted on top of the pile and vibrates the pile into the ground.
3. **The Diesel Impact hammer**: No intro needed I am sure... big noise / big vibration
4. **Conventional vibratory hammer**: Not computer controlled and causes high peak vibrations during start up and shut down.

The CTA has ruled on how each piece of equipment can be used:

1. **GIKEN**
 - a. Extended its use throughout the installation of piles
 - b. Should be used in the most sensitive areas
 - c. Can be used between 7:00am and 7:00pm on weekdays (excluding holidays) and between 9:00am and 7:00pm on Saturdays
2. **PTC Vibro**
 - a. The CTA has ordered that the PTC Vibro is the primary means to install piles
 - b. Depending on ground conditions, the PTC Vibro may not be able to completely install the piles. In those cases, an auger is supposed to be used to reduce ground resistance so that the pile can be completely installed by the PTC Vibro.
 - c. When auguring and the PTC vibro will not work, then in these extenuating circumstances, the diesel impact hammer may be used to finish the job.
 - d. Can only be used between the hours of 8:00-4:00
3. **The Diesel Impact Hammer**
 - a. Can only be used in conjunction with the PTC vibro or where no other method is possible
 - b. Workers must de-power the hammer, reducing its force, where possible, in order to reduce noise and vibration.
 - c. GO must use shrouds, and noise absorbing skirts when using the diesel impact hammer. If shrouds need to be opened to reduce heat, the opening must face either up or down the tracks and not toward any residential area
 - d. Where the hammer must be used, moveable noise barriers must be used wherever possible to deflect noise away from residential areas
 - e. Can only be used between the hours of 8:00-4:00
4. **Convention Vibratory Hammer**
 - a. Can be used in areas that are less sensitive to vibrations or where GO can mitigate the impact of vibrations

Two Second Summary

The PTC vibro combined with auguring is the *primary method* used to install piles. The impact hammer may have to be used to install the pile as a last resort if the PTC vibro, plus auguring cannot fully install the pile.

This means that you should never see a full length of pile being installed into the diesel impact hammer, as they would only be used in extenuating circumstances after the PTC vibro and auguring has failed to completely install the pile.

The GIKEN can run continuously during extended hours for the duration of piling. The conventional vibratory hammer may be used in areas that are less sensitive to vibration