

# Drilling rig creates good vibes for condo

## How It's Built

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An esoteric piece of construction equipment called a hydraulic drilling rig helped solve two irritants common with construction of infill condominium projects.

When planning construction of its 14-storey Clairmont project, now being built on Yonge St. just south of St. Claire Ave., Edilcan Development Corp. faced a serious engineering issue.

The city wanted Edilcan to reduce the vibrations generated during excavation to a level significantly lower than what had usually been allowed.

"There's a funny thing I learned on this project," says G.P. Di Rocco, Edilcan's vice-president. "There's vibrations that humans feel that won't damage a building, but then there's vibrations that are not discernible to humans that can damage buildings."

One of the challenges when constructing condos on small infill sites is completing the excavation without affecting neighbourhood buildings.

With some infill sites, neighbourhood buildings or other infrastructure are so close to the property lines that before excavation can begin, an underground retaining wall must be built around the perimeter of the construction site.

This insulates the excavation, so digging and construction does not affect the soils or foundations under adjacent buildings.

"In our case, we have everything. A road (Yonge St.), a cemetery and buildings right on the property lines," says Di Rocco.

The most common way to build these retaining walls, called caisson walls, is to use a vibrating hammer, which drives the steel girders and steel liners into the earth. Concrete is then



PHOTO COURTESY BIRMINGHAM CONSTRUCTION

**This German-made hydraulic drilling rig, called a BG22, was used to construct an underground retaining wall for the 14-storey Clairmont condo project on Yonge St. near St. Clair Ave.**

poured into the liners and, before it hardens completely, the liners are pulled out, leaving a concrete wall behind.

However, vibrating hammers make a lot of noise and produce vibrations that not only irritate people, but also have the potential to damage nearby buildings.

Enter the hydraulic drilling rig, a piece of excavation equipment commonly used in Europe, which enabled Edilcan to proceed with digging for the 87-unit Clairmont and meet the city's request to reduce vibrations.

While vibrating hammers work by shaking or oscillating caisson liners into the ground, hydraulic drilling rigs screw the liners into the ground.

"What this rig does is it pushes down on the caisson (liner) while turning it and, at the same time, it excavates the material underneath it," Explains Patrick Bermingham, president of

Birmingham Construction Ltd., a Hamilton-based foundation contractor and equipment manufacturer.

He says the hydraulic drilling rig used on the Clairmont site advances liners "without producing ground vibration of any noticeable or measurable degree."

And it gives us a higher degree of accuracy, so we can more accurately install the liner vertically. And thirdly, it's quieter."

Di Rocco says the rig solved the city's concerns.

"The city was quite surprised when we went back and said, 'Guess what. We are going to do this without vibrating,'" he says.

Birmingham says they searched all the way to Portland, Ore., to find a hydraulic drilling rig that would meet the city's specifications for the Clairmont site.

"If the one in Oregon wasn't

available, my next stop would have been Malaysia or Singapore, where I know I can get one. It's fairly specialized, there's simply not that many of these machines in North America," he says.

The rig purchased for the Clairmont project cost about \$1.3 million and was made by the Bauer Group, a German company that specializes in equipment for foundations and excavations.

By comparison, Bermingham says the older technology of vibrating hammers typically costs about \$500,000 to \$700,000 (including the crane the hammers are mounted on).

"The tooling is very, very expensive," he says of the Bauer made hydraulic system. "To make it pay off, you have to have some serious constraints that prohibit you from using older (drilling technologies)."

He says hydraulic drilling rigs are commonly used in European cities, which have been dealing for years with the engineering and construction challenges Toronto builders are now experiencing.

"In Europe, most cities already have a great deal of development. And when they're reconstructing, they're always working between two or three other buildings," Bermingham says.

While infill projects aren't new in Toronto, the difference is the increased volume of infill construction generated by the city's booming condo market.

"And people are more sensitive," Bermingham says. "So we now have the same social and development constraints that require us to use the same equipment they use in Europe."

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