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Movax Robotic: Hydraulic Vibratory Pile Driver

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MOVAX ROBOTIC: HYDRAULIC VIBRATORY PILE DRIVER

THE NEED

Pile sheeting operations need auxiliary equipment and personnel to complete, while contractors have been concerned in increasing safety for crews, saving money, and efficiency. Environment constraints, such as low headroom, and dense soil conditions make the contractors' concern difficult to achieve in some cases. The introduction of vibratory pile driving equipment have helped contractors to try accommodating these issues. Yet, the needs of additional personnel and limitation of 5-10 feet headroom for operation are still considered as the shortcomings of these methods.



FIGURE 1 MOVAX ROBOTIC: HYDRAULIC VIBRATORY PILE DRIVER

THE TECHNOLOGY

Movax is a robotic excavator mounted hydraulic vibratory pile driver. Its unique robotic articulation and side gripping ability allows the operator not only to drive and extract sheet piles, but also to pick a sheet, move it, thread it, and place it. The Movax can pick up a 50-foot sheet without releasing the sheet during these operations. This ability allows the Movax Robotic to help increasing crew safety by reducing the need of personnel in the job site. It is possible to assign only one man to do pile sheeting with the Movax.

The Movax Robotic uses very high frequency hydraulic vibrator, 3000 cycles per minute, and has about 55 tons dynamic drive force. It is perfectly mounted on a 20 ton



excavator or above. It also takes advantage of the powerful hydraulic of excavator to add a 15 ton down force. With this power, the Movax can be used to drive sheet piles, I-beams, and pipes relatively for any type of soil condition.

With the full automatic steering and side grip ability, the excavator automatically corrects the straightness of the sheet pile during the driving and extracting. When the Movax drives the first pile into the ground, the distance is put into memory. The 'auto' takes the pile to the right distance near the guide and sets pile into the upright position. The 'walking' of the pile wall is eliminated with the side grip and 'auto' steering. The guide directs and the auto drives the pile straight. Addition to these abilities, the side grip allows the Movax to operate in a 4-6 inch headroom environment.

THE BENEFITS

- A side grip allows for low head clearance.
- Only one man needed for pile driving operation.
- Semi-auto steering device for exact pile placement.
- Powered by excavator hydraulics for true one man control.
- From horizontal to vertical, Movax Robotic places & drives the pile.

STATUS

The Movax Robotic is manufactured by Unisto Oy, Finland, and distributed by Hercules Machinery Corporation. The versatility of this equipment has been proven in a rehabilitation project under bridge, pile driving inside building, and pile extraction project in Louisville.

BARRIERS

While the Movax may reduce the need of personnel on the job site to assist the pile sheeting operation, more technical skill is needed for the excavator operator to perform the operation.



**FIGURE 2 SUPERIOR PERFORMANCE IN NARROW CONDITIONS
AND LOW HEADROOM AREAS**



POINTS OF CONTACT

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REFERENCES

1. "Movax SP50D", Video Presentation, Hercules Machinery Corporation.

REVIEWERS

Peer reviewed as an emerging construction technology

DISCLAIMER

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