



Vibrolance

success
through
innovation



With the constant growth of infrastructures in the industrialized countries, land prices are increasing constantly. Areas where soils were initially poor for building are getting more attractive. Ground engineers must verify the geotechnical stability of the soil where the structures are to be built. When these investigations indicate that soil is not strong enough, different solutions can be proposed.

Ground treatment

Ground treatment by Vibrolance methods is the **most economical solution** compared with other techniques of soil improvement (substitution, removing, injection) or with other foundation technologies (cast in-situ piles, precast piles) which can be quite expensive.

Vibrolance

The PTC Vibrolance is a slender cylindrical hydraulic vibratory system which comes with:

- A robust HP vibrating probe.
- Specially designed power packs fitted with a 127 kW to 246 kW diesel engines.
- One or several extension tubes.
- A 30 or 45 meters set of linking hoses.
- The variable frequency makes a variable vibration energy of the PTC VIBROLANCE and allows instant adaptation to varying soil types.
- The simplicity of the VIBROLANCE modular design and assembly result in great reliability and ease of on-site maintenance.

The PTC VIBROLANCE is free hanging from a crane and is vibrated into the ground by its own weight usually assisted by water or air jetting.

- The elastic suspension of the VIBROLANCE dampens totally the vibrations from the crane.
- The use of standard 5 m extension tubes allows the length of the VIBROLANCE to be adjusted easily according to penetration.
- The PTC VIBROLANCE is the result of thorough on-site testing.

Advantages

- Flexible and natural foundations.
- Compaction by lateral soil displacement.
- Drain effect for lower soil liquefaction risk.
- Lowering of interstitial water pressure.
- No excavation, which means no "destructured" soil, no transport nor waste disposal.

Water Jetting

The VIBROLANCE can be used for vibro-compaction and vibro-replacement, with water or air jetting without modification.

PTC offers water jetting pumps (150 m³/h at 15 or 30 bar) powered by separate diesel engine or by the main power pack of the VIBROLANCE.



Vibrocompaction of reclamation made of sand, carried out by the 140HL and supported by lateral water jets.

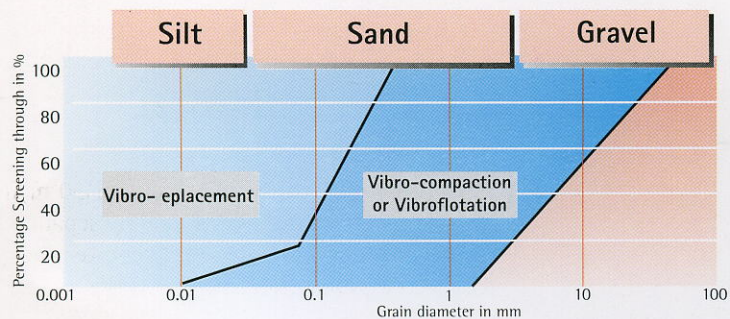
Ground treatment methods

Relationship between grain size and ground treatment techniques.

The grain size curves indicate where Vibro-compaction and Vibro-replacement can be used.

Two methods are proposed with the Vibrolance:

- Vibro-compaction
- Vibro-replacement



Vibroreplacement.

Vibro-Replacement:

creating stone columns for soft saturated more cohesive soils not compactable. The content of fines could be up to 15%.

The soil is laterally compacted by displacement, then it is replaced by stones.

The stones which are also compacted create a so called "stone column".

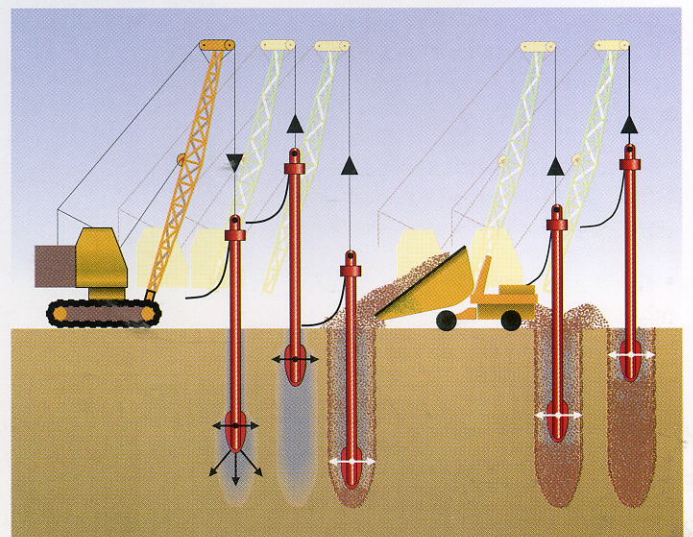
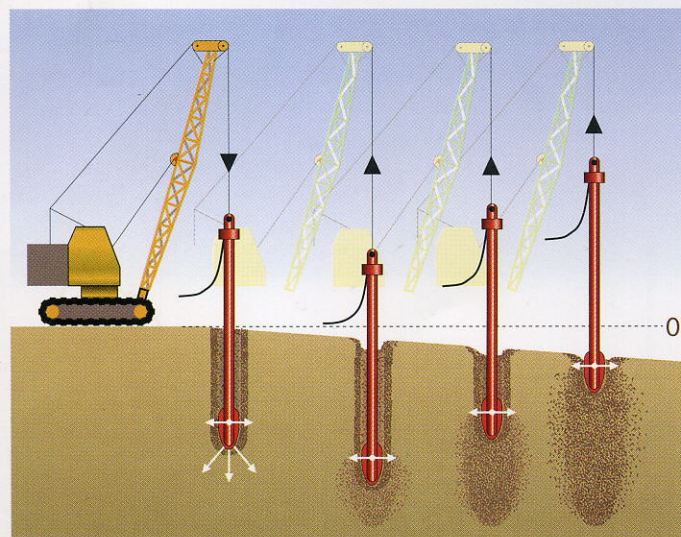
The VIBROLANCE penetrates mainly by the cutting action of the jets which form an oversized hole in the ground. As the VIBROLANCE is withdrawn and re-driven several times, a suitably graded fill is fed into the hole until a compacted stone column is formed.

Vibro-Compaction:

also called Vibroflotation: for loose non cohesive soils.

To densify natural granular soil filled or reclaimed made with less than 10% of fines.

When the required depth is reached actual compaction begins: the downward jetting is shut off, the VIBROLANCE is gradually withdrawn with brief compaction periods at predetermined stages. Backfill material after processing is well compacted.



Vibrolance monitoring system

The PTC monitoring system provides the high pressure as well as the depth values of the VIBROLANCE versus time through a display and printer device.

For instance in the application attached a pressure of 210 bars corresponds to a CPT resistance of 30 MPa which is required here.

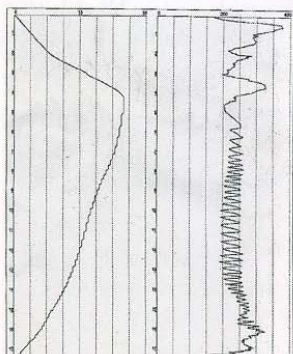
The Monitoring system can be installed inside the cab of the crane

The high pressure value as well as the depth is displayed on a screen in big characters.

The high pressure value is given by a pressure sensor which takes the information on the HP circuit of the main pump. The depth value is given by a sensor mounted on the pulley of the crane.

In the same time, both values are printed on paper vs time. Compaction time proves the columns are well achieved at the right densification. In this way record can be kept for report.

The powerpack is equipped with a connector to plug or unplug the display system.



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VIBROLANCE SPECIFICATIONS



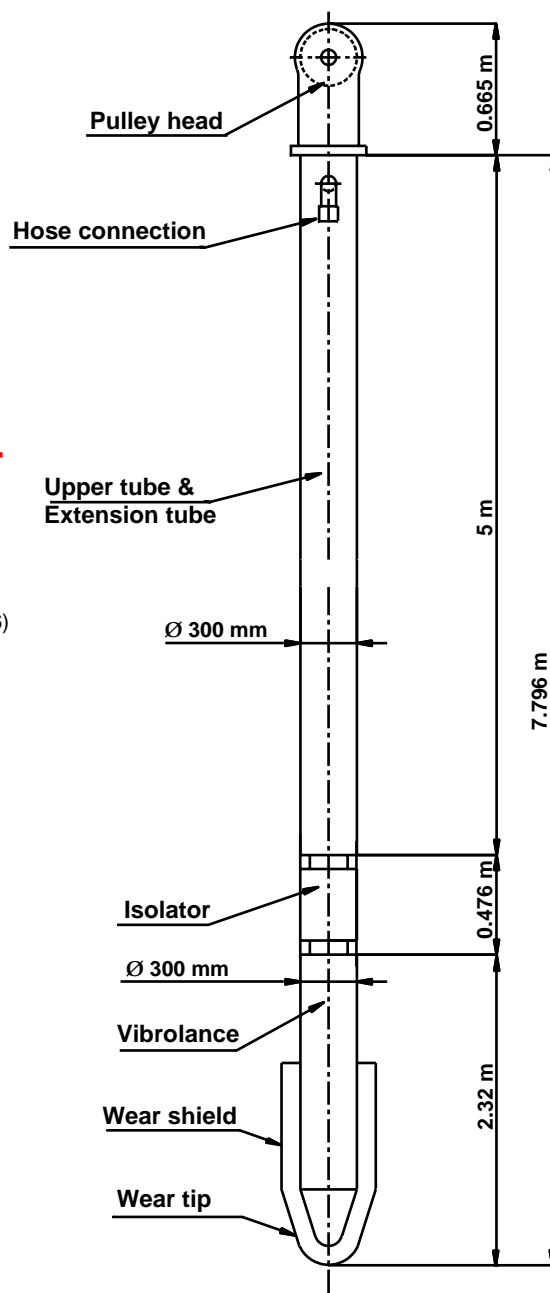
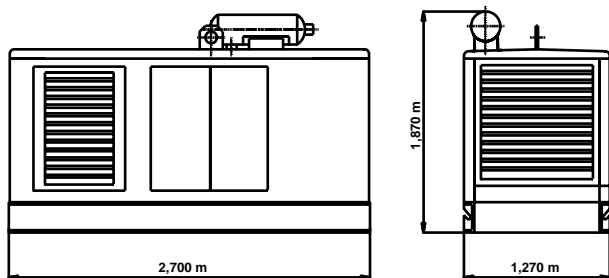
Certified Quality System

VIBROLANCE 140 HR

Power of Vibrolance:	112 kW
Eccentric moment:	18 m.N
Operational. frequency:	50 Hz(3000 rpm)
Operational centrifugal force:	181 kN
Amplitude:	12 mm at tip
Wear shield / Tip:	Split design for ease of replacement made from special heavy duty wear steel
Pulley head:	Design for 24 mm diameter cable
Connecting hoses:	30 m (HP-LP 1" ; Dr ¾" ; Lubrication ½")
Total weight:	2.2 t (7.796 m model)
Weight of extension:	1 t

POWER PACK V 220

Engine model:	JOHN DEERE 6068TF 275
Intermittent rating of engine:	138 kW / 185 HP at 2500 rpm. (DIN 6271 or ISO 3046)
Operational oil flow:	225 l / mln
Max. working pressure:	350 bar
Fuel capacity:	180 l
Hydraulic oil capacity:	230 l
Length:	2.70 m
Width:	1.27 m
Height:	1.87 m
Weight without fuel:	2.2 t



INSTRUMENTATION

PTC can supply a quality control recording monitor, named Vibrolance Vibcoder, for vibroflotation processes. This monitor is equipped with a screen and allows the display and the printing of the operating pressure vs. time. Several other parameter display are available. The Vibcoder can be mounted on the crane cab.



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VIBROLANCE SPECIFICATIONS



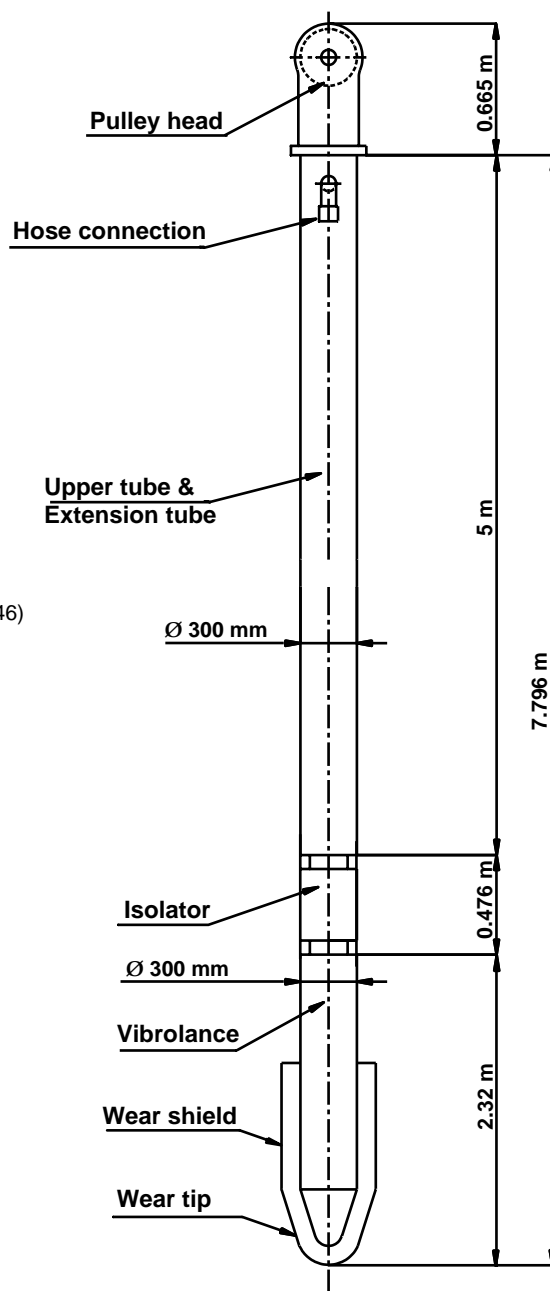
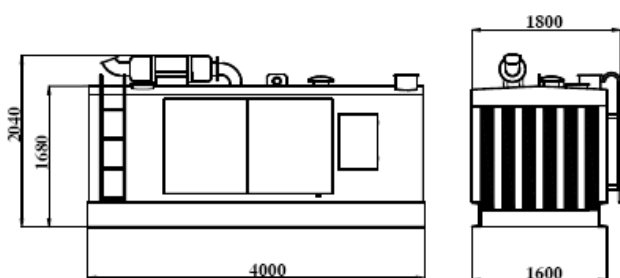
Certified Quality System

VIBROLANCE 160 HR

Power of Vibrolance:	150 kW
Eccentric moment:	18 m.N
Operational. frequency:	40 Hz (2400 rpm)
Operational centrifugal force:	116 kN
Amplitude:	12 mm at tip
Wear shield / Tip:	Split design for ease of replacement made from special heavy duty wear steel
Pulley head:	Design for 24 mm diameter cable
Connecting hoses:	30 m (HP-LP 1 1/4" ; Dr 1" ; Lubrication 1/2" and 3/8")
Total weight:	2.2 t (7.796 m model)
Weight of extension:	1 t

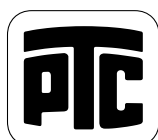
POWER PACK V 260

Engine model:	CATERPILAR C7
Intermittent rating of engine:	205 kW / 275 HP at 2300 rpm. (DIN 6271 or ISO 3046)
Operational oil flow:	280 l / mln
Max. working pressure:	350 bar
Fuel capacity :	180 l
Hydraulic oil capacity:	230 l
Length:	4.00 m
Width:	1.80m
Height:	2.04 m
Weight without fuel:	4.2 t



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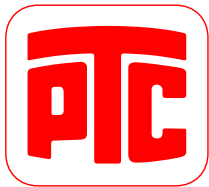
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VIBROLANCE SPECIFICATIONS



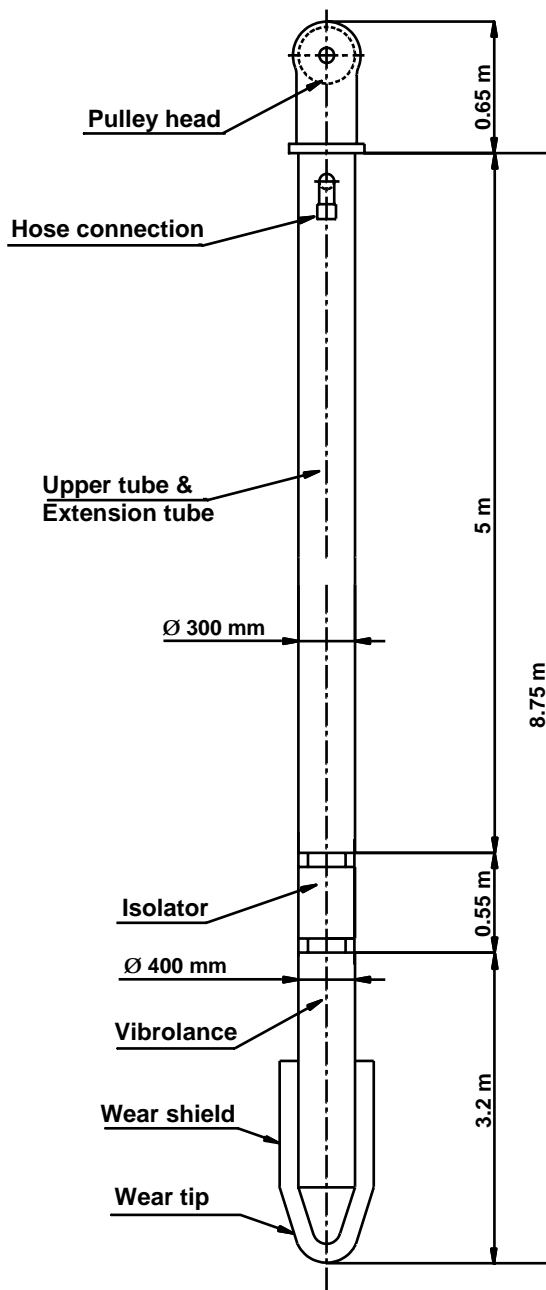
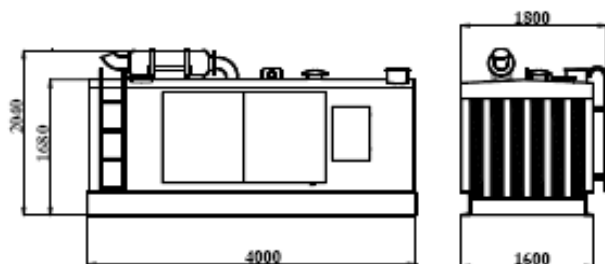
Certified Quality System

VIBROLANCE 400 HR

Power of Vibrolance:	176 kW (350 bar – 28 Hz)
Eccentric moment:	112 m.N
Operational frequency :	28 Hz (1680 rpm)
Operational centrifugal force:	354 kN
Max. amplitude:	26mm at tip
Wear shield / Tip:	Split design for ease of replacement made from special heavy duty wear steel
Pulley head:	Designed for 24 mm diameter cable
Connecting hoses:	30 m (HP-LP 1" ½ ; Dr 1" ; Lubrication ½")
Total weight:	2.650 t (8.75 m model)
Weight of extension:	1.1 t

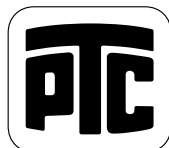
POWER PACK V 350

Engine model:	CATERPILLAR C9
Intermittent rating of engine:	242 kW at 2200 rpm. (DIN 6271 or ISO 3046)
Pump oil flow:	335 l / mln
Max. working pressure:	350 bar
Fuel capacity:	560 l
Hydraulic oil capacity:	310 l
Length:	4.00 m
Width:	1.8 m
Height:	2.04 m
Weight without fuel	4.2 t



INSTRUMENTATION

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VIBROLANCE SPECIFICATIONS



Certified Quality System

VIBROLANCE 140 HR+BOTTOM FEED SYSTEM

Power of Vibrolance:	112 kW
Eccentric moment:	18 N.m
Operational frequency:	50 Hz(3000 rpm)
Max. centrifugal force:	181 kN
Max. amplitude:	12mm to 14 mm at tip
Wear shield/tip:	split design for ease of replacement made from special heavy duty wear steel
Total weight:	5 t
Depth soil treatment:	10.4 m
Stone tank capacity:	1.5 m ³

BOTTOM FEED SYSTEM

Hydraulic cylinders

Quantity:	2
Max pressure:	250 bar
Oil flow:	15 l/mn

Required pneumatic pressure

Max pressure:	10 bar
Max pressure in BFS:	5 bar

Required hydraulic power

High Pressure

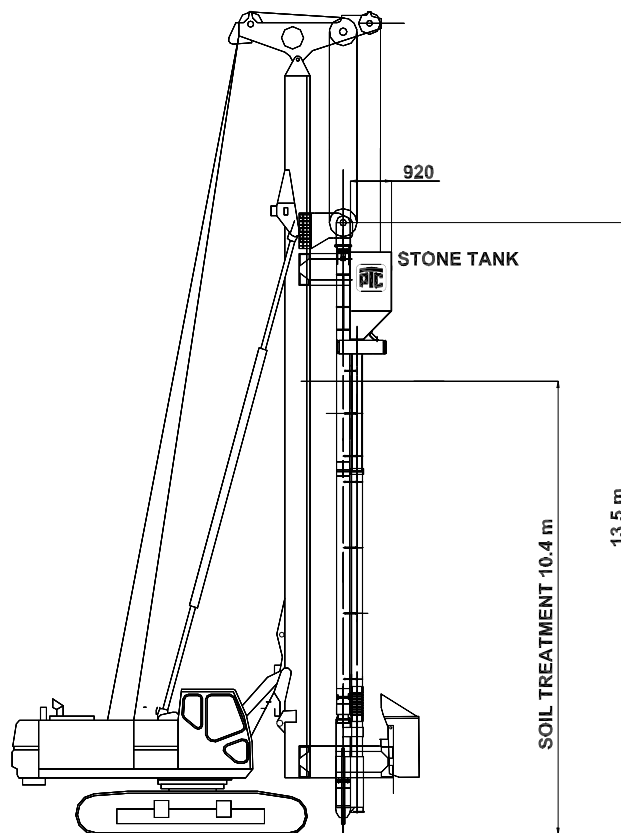
Max. oil flow:	225 l/mn
Max oil pressure:	350 bar

Lubrication

Max Oil flow:	10 l/mn
Max Oil pressure:	15 bar

Drain pressure

Back pressure lower than:	3 bar
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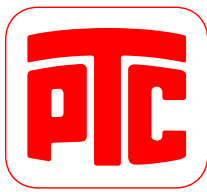
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VIBROLANCE VIBCORDER™

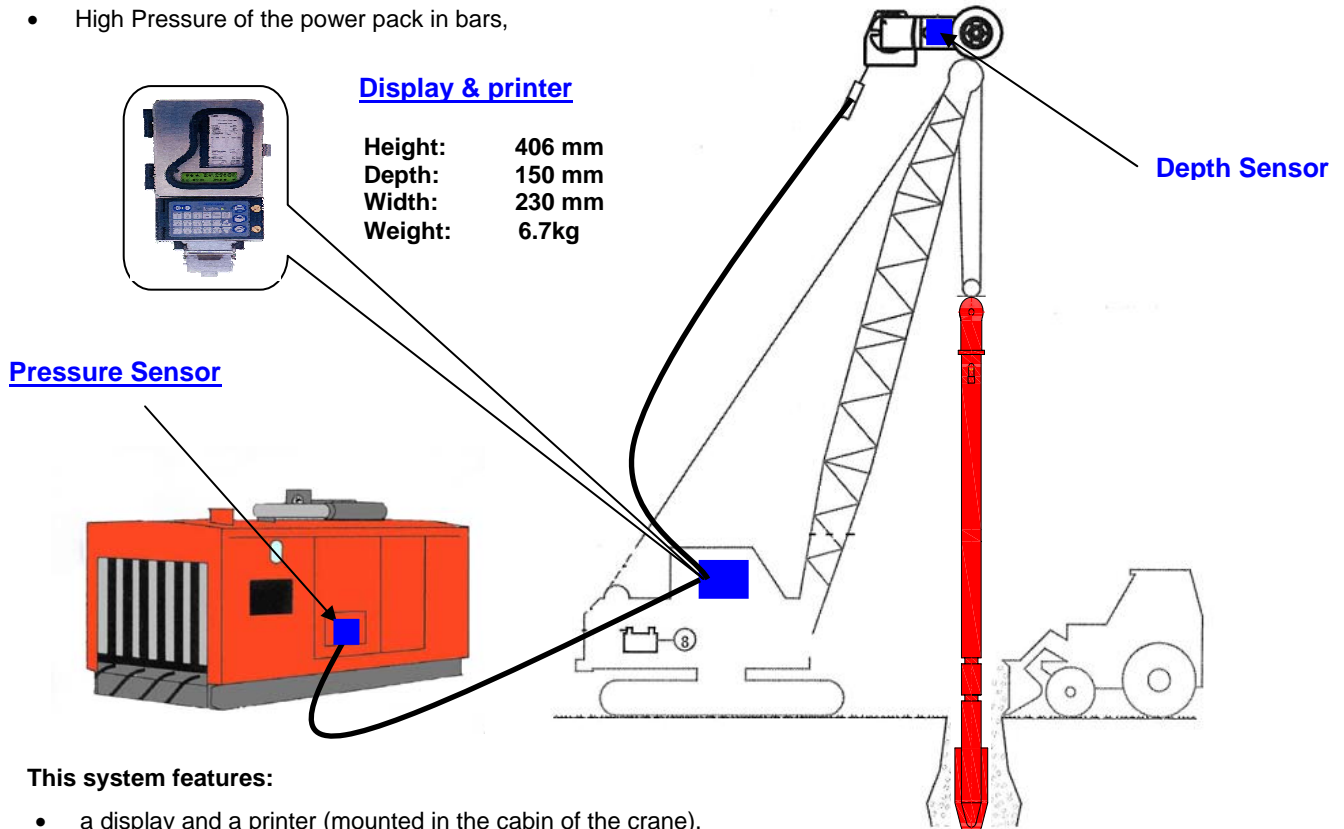


Certified Quality System

The VIBROLANCE VIBCORDER™ is a monitoring system utilized for PTC Vibrolance applications which allows the operator to control the compaction rate and the treatment depth.

The system simultaneously measures, records and prints the following parameters:

- Depth of the Vibrolance tip in meters
- High Pressure of the power pack in bars,



This system features:

- a display and a printer (mounted in the cabin of the crane),
- a depth sensor (mounted on the crane),
- a pressure sensor (installed inside the power pack),
- as an option, a solid state memory card which can be read on a PC computer (inserted in the display of Vibcorder).

Advantages:

- The Vibcorder, which can be installed in the crane cab, allows the operator to check all the parameters during driving.
- This system controls the ground treatment job in simple manner: the operator can see when the desired depth is reached, and then he can start the compaction. This second phase will be monitored by checking the high pressure value.
- This system can be used either with sand compaction or with stone columns applications.
- Due to the solid state memory card, the report can be printed as a proof of high quality driving of each profile according to the client's requirements.
- As an option, it is also possible to measure continuously the inclination (x, y) of the Vibrolance.



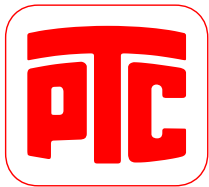
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VIBROLANCE APPLICATIONS



160HR Vibrolance for vibro-replacement by stone columns in Stoke on Trent, in England

Innovation and Diversity

400HR Vibrolance with water jetting for vibro-compaction of 25 m deep on a triangular grid, in Singapore



140HR Vibrolance with BFS (Bottom Feed System) mounted on a rig driving 6m deep stone columns, in France



140HR Vibrolance for vibro-compaction of 25m deep on a regular grid, in Hong Kong



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Greece

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