

ICE

INTERNATIONAL CONSTRUCTION EQUIPMENT

VIBROFLOT PRODUCT RANGE



GANDARA

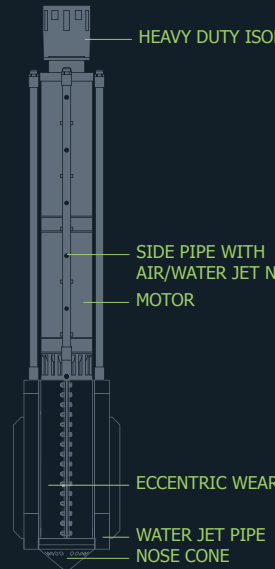
SU EQUIPO EN CIMENTACIÓN

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DEEP COMPACTION TECHNIQUES BY ICE VIBROFLOTS

Vibro Compaction is a deep compaction technique for densifying granular soils in situ by means of an electric vibrating unit. Under the influence of simultaneous vibration and saturation, loose sand or gravel particles are repacked into a denser state, and lateral confining pressure within the soil mass is increased.

Extension tubes are added to allow the Vibroflot to do its work to depths up to 30 metres below surface level. The Vibroflot assembly is typically supported from a standard crane or purpose-built hydraulic crawler crane. Treatment is accomplished over a 50 - 100 cm interval and the vibrator is raised to the next level. This procedure is repeated over the entire depth of treatment.



Compaction or Replacement

The two primary deep vibratory techniques are Vibro compaction and Vibro Replacement. Vibro compaction is used to densify loose sands and gravels. In soils that do not respond well to vibration alone, improvement is achieved by the installation of stone columns using the vibro replacement technique. There are two primary methods of vibro stone column construction; The wet top feed and the dry bottom feed method

As well as the Vibro Compaction as the Vibro Replacement technique offers a technically proven and cost effective alternate to deep vibrations, allowing a variety of structures to be supported on shallow spread footings. These structures include: residential, Commercial and industrial facilities; office buildings, schools, bridges, overpasses, highways, dams and embankments.



EXPECTED VIBRO COMPACTION RESULTS

Ground type	Relative effectiveness
Sands	Excellent
Silty sands	Marginal to good
Silts	Poor
Clays	Not applicable
Mine spoils	Good (if clean granular)
Dumped fill	Dependent on nature of fill
Garbage	Not applicable

EXPECTED VIBRO REPLACEMENT RESULTS

Ground type	Relative effectiveness	
	Densification	Reinforcement
Sands	Excellent	Very good
Silty sands	Very good	Very good
Non plastic silts	Good	Excellent
Clays	Marginal	Excellent
Mine spoils	Excellent, depending on gradation	Good
Dumped fill	Good	Good
Garbage	Not applicable	Not applicable

ICE Vibroflot HAMMERS

- EQUIPMENT AVAILABLE FOR STRAIGHT SALES TO THE OPEN MARKET. (BUT THE ECCENTRIC AND ELECTRIC MOTOR DESIGNS ARE PATENTED)
- FULLY ADJUSTABLE ECCENTRIC MASS TO BE ABLE COPE WITH DIFFERENT SOIL CONDITIONS AND TO PROLONG THE LIFE OF THE BEARINGS.
- NO COMPLICATED OIL PUMPS INSIDE THE ECCENTRIC HOUSING OF THE Vibroflot TO FAIL. SIMPLE YET VERY EFFECTIVE DESIGN.
- MODULAR CONSTRUCTION OF THE Vibroflot - WHICH ENABLES THE FULL ECCENTRIC AND ELECTRIC MOTOR ASSEMBLIES TO BE EASILY BUILT AND STORED SEPARATELY. THIS ALLOWS ROUTINE OVERHAULS AND REPAIRS TO BE CARRIED OUT VERY EFFICIENTLY. AVAILABLE SOON - ADDITIONALLY, THE Vibroflot CAN BE CHANGED EASILY TO A HYDRAULIC VERSION, USING THE EXISTING ECCENTRIC WEIGHT ASSEMBLY.
- VERY LOW DAILY MAINTENANCE - JUST TO CHECK THE WEAR PARTS AND GENERAL SECURITY OF FIXINGS.
- POSSIBLE TO SERVICE THE INTERNAL OF THE ECCENTRIC AS THE OIL CAN BE CHANGED PERIODICALLY ON THE JOB SITE.
- ELECTRIC MOTOR HAS OVERHEATING PROTECTION - 1 SENSOR FOR MONITORING THE REAL TIME TEMPERATURE AND 1 SWITCH TO STOP THE MOTOR ONCE IT REACHES 180°C
- THE MONITOR IN THE OPERATORS CABINE IS USER FRIENDLY AND THE DATA CAN BE TRANSFERRED TO A PC OR LAPTOP USING A SIMPLE USB MEMORY STICK. NO SPECIAL MEMORY BLOCKS REQUIRED.

The Wet, top feed method

In this method jetting water is used to remove soft material, stabilize the probe hole, and ensure that the stone backfill reaches the tip of the vibrator.

Dry Bottom Feed Method

This technique uses the same vibrator probes as standard Vibro Replacement, but with the addition of a hopper and supply tube to feed the stone backfill directly to the tip of the vibrator. Bottom feed Vibro Replacement is a completely dry operation where the vibrator remains in the ground during the construction process.



All the imported data are gathered and kept to insure a safe and smooth operation. Daily records will be kept and submitted to the Engineer for information and review, and the record will include the following details:

- Date,
- Compaction Point Reference Number, Depth of Penetration,
- Holding time per lifting increment
- Depths of obstructions encountered (if any).

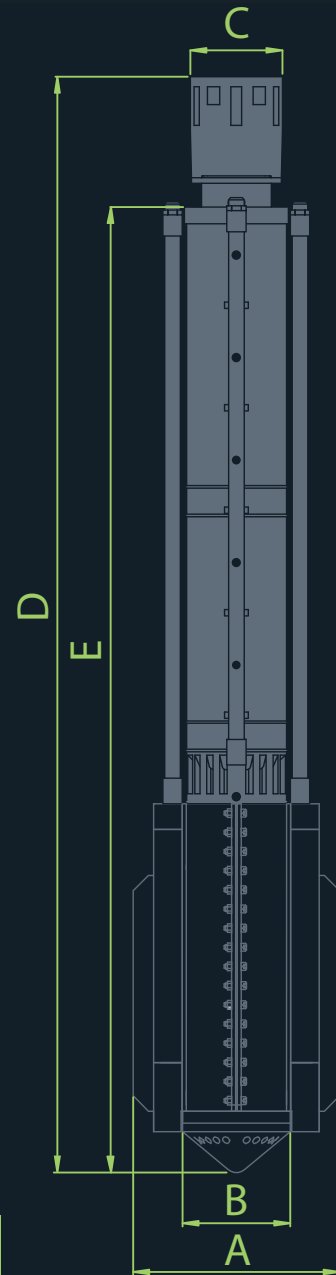
Also general site settlement records for each area are kept. The installation rigs are equipped with automatic recording units which record on a continuous basis the following parameters:

- Date and rig reference
- Compaction point identification
- Depth-time records
- Amperage-time records

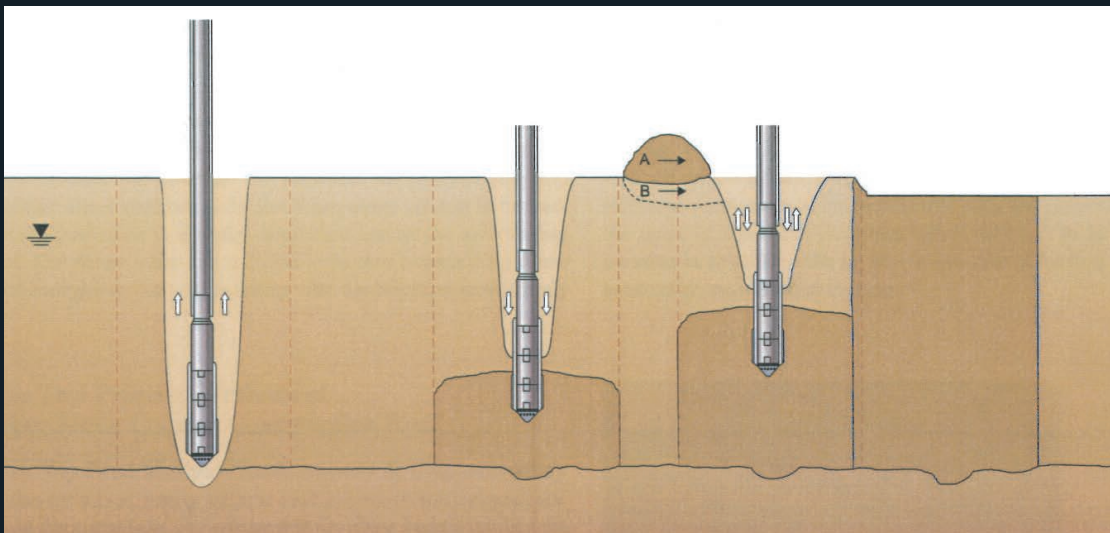


VIBROflot COMPACTION HAMMERS

	V130		V180		V230	
Electric motor	KW		180		230	
Speed	RPM		1.450 - 1.770		1.450 - 1.770	
Max. Amplitude	mm		25		40	
Weight vibrator	kg		2.700		3000	
Weight follow. tube	kg/m		377		439	
Weight lifting head	kg		406		406	
Weight pulley block	kg		900		900	
Length A	mm				806	
Diameter B	mm				420	
Diameter C	mm				5.666	
Length D	mm				6.386	
Length E	mm		816		816	
Required equipment	Single	Tandem	Single	Tandem	Single	Tandem
Engine power	KVA		250 - 350		350 - 500	
Typical crane size			500 - 700		700 - 1.000	
Compressor	cfm				60 - 80	
Water pump	bar				150	
Wheeled loader					750 - 850 ^(1x)	
					750 - 850 ^(2x)	
					6 - 10 ^(1x)	
					6 - 10 ^(2x)	
					930 - 966 ^(1x)	
					930 - 966 ^(1x)	



THE PRINCIPLE OF COMPACTION



■ PENETRATION

AT FULL WATER PRESSURE THE VIBROflot PENETRATES TO THE WANTED DEPTH AND IS SURGED UP AND DOWN AS NECESSARY TO AGITATE SAND, REMOVE FINES AND FORM AN ANNULAR GAP AROUND THE VIBRATOR. THE WATER FLOW IS THEN STOPPED OR REDUCED.

■ COMPACTION

UNDER THE ACTION OF INDUCED HORIZONTAL FORCES THE SOIL PARTICLES SURROUNDING THE BASE OF THE VIBRATOR ARE REARRANGED TO A DENSER STATE OF COMPACTION. THE VIBRATOR IS RAISED INCREMENTALLY AS COMPACTION IS ACHIEVED

■ REFILLING

DURING COMPACTION EITHER IMPORTED (A) OR IN SITU (B) MATERIAL IS INTRODUCED. IF IN SITU MATERIAL IS USED THE SURFACE OR THE AREA BEING COMPACTED MAY BE LOWERED 5% TO 15% OF THE TREATED DEPTH.

■ COMPLETION

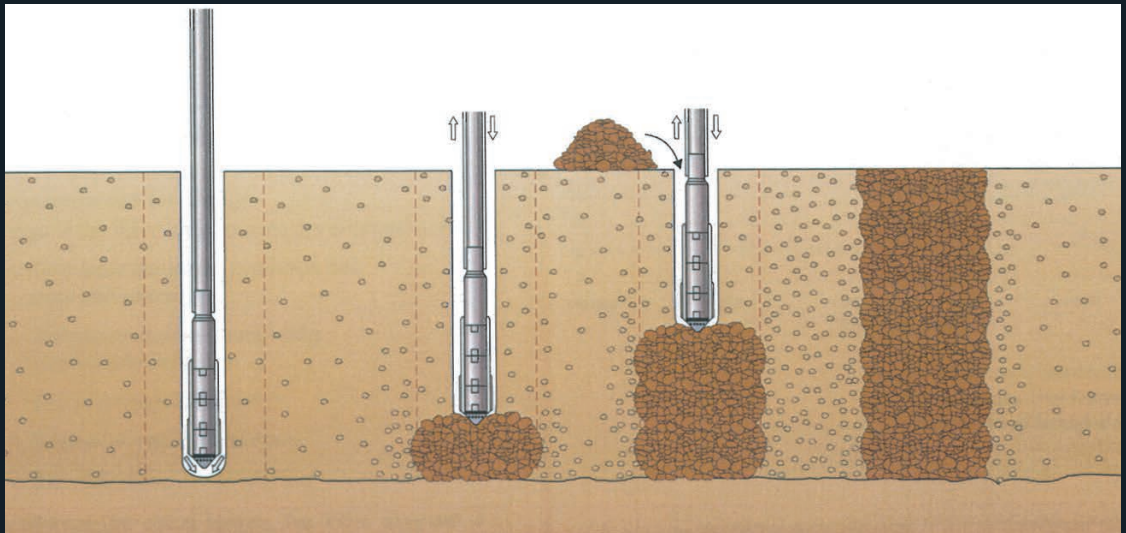
WITH AN ECONOMICAL LAY-OUT OF COMPACTION PROBES, AN OPTIMUM IMPROVEMENT CAN BE ACHIEVED. THE SURFACE OF THE IMPROVED AREA IS THEN RE LEVELLED AND DENSIFIED WITH A SERVICE COMPACTOR.

VIBROFLOT REPLACEMENT HAMMERS



	V130	V180	V230
Electric motor	KW	180	230
Speed	RPM	1.450 - 1.770	1.450 - 1.770
Max. Amplitude	mm	25	40
Weight vibrator	kg	2.700	3000
Weight follow. tube	kg/m	377	439
Weight lifting head	kg	406	406
Weight pulley block	kg	900	900
Length A	mm		806
Diameter B	mm		420
Diameter C	mm		5.666
Length D	mm		6.386
Length E	mm	816	816
Required equipment	Single Tandem	Single Tandem	Single Tandem
Engine power	KVA	250 - 350	500 - 700
Typical crane size			350 - 500 700 - 1.000
Compressor	cfm		60 - 80 150
Water pump	bar		750 - 850 ^(1x) 750 - 850 ^(2x)
Wheeled loader			6 - 10 ^(1x) 6 - 10 ^(2x)
			930 - 966 ^(1x) 930 - 966 ^(1x)

THE PRINCIPLE OF TOP FEED REPLACEMENT



■ PENETRATION

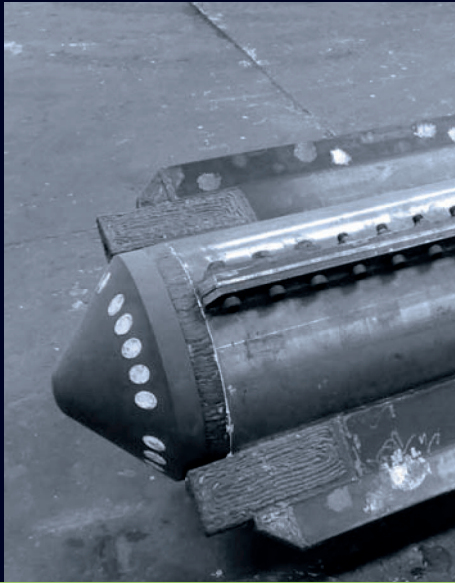
ASSISTED BY WATER JETTING THE VIBROFLOT PENETRATES TO DESIGN DEPTH UNDER ITS OWN WEIGHT. THE WATER JETS ARE THEN ADJUSTED TO MAINTAIN AN ANNULAR SPACE AROUND THE VIBRATOR.

■ REPLACEMENT

CRUSHED STONE BACKFILL IS INTRODUCED IN DISCRETE LIFTS FROM THE GROUND SURFACE. RE PENETRATION OF EACH LIFT, AND HORIZONTAL FORCES OF THE VIBRATOR, LATERALLY COMPACTS THE STONE AGAINST THE SURROUNDING SOIL.

■ COMPLETION

THIS PROCESS IS REPEATED UP TO GROUND LEVEL, FORMING A WELL COMPACTED, TIGHTLY-INTERLOCKED STONE COLUMN SURROUNDED BY SOIL OF ENHANCED DENSITY.



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