LANDPAC®

GROUND ENGINEERING

VALUE ENGINEERED GROUND IMPROVEMENT

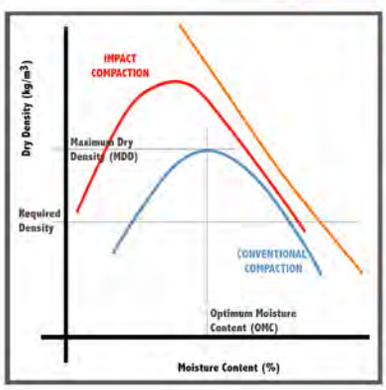
with

HIGH ENERGY IMPACT COMPACTION

HIGH ENERGY IMPACT COMPACTION

High energy impact compaction involves the transfer of compaction energy into the soil by means of the lifting and falling motion of non-circular rotating masses. The rotation of such masses to their highest point results in an effective potential energy build-up. Further rotation of these masses results in the conversion of this potential energy into a falling kinetic energy, which is transferred to the soil upon the impact of the lowest point of the masses with the surface of the soil. The amount of energy transferred, in the form of compactive effort, is closely related to the amount of potential energy generated in the lifting process.

FEATURES of HIGH ENERGY IMPACT COMPACTION



COMPACTION LOADS
- *Typical compaction loads of 1200-2500kN.*

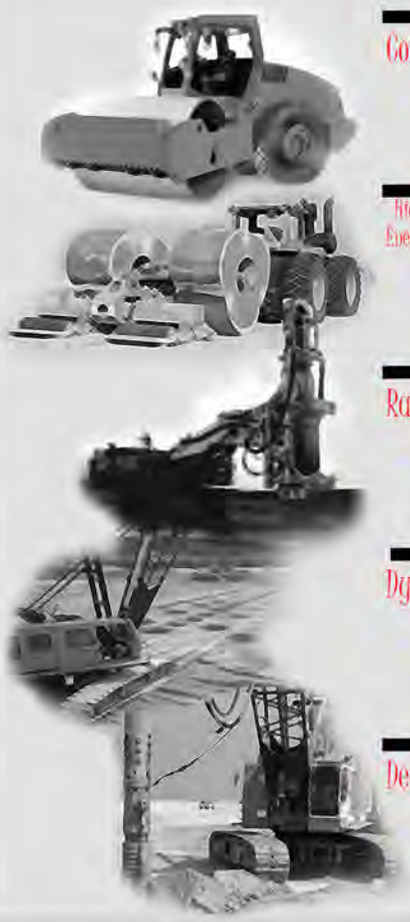
MATERIAL MOISTURE CONDITION
- *Ability to compact the material to a higher maximum dry density.*
- *Ability to compact over a wider range of moisture content, particularly dry of OMC.*

DEPTH OF INFLUENCE
- *Higher surface contact pressure coupled to a relatively large contact area leadsto a vastly increased depth of influence.*
- *Ground improvement is typically measured to effective depths of 1.5m to 3m.*

SOIL COMPRESSIBILITY
- *The energy is transferred in the form of a "rolling impact" resulting in a relatively longer load duration, leading to a softer soil response to the load and hence an enhanced soil compressibility is achieved.*

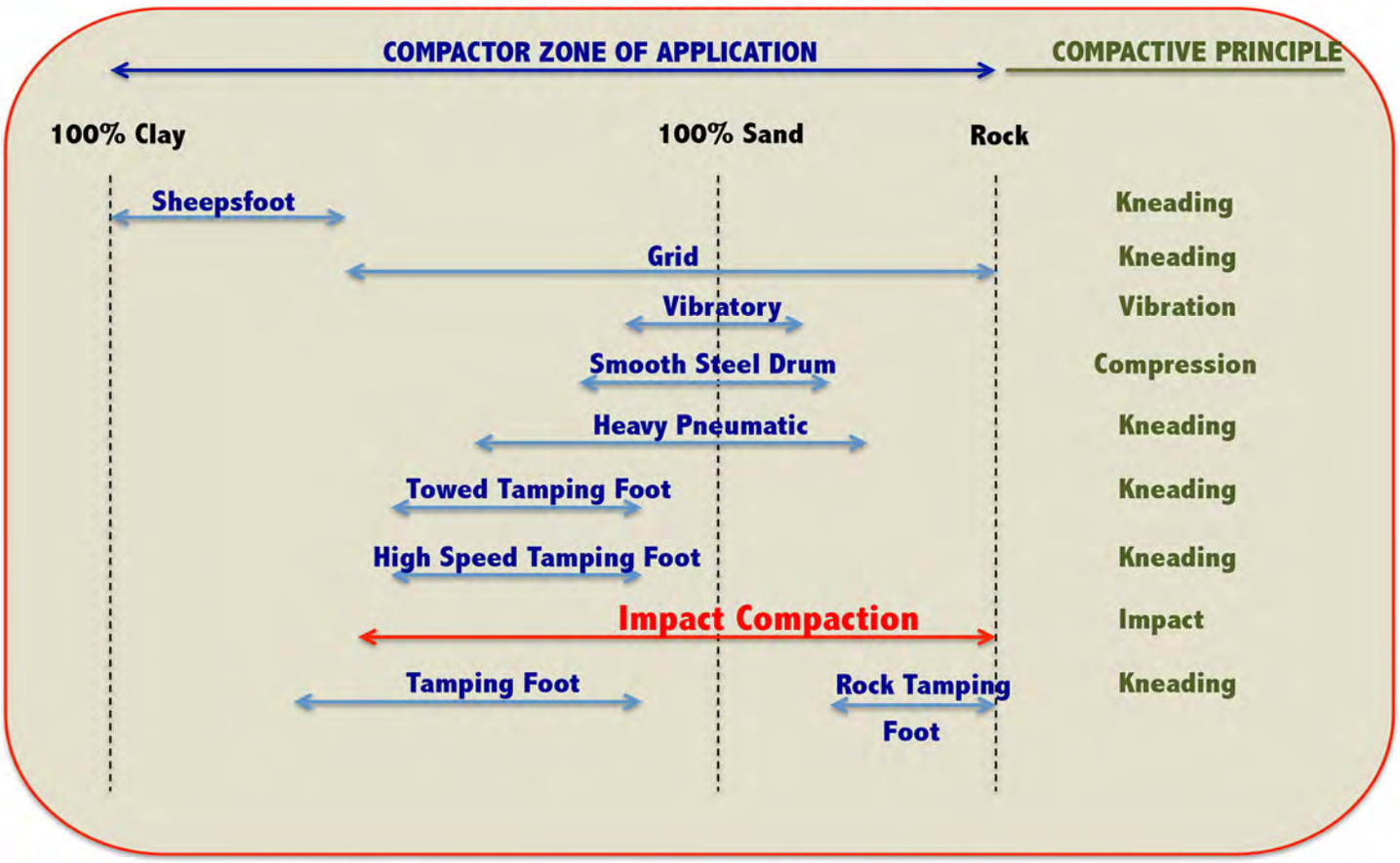
COMPACTION PRODUCTIVITY
- *Higher operating speeds and increased depth of influence result in higher productivity.*

DEPTH of INFLUENCE COMPARISONS



	Disturbed	Nominal Influence	Typical Range of Influence
CC Conventional Compaction	0 m / 0 ft	200 mm / 8"	150 - 300 mm / 6" - 1 ft
HEIC High Energy Impact Compaction	150 mm / 6"	2.0 m / 6.5 ft	1.5 - 5.0 m / 5 - 16 ft
RIC Rapid Impact Compaction	1.0 m / 3 ft	4.0 m / 13 ft	4.0 - 6.0 m / 13 - 20 ft
DC Dynamic Compaction	1.0 m / 3 ft	8.0 m / 26 ft	6.0 - 12.0 m / 20 - 40 ft
DVC Deep Vibro Compaction	2.0 m / 6 ft	10.0 m / 32 ft	10.0 - 20.0 m / 32 - 64 ft

ZONE OF APPLICATION



TYPICAL APPLICATIONS

Deep In-Situ Compaction.

Thick Lift Compaction.

Pavement Rehabilitation.

Compaction of Rockfill.

Proof Rolling.

Rehabilitation of Quarries and Mines.

Treatment of Unsurfaced Roads.

Coal Discard Compaction.

Treatment of Dry Sandy Materials.

Treatment of Collapsible Materials.

Treatment of (Dredged) Marine Sands.

Permeability Reduction.

Accelerated Consolidation.

Compaction of Landfills/Brownfields Rehabilitation.

Induced Settlement.

TYPICAL BENEFITS

1. *40-60% saving in Water requirements – the higher impact energy allows for the maximum dry density to be achieved at moisture levels below OMC. Compaction at 2-4% below OMC is possible.*
2. *Increase the size of the layerworks from the conventional 150-300 mm (6"-12")to between 500 mm (1.65 ft) and 1000 mm (3.3 ft). The net effect is an improved strength profile and increased production.*
   - *500 mm Layer: 6,500 – 8,000 m^2 (70,000 - 86,100 ft^2) /shift/unit.*
   - *750 mm Layer: 5,000 – 6,500 m^2 (53,820 - 70,000 ft^2 /shift/unit.*
   - *1000 mm Layer: 4,000 – 5,500 m^2 (43,050 - 59,200 ft^2) /shift/unit.*
3. *Increased rockfill layers with HEIC not only improves the strength profile and increases productivity but also has the added benefit in that it reduces the amount of crushing required to reduce the maximum particle size. Increased rockfill layers allows for increased particle sizes, up to 2/3^{rds} the thickness of the layer.*
4. *The increased depth of influence in in-situ compaction may eliminate the need to excavate and replace material in thin layers.*
5. *Potential reduction in design layer thicknesses, even complete layers, with improved bearing capacities achieved throughdeep in-situ compaction.*
6. *Reduction in black top thicknesses due to increased bearng strength achieved throgh deep in-situ compaction and improved compaction of layers.*
7. *Compaction of a wide range of materials over wider range of moisture content.*
8. *Improving existing on-site materials, eliminating the need to import expensive material.*
9. *Employment of an improved quality control technique (through Landpac's CIR) resulting in improved accuracy and an increased number of correlated results whilst reducing the time required to test and the*

TYPICAL MARKET APPLICATIONS

MINING INDUSTRY

- *Mine Access Roads*
- *Mine Haul Roads*
- *Tailings/Slimes Dams*
- *Platforms/Foundations*
- *Coal Discard Compaction*
- *Quarry Rehabilitation*
- *Mine Waste Management*

CONTAINER TERMINALS

INFRASTRUCTURE DEVELOPMENT

- *Roads and Highways*
- *Airport Runways and Structures*
- *Ports and Harbour expansions*
- *Rail networks*
- *Container terminals*
- *Unsurfaced roads*
- *Pavement rehabilitation*

BROWNFIELDS REHABILITATION

ENVIRONMENTAL APPLICATIONS

PETRO-CHEMICAL INDUSTRY

RETAIL and INDUSTRIAL DEVELOPMENTS

FORESTRY INDUSTRY

- *Unsurfaced roads (contruction and rehabilitation)*

RESIDENTIAL DEVELOPMENTS

POWER INDUSTRY