LANDPAC®

GROUND ENGINEERING

HIGH ENERGY IMPACT COMPACTION

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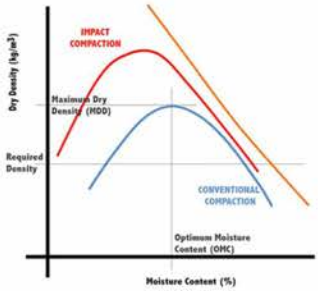
High energy impact compaction involves the transfer of compaction energy into the soil by means of the lifting and falling motion of non-circular rotating masses. The rotation of such masses to their highest point results in an effective potential energy build-up. Further rotation of these masses results 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

HIGHER COMPACTION LOADS

- Typical compaction loads of 1200-2500kN.



WIDER MOISTURE RANGE

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

INCREASED 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.

TOTAL COVERAGE

- The split mass configuration and the compaction process adopted results in 100% compaction coverage of the project site.

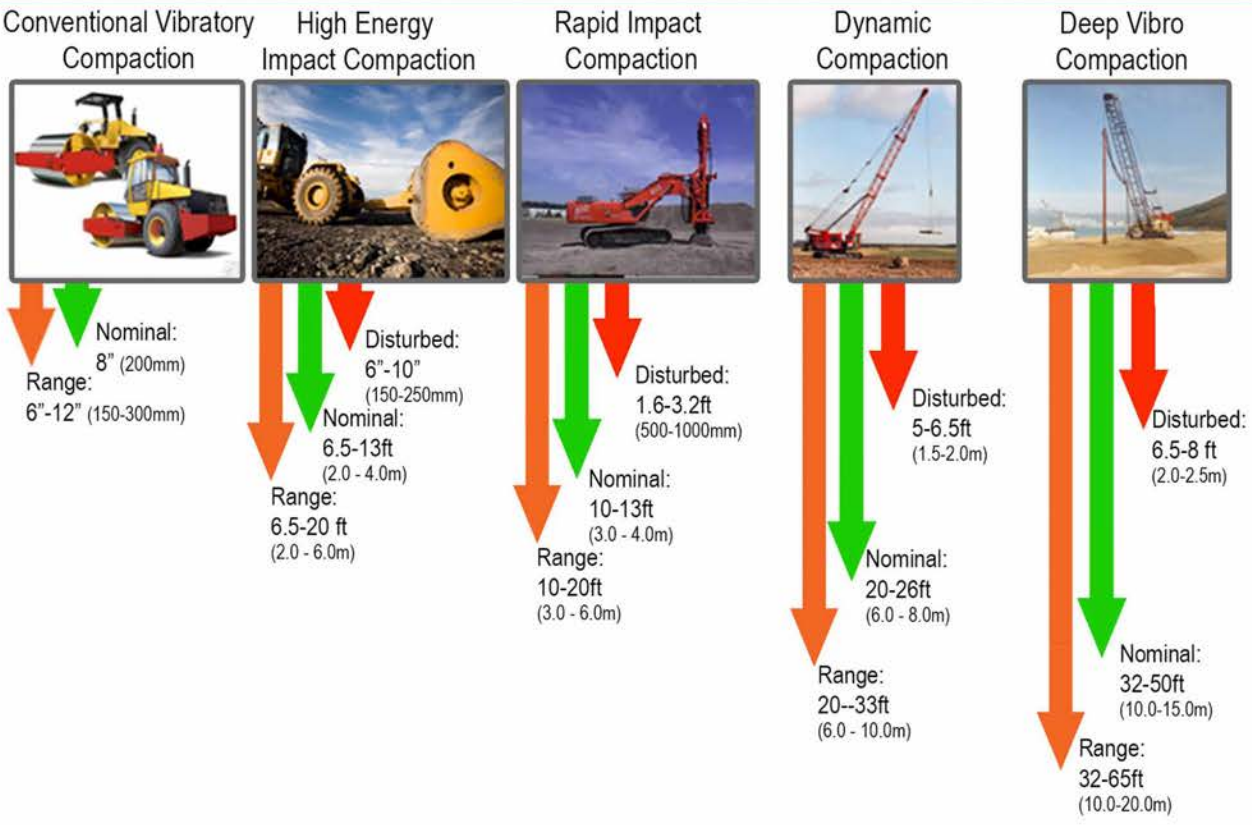
INCREASED SOIL COMPRESSIBILITY

- 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.

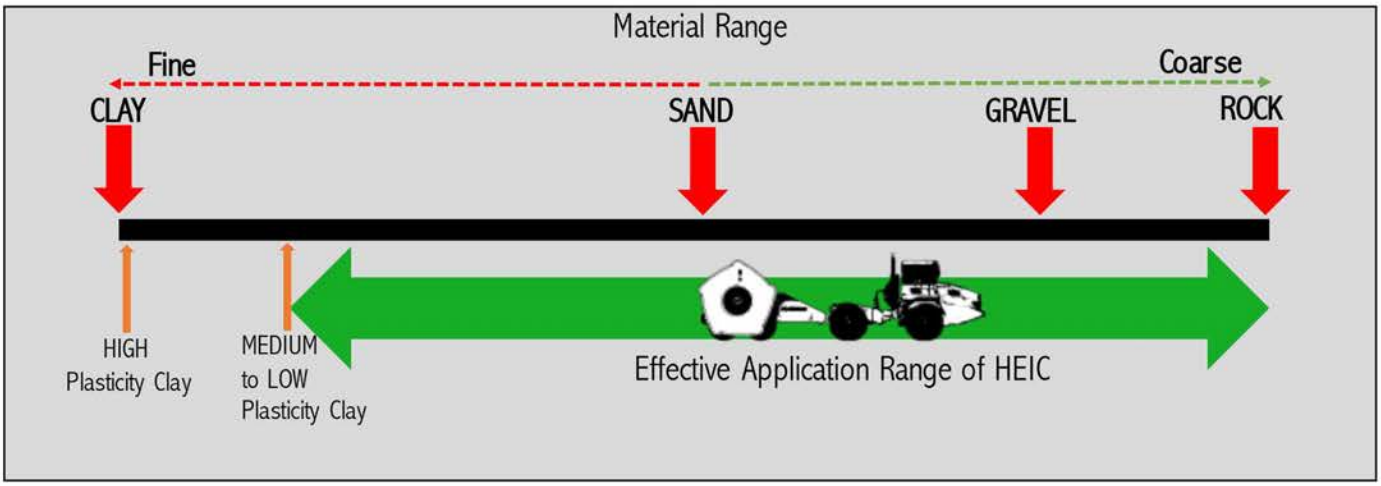
IMPROVED COMPACTION PRODUCTIVITY

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

DEPTH of INFLUENCE COMPARISONS



MATERIAL APPLICATION RANGE



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 MARKETS

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

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
POWER & ENERGY INDUSTRY
- Platforms/Foundation preparation
- Haul and Access Roads

RESIDENTIAL AND COMMERCIAL DEVELOPMENTS
MARINE-LAND DEVELOPMENTS
- Dredged Marine Sand Platforms

FORESTRY INDUSTRY
- Unsurfaced Road Construction & Rehabilitation

WASTE MANAGEMENT INDUSTRY

TYPICAL BENEFITS

Some Typical Benefits include:

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).
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 through deep 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 time required for results to be made available.

TYPICAL PRODUCTION RATES

Production rates are dependent on several factors, including material characteristics, strata profile, moisture content, performance specification requirement and so forth. The figures indicated below are typical rates based on project experience and serve as a guideline only.

IN-SITU (SUBGRADE) COMPACTION

Typical compaction is estimated at 3,200 - 5,000 m^2 (34,500 - 54,000 ft^2) /shift/unit.

For highly collpasible material, this may be reduced to 2,500 m^2 (27,000 ft^2) /shift/unit.

LAYERWORKS COMPACTION

Typical production rates are estimated as follows:

- 500 mm (1.65 ft) Layer: 6,500 – 8,000 m^2 (70,000 - 86,100 ft^2) /shift/unit.
- 750 mm (2.5 ft) Layer: 5,000 – 6,500 m^2 (53,820 - 70,000 ft^2 /shift/unit.
- 1000 mm (3.3 ft) Layer: 4,000 – 5,500 m^2 (43,050 - 59,200 ft^2) /shift/unit.

PROOF ROLLING

Typical compaction is estimated at 12,000 m^2 (130,000 ft^2) /shift/unit.