

# Soil Mixing

Soil mixing is the process of mixing cement or other binders with insitu soils by means of augers or other specially designed mixing tools.

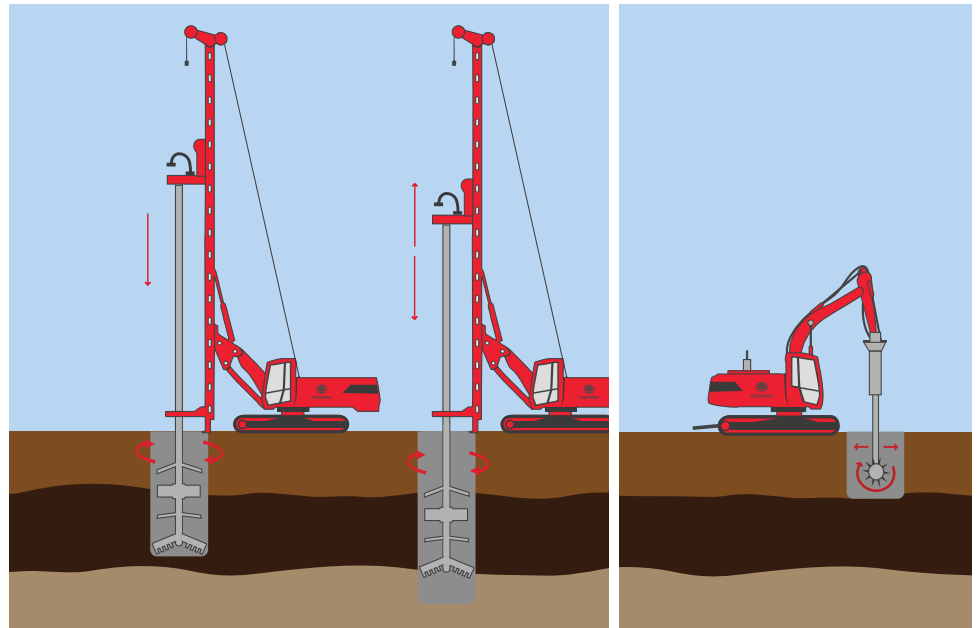
Soil mixing is one of the most versatile geotechnical construction techniques and is used for a wide variety of applications including ground improvement, tunneling support, support of excavation, hydraulic cut off, and environmental remediation. Depending on the application, the additives that are mixed with the soil may be selected in order to stiffen, to bind, or to decrease permeability.

## Implementation

Soil mixing entails breaking up the soil structure, adding cement (or other additives) in wet or dry form, and thoroughly mixing within the treated zone.

Soil mixing may be performed using augers or paddles to form soil mix columns. Columns can be installed to depths of up to 80-ft and typical diameters are in the range of 2-ft to 8-ft. Columns may be installed using single- or multiple- axis tooling allowing for the installation of discrete or overlapping/tangent columns. Depending on the application, columns can be installed individually or to form continuous rows, panels, grids, or block/mass treatment.

Shallow mixing, also referred to as mass stabilization is most typically performed with a bladed rotary mixing



Soil mix columns

Mass stabilization/shallow mixing

tool that is attached to the arm of an excavator. Rather than columns, the mixing is performed in linear panels that are overlapped to result in mass or full treatment of the improved zone. Shallow mixing is typically limited to a depth of approximately 20-ft.

## Applications

For ground improvement applications, soil mixing is commonly used to reduce compressibility of weak soils, to enhance shear resistance and bearing capacity, and to mitigate liquefaction. Soil mixing is also used to support tunneling and excavation operations, for hydraulic cutoff, and can also be incorporated into earth retention structures. For environmental remediation applications, soil mixing is commonly used to treat, neutralize, demobilize

or confine contaminants that are present in the soils.

## Advantages of Soil Mixing Include:

- Extremely versatile technique
- Wide variety of ground improvement, ground treatment, and geotechnical construction applications
- Relatively free of vibrations
- Columns and panels can be installed in a variety of configurations
- Can be used to form stable work platforms for follow-on construction activities