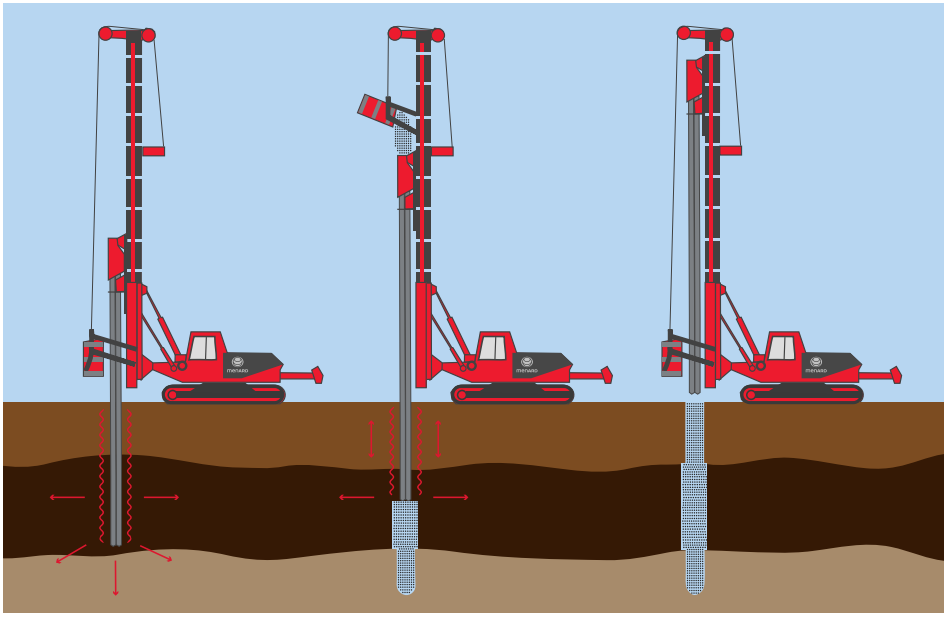
Stone Columns



Stone columns are columns of compacted aggregate that are used to enhance shear capacity, reduce settlement, increase bearing capacity and mitigate liquefaction

Advantages of Stone Columns include:

- Enhancing the shear capacity of soils
- Densify granular layers
- Effective for liquefaction mitigation
- Enhance drainage characteristics of soils
- Very little spoil is generated when displacement installation methods are used

Learn more and see Stone Columns in action here:
https://youtu.be/WT3RD_MiVyw

Stone columns are continuous columns of compacted aggregate that are typically formed using a vibratory probe or ramming probe to create vertical inclusions of high stiffness, shear strength and improved drainage characteristics. Stone columns typically range in diameter between 18 and 42 inches. When a vibratory probe is used to form the hole in which the stone column is constructed, then the elements are referred to as Vibro stone columns or Vibratory stone columns. If separate drilling equipment is used to create the hole in which the stone is placed, then the elements are commonly referred to as Aggregate piers

Implementation

Stone columns can be installed using a wide variety of methods and equipment to create the hole and to place and compact the aggregate. Conventional vibratory probes or "flots" are equipped with a leading head that vibrates laterally as it is inserted into the ground, displacing the soils laterally as it advances to the target depth. This same probe is used to compact the placed stone as well. For applications where the hole will not stay open, stone is added through a side feeder tube – this method is known as the "bottom-feed method." Where the hole stays open, the stone is added directly from the surface – this is known as the top-feed method. In addition to flots (where the vibratory is generated at the leading head), stone columns can be installed with top drive vibratory probes

Applications

Stone columns are commonly used to reduce settlement and increase the bearing capacity of soils for the support of structures. Because of their high shear strength, they are also commonly used to enhance slope stability and prevent lateral spreading. The elements may be installed in a grid pattern under uniformly loaded structures and can also be installed in groups to accommodate very concentrated loads. Stone columns are proven to efficiently mitigate liquefaction owed to the significant densification of granular layers that occurs during installation; enhanced drainage capacity is also a benefit for liquefaction mitigation. In spite of the versatility of Stone columns, slower installation rates and subsequent higher cost of stone columns deeper than about 40 feet make their use for deeper soils less viable. Stone columns are not applicable for very soft clays or organic soils where the columns would beprone to excessive settlement or even failure. For deeper applications and for sites with very soft soils, other systems such as Controlled Modulus Columns (CMC)® should be considered.