

Ringtrac® Geotextile Encased Columns

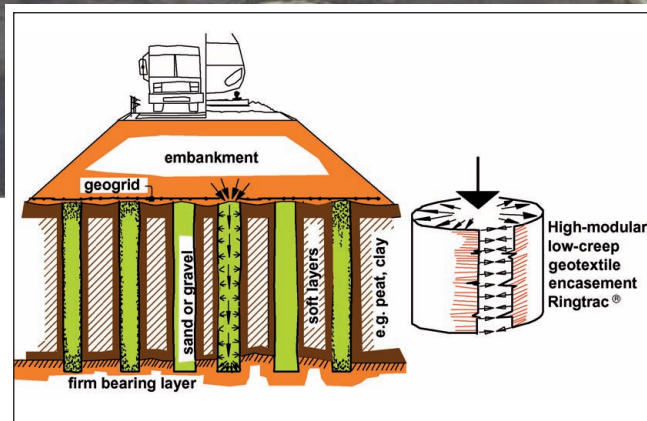
foundation system for embankments
on very low bearing capacity soils

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The geotextile encased column (GEC) system is a further development of well-known column-type techniques such as stone columns. The main idea of the GEC-System is to transfer the embankment load through the soft soil to a firm stratum. Thereby, the embankment load is borne mainly by the encased columns. The geotextile encasement (product **Ringtrac®**) limits the spread of the granular (sand or gravel) columns into the surrounding weak soils by providing a certain amount of radial support. Therefore the GEC's can be used in very soft soils ($c_u < 300 \text{ lb/ft}^2$), which are not capable to provide sufficient lateral support for conventional granular columns. With a non-encased column, the horizontal support of the soft soil must be equal to the horizontal pressure in the column. The encasement therefore increases the load-carrying capacity of the columns to permit construction to take place over extremely weak soils.

The vertical deformations as well as the load distribution between the columns and the soft soil are defined by the tensile strength and the stiffness of the encasement. Due to the **Ringtrac®** encasement much larger settlement reduction can be achieved compared to non-encased column types. Since the soft soil is involved in the transfer of vertical loads,



the drainage function of the GEC's, acting as vertical drains, is also important to reduce the consolidation time of the system.

A design method which allows an estimation of settlements, an analysis of the required radial tensile strength of the encasement and an analysis of the distribution of vertical stress between the columns and the soft soil was recently published in the German EBGeo (Recommendations for Design and Analysis of Earth Structures using Geosynthetic Reinforcements).

Ringtrac® is specially manufactured to suit the requirements of each project. Among other parameters, the design strengths and stiffness are calculated from the properties of the weak soils, the spacing and diameter of the sand columns and the embankment height.

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Ringtrac® is currently manufactured seamless with short-term circumferential tensile strengths of up to 27,400 lb/ft. Reinforcement sleeves are available in diameters between 1.31 ft and 3.28 ft. with the standard being typically 2.62 ft.

Advantages:

- suitable for soft soils with $c_u < 300 \text{ lb/ft}^2$
- almost all settlement takes place within the construction period
- adjacent buildings are unaffected by the settlement
- fully loadable immediately after construction (high embankments in a short time with no danger of base failure)
- highly adaptable to local conditions and loading
- no removal of unsuitable or contaminated excavated soil (using soil displacement method)
- no adverse influence on groundwater flow
- base sealing protects underlying aquifers
- economic use of space on site and savings in excavation, disposal and imported material costs
- reduction in construction time and cost
- the system is not rigid and can absorb dynamic loads, e.g. from passing trains, without damage
- consolidation is accelerated



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