

SCHÖKEM Procedure for foundation works

SOIL CEMENT FOUNDATIONS IN NO TIME

Developed jointly by KEMROC and Schönberger Bau

Based on trenching technology from KEMROC, the innovative SCHÖKEM Procedure for the construction of soil cement foundations was developed jointly by KEMROC and Schönberger Bau. The procedure uses an excavator attachment which, after penetration into the soil, can simultaneously inject and mix a binder suspension with the soil to create a soil cement structure and this is done without the need for any excavation or filling work. These soil cement structures are the solution for many foundation problems in civil engineering projects.

Progress through Innovation – with this motto in mind, KEMROC Spezialmaschinen GmbH from Leimbach in Thüringen, Germany and Schönberger Bau GmbH & Co. KG from Zenting in Bavaria, Germany developed a new excavator attachment for ground stabilisation. This attachment can treat soil in-situ, without the need for costly shoring or soil replacement. While mixing the soil, a binder material is simultaneously injected into the soil. After a few days of settling time, the treated soil turns into a stable load bearing, impermeable structure. After completion of the first field trials, the homogeneity, strength and impermeability of the soil cement slabs were tested by geotechnical testing company Dipl. Eng. A. Pampel GmbH (GCE) from Leipzig. Test results confirmed the compressive strength at 3 to 4 MPa which was as predicted by KEMROC.

Load Bearing Foundations for Civil Engineering

The innovative SCHÖKEM Process is based on a proven method of soil stabilisation by mixing soil and cement. It conforms to methods specified by planners and contractors for decades and to the DIN standard for deep soil mixing by the injection of a cement suspension for the stabilisation of soils (FMI) as used in civil engineering projects. In this process, the soil is mixed with an injected cement suspension using a mixing machine that can reach the required depths in the soil. This creates a homogenous, impermeable, frost-proof and crack-free soil cement slab. Typical applications where the load bearing capacity of the ground needs to be increased by soil stabilisation include road and railway construction, stabilisation of embankments, sealing contaminated areas or in flood defences. Regardless of the application, the process is economical as it eliminates transportation of excavated and fill material.

Working in close cooperation, the manufacturer KEMROC and the specialist civil engineering company Schönberger Bau, have developed this process further. The new SCHÖKEM process has made this technology available to operators of standard hydraulic excavators which provide an added degree of flexibility. The new KSI range (KEMROC Schönberger Injector) was developed



Soil stabilisation by mixing soil and cement while injecting a binder suspension – with the new SCHÖKEM process there is no transportation of soil, it is all done in-situ.



The binder suspension is fed through a hose to the injectors located on the sides. The composition of the binder material injected determines the density and strength of the soil-cement structure.



At the KEMROC test site, a completed soil-cement wall is exposed and ready for testing and sampling.

by modifying the tried-and-tested KEMROC chain cutter attachment. The cement suspension material is transported to the injection nozzles by hydraulic hoses from the drive unit through channels in the support frame. In modern grout-mixing plants (both partners recommend compact, self-contained plants from GERTEC GmbH in Waltenhofen, Bavaria) it is possible to regulate the amount of cement used in the suspension material with a high degree of accuracy. By modifying the amount of cement used according to soil conditions, it is possible to stabilise soils to pre-defined required characteristics.

Set up time for the SCHÖKEM process is about two hours. It is then possible to create load-bearing soil-cement slabs to the dimensions required. They are used in road construction (peripheral barriers, shoulder repairs, stabilising slopes and embankments), flood defences (sealing walls, dam stabilisation, diaphragm walls), retaining walls for deep excavations in civil engineering and pipeline as well as railway construction. The KSI range of attachments can be used on standard, relatively small sized hydraulic excavators. With relatively low capital outlay, the contractor has a high degree of flexibility for ground stabilization work, such as installation of foundations or retaining walls, even in small confined spaces. However, the construction of even larger soil-cement structures is possible. Even with the standard configuration GERTEC grout pump, the SCHÖKEM process offers a working range of 500 m from the excavator in both directions. The KSI attachments are very efficient, achieving production rates of 1 m/min in cohesive soils.

Range of Sizes and Blade Lengths

The new KSI soil stabilising attachment is available in two sizes with a variety of blade lengths. The KSI 5000 drive unit (130 kW rated power) can be equipped with blades for 3, 4 or 5 m mixing depth and, depending on blade length, used on excavators in the 30 to 50 t operating weight range. The larger KSI 10000 (220 kW rated power) can be fitted with blades for mixing depths of 6, 8 or 10 m and can be used on excavators in the 45 to 70 t weight range. Accessories for both models include mixer extensions (1 m), the KRM 80 rotation unit and replacement mixer teeth. The KSI range of stabilisation attachments are available from KEMROC or Schönberger Bau and the Bavarian civil engineering company also offers soil-cement stabilisation as a service provider in German speaking countries. ■

Publisher

KEMROC Spezialmaschinen GmbH
Jeremiasstr. 4, 36433 Leimbach, Germany

Phone +49 3695 850 2550

E-Mail info@kemroc.de

www.kemroc.de

KEMROC[®]
revolution of cutting



After about two hours of set-up time work can start on the construction of soil-cement structures. In practice, productivity rates of one meter per minute have been achieved.



The KSI range of stabilisation attachments are available in different sizes and with a choice of blade length – here the KSI 5000 with 4 m mixing depth before going into operation.

SCHÖKEM