



TERRA-3000®

Climate and environmental protection

TERRA-3000® - Road Construction

In construction sector climate related and environmental aspects such as reduction of Co2 emissions and saving of natural and monetary resources are of growing importance!

Everyone professionally engaged in road construction knows about the immense quantities of building materials processed such as gravel, cement, concrete, additives, geo-textiles etc.

The consumption of these materials together with the required energy and related CO2 emissions are playing a huge role in destroying climate and environment. TERRA-3000® construction process conserves natural resources by using existing soil which is for conventual construction declared as "waste product" or as "useless.. Doing so TERRA-3000® also reduces the output of emissions. Cohesive materials such as loam and clay that are not applicable for conventional road construction because of its swelling and shrinking behavior can be refined to an extremely stable and sustainable building material by TERRA-3000®.

Depending on soil analysis the locally available cohesive soil material can be used by TERRA-3000® in addition with sand or feeding of loam/clay according to the results of analysis

This eliminates the drain and bringing transports and the excavation for the exchange of soil material with crushed grain as it is necessary within conventional road construction according to the „ Mc Adams“ process.

The reduction of truck transportation and associated fuel and time savings, lead to an enormous reduction of CO2 emissions.

Supposing a road width of 10 m, an excavation of 70 cm depth and a road distance of 10 km you will have to dredge and carry away about 70.000 m³ of ground.

Presuming the specific weight of the dredged ground is 1,8 (lower limit)

this will result in about 126.000 tons of material!

A four-axle dump truck with 38 tones of payload and a consumption of 40 liters Diesel/100Km required for the removal of excavation 3316 cartloads.

The distance of 20 kilometers per load, resulting 66.320 km and a

Diesel consumption of 26.528 liters!

For the delivery of gravel that are 3.316 cartloads again!

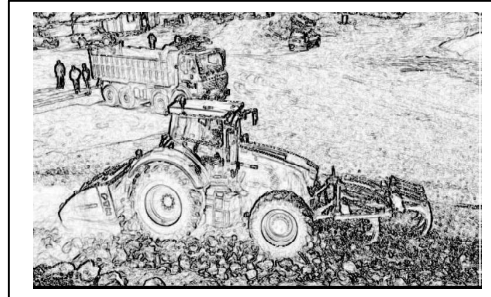




Using TERRA-3000® and working with local soil we are able to eliminate this gigantic complexity. A huge saving in cost, time and emissions.

The rocks in the local existing soil themselves can be smashed into the required amount of gravel by stone-crusher equipment which is necessary for soil stabilization with TERRA-3000®.

This protects another natural resource, or makes locally existing resources available!



TERRA-3000® - contaminated soils

Another aspect in many projects is that contaminated toxic local soils must be deposited in special landfills. To assure pollutants will not be washed out into ground water. This appears to be very expensive! By treating the soil with TERRA-3000® the soil layer becomes agglomerated (made into one piece).

This assures that pollutants are not washed out and remain in the layer without detriment to the environment, fixed and immobile!

TERRA-3000® - Generate Building Materials (Sieve Scrap)

Another possibility is to manufacture building materials from so-called "sieve scrap"-waste materials from quarries and clay pits which contain cohesive material (loam/clay) and gravel.

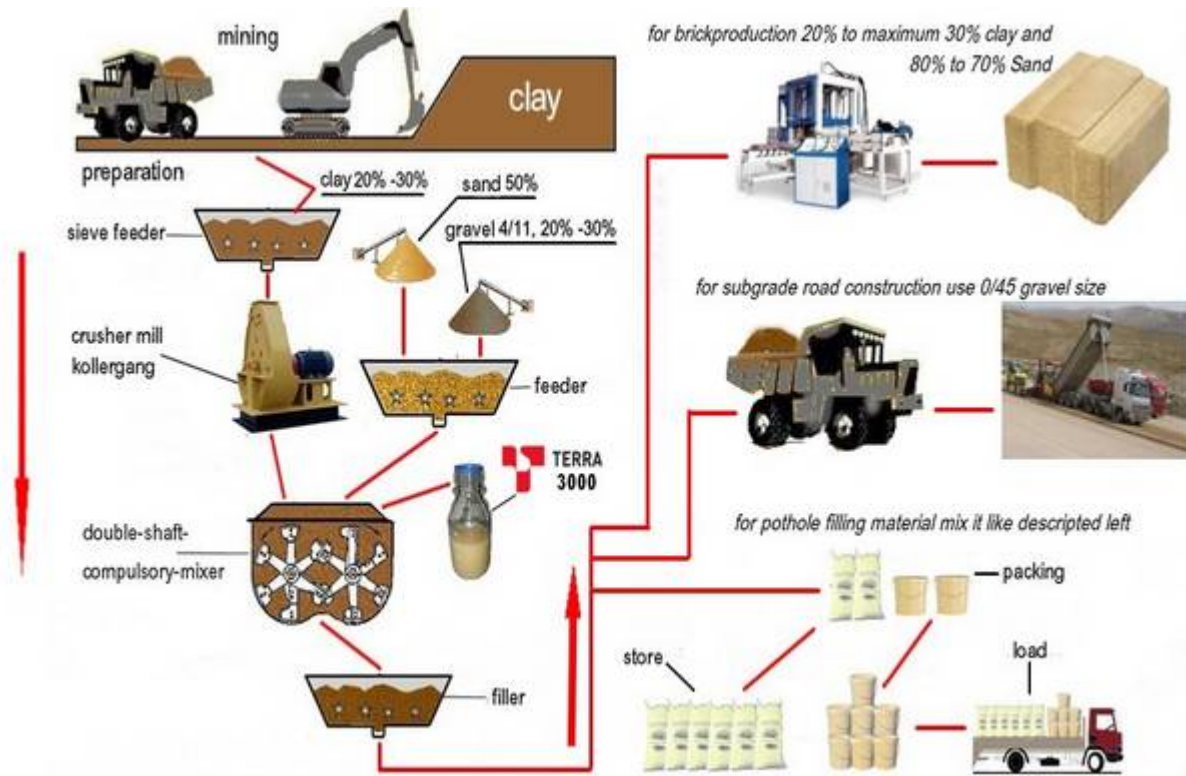
In most cases, these materials are deposited on huge mining waste heaps and are assumed largely worthless for the construction industry.

TERRA-3000® is able to produce a high-quality building material from this sievescrap.

This may contribute to the resources, time, emissions and money- savings and therefore enabling us to protect our environment!



Building material the central mixing processes with TERRA-3000®



Where the locally available earth & soil material is composed unfavorably for the TERRA-3000® a central mixing processes may be used. At first glance this process seems very complicated. But it holds some very serious advantages in terms!

Existing overburden material or soil materials, that only in certain zones appears, can thus optimally and easily to a consistent quality building materials are mixed together.

The thus-produced building material will be coated by a paver on the stable mature soil and can be directly highly compressed.

Through the resulting subgrade, the water can derived from the later finished road. This is a very important aspect which should be in principle used at every roadconstruction!

Furthermore, this method saves time, because the breaking of the gravel, the application of TERRA-3000® and the mixing process at the local site is completely eliminated.

A continuous, rapid construction and a high-quality effect is the result.

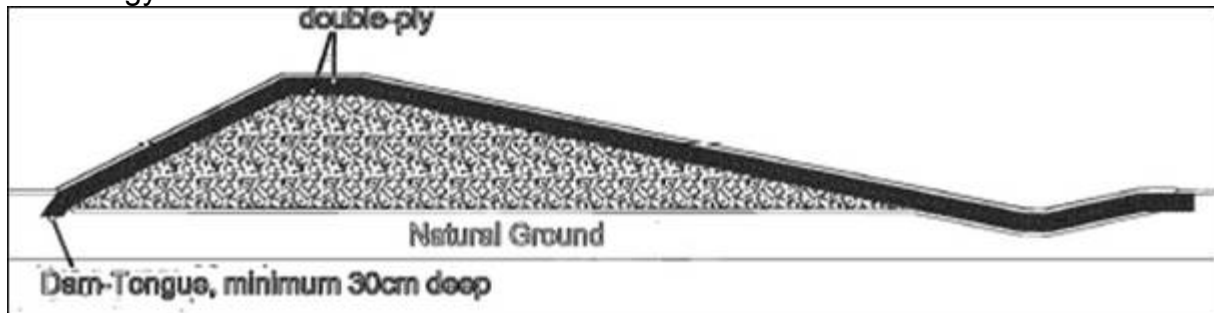


TERRA-3000® - Landfills, Dykes & Dams

A central-mixing-process is an advantage for the dyke- and dam buildings and the edge sealing's of landfills, where the local soil material is not optimally composed for soil stabilization with TERRA-3000®.

Most of the soil fractions which are close to the coast, can be very salty and those are hygroscopic. All soils that have a salt content of about 4% are not suitable for soil stabilization.

Let's stick to the topic of dyke construction and its aspects in environmental technology:



Example of a dam sealant after TERRA-3000®

Global warming leads worldwide to more and more low-pressure systems and the numbers of storms will escalate in the future!

A race between man and the weather has begun. A change of views about coastal protection, flood embankments as well as the dykes is needed urgently!

A dam break is unfolding by hydrostatic pressure and the softening of the soil material. The shear stress pushes the softened material away horizontally. TERRA-3000® prevents the erosion of the dam body and so makes it fairly stable and insensitive to water!

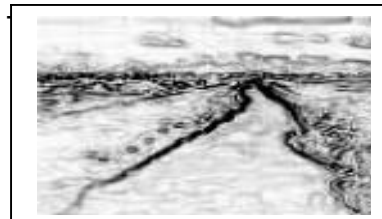
Most floodings remain only a certain time before they flow back again.

If we increase the stability of a dam to hold just about double the existing flooding time the environment is spared a catastrophe!

Moreover TERRA-3000® is able to prevent from cracking of the dam face material in severe drought which is the most common traditional problem of enormous impact.

Through a higher stability of dams treated with the dambody is prevented and therefore persist over a longer period.

The soil stabilization with TERRA-3000® for the dyke and dam construction is interesting because of the relatively simple, time-saving, costefficient and reliable results!



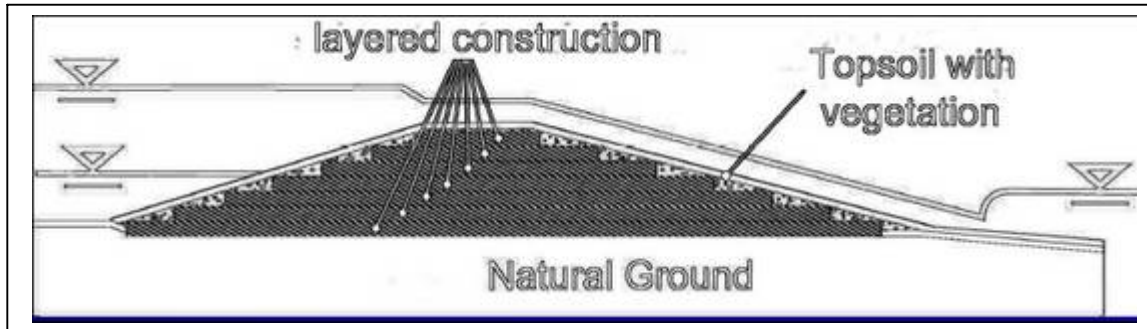
A softening of the dam body during flooding is largely eliminated by the disruption of the capillary action and a reached Kf value of 10^{-1} !



Conclusion:

Dams and dykes which are attached or built with TERRA-3000® resisting floods better!

Treatment with TERRA-3000® and the high compaction ensures a higher relative impermeability of the earthworks.



Layered Construction with TERRA-3000®

A rapid softening is delayed or prevented.

The dams and dykes are stable and withstand the flood for longer period of time
An enormous environmental damage in local economy can be prevented!

TERRA-3000® - Disposal Sites

The same advantages as previously described for ground stabilization with TERRA-3000® also arises in the design and construction of landfills or disposal sites. That for the edge-seal of a landfill necessary cohesive soil material will be made into a material that is enormously stable, impermeable to fluids and largely crack-resistant.



This leads to the following advantages for landfill:

Through the injection of TERRA-3000® and gravel to edge-sealing-material, a much higher bearing capacity on the later finished edge-seal can be reached!

This prevents leakage occurring in a sedimentary setting under the edge seal.

The static pressure can be intercepted!

Due to the relative elasticity of material treated with TERRA-3000® sediment subsidence's can be bridged.

Cracking is substantially eliminated!

The pollutants in the landfill therefore can not reach the ground water and are controlled by the landfill operator. Environmental damage will be avoided!



TERRA-3000® - About our Product

The innovative, modern ground stabilization with TERRA-3000®, combined with cohesive soil materials is an environmental friendly and highly efficient procedure and may also be used as complementary action together with traditional construction methods.

TERRA-3000® is completely environmentally compliant!

TERRA-3000® is in use completely safe on the environment.

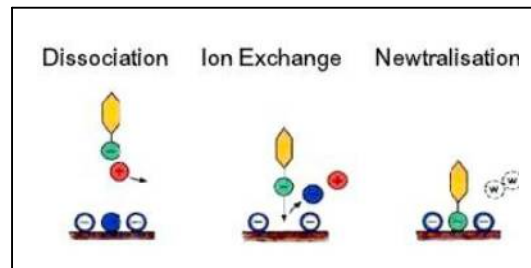
TERRA-3000® is a natural and environmentally compatible product, for soil stabilization.

Each soil has the natural property to turn back to stone. It needs a very long time for this process and high pressure.

With the addition of TERRA-3000®, this process can be accelerate.

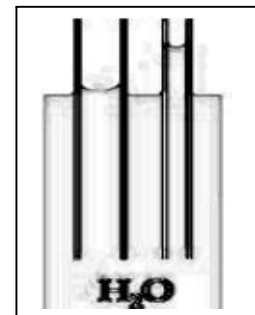
The soil is in its behavior in terms of capacity and density permanently improved.

TERRA-3000® affects the pore and micro pore area of the soil surface. It breaks the adhesive water film around the fine and ultrafine particles and acts on the ground electro-physical ion exchange. This leads to an irreversible agglomeration of the fine- and extremely fine particles of the treated soil.



The decrease in permeability by closing the capillary, leads to a strongly increased resistance to water of the so treated soil, which in turn is the source for shrinkage effect.

Due to the greatly reduced water absorption capacity of the so treated soil, a softening of the sub grade is prevented. Because of this decreased capillarity and also frost resistance is increased.



TERRA-3000® - Our Partners

The successful introduction of an innovative and pioneering technology to a large extent depends on the serious attitude of all involved partners.

If all parties involved bring in commitment to the technology as well as enthusiasm and a professional behavior, this besides the most common aim to make it an profitable business will guarantee an overall success.

Regarding the practical application of TERRA-3000® we are always interested to receive serious suggestions so we will be able to assure ongoing improvement and reliable proposals!