

## TERRA-3000®

### Climate and environmental protection TERRA-3000® - Road Construction

In construction sector climate related and environmental aspects such as reduction of CO<sub>2</sub> 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, geo-textiles etc.

The consumption of these materials together with the required energy and related CO<sub>2</sub> 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 conventional 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 CO<sub>2</sub> 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 m<sup>3</sup> 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

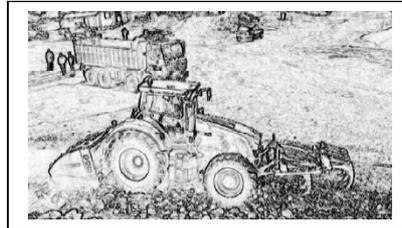
Diesel consumption of 26.528 liters!

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)**

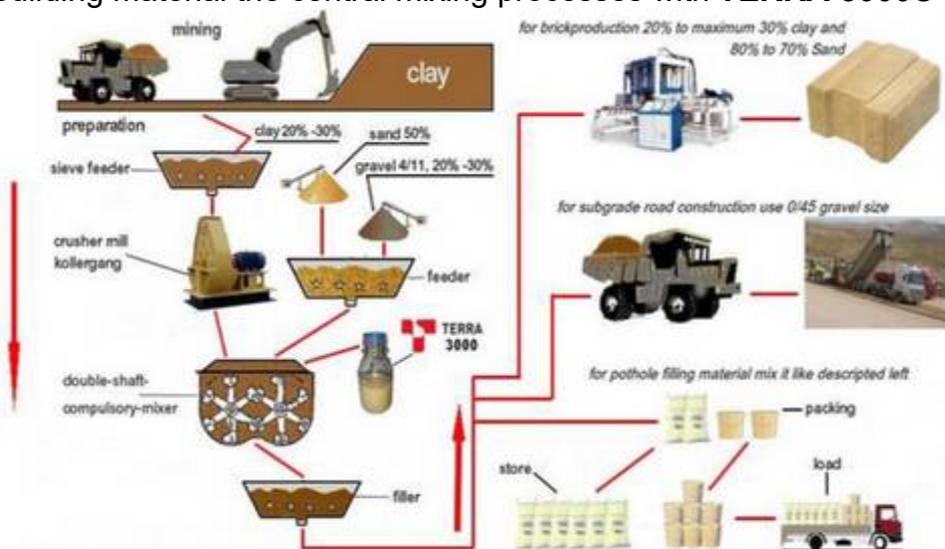
Another possibility is to manufacture building materials from so-called "sieve scrap"-waste materials from quarries and clay pits which contain cohesive material (loam/clay) and gravel.

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 Road construction!

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®** - Our partners

The successful introduction of an innovative and groundbreaking technology in a large scope depends on the serious attitude of all partners involved.

When everyone involved shows commitment to the technology and enthusiasm and professional behavior, alongside the most common goal of making it one profitable business guarantees an overall success.

We are always interested in the practical application of **TERRA-3000®**, if we receive serious suggestions so that we can ensure continuous improvement and reliable solutions!

## Conclusion

### Soil stabilization - **TERRA-3000®**

Climate - CO2 neutral - environmentally friendly

Soil stabilization or soil improvement are at the present time Infrastructure construction or road construction, as well as other construction projects indispensable - there are different processes depending on the use of products:

#### Electro-physical soil stabilization:

**TERRA-3000®** water soluble catalyst - no binder, ion exchanger

Mode of action: physical - by compression (static, heavy weight no vibration)

Installation: Liquid - is processed directly with a milling machine in the ground

Ecological damage: no emissions - no dust (liquid), ph neutral –

no flooding or other environmental pollution –

no dangerous goods - no protective measures required

#### Hydraulic soil stabilization:

Binder: cement or lime or mixtures of both,

depending on the soil composition or moisture

Mode of action: chem. Reaction - bind, glue

Installation: fine-grain powder, strong dust development during installation

Ecological damage : fine dust pollution, strongly alkaline,

mixed with water, lye with a pH value of > 12 is formed,

highly caustic, is simply applied to floors,

parts penetrate into groundwater (drinking water) - there

unfortunately, no conclusive studies of consequences

this procedure!



### TERRA-3000: THE CARBON NEUTRAL ALTERNATIVE TO CEMENT STABILISATION

**TABLE 1**

PROJECT SPECIFICATION				
Item	Specification	Unit	Value	Formula
a	Length (m)	m	1 000,00	
b	Width (m)	m	5,00	
c	Area (m <sup>2</sup> )	m <sup>2</sup>	5 000,00	c = a * b
d	Depth (m)	m	0,30	
e	Volume (m <sup>3</sup> )	m <sup>3</sup>	1 500,00	e = c * d
f	Bulk Density (t/m <sup>3</sup> )	t/m <sup>3</sup>	2,00	
g	Weight (t)	t	3 000,00	g = e * f
h <sub>1</sub> , h <sub>2</sub>	Cement Stabilisation (%)	%	4%	h <sub>2</sub> = g * h <sub>1</sub>
i	Cement Application Rate (kg / m <sup>2</sup> )	kg / m <sup>2</sup>	14,00	i = (h <sub>2</sub> * 1000) / c

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**TABLE 2**

CARBON EMISSIONS TERRA-3000 VS CEMENT STABILISATION			
		TERRA-3000	CEMENT
Unit:		CO <sub>2</sub> / t	CO <sub>2</sub> / t
Phase: <u>Manufacture</u>			
Region: Cement Manufacture		Global Average (0.87) t	
CO <sub>2</sub> Emissions During Manufacture	t	5,00	0,87
Required Quantity	t	0,25	120,00
Actual	t	1,25	104,40

**TERRA-3000 EMITS 81 TIMES LESS CO<sub>2</sub> THAN CEMENT DURING MANUFACTURE**

Phase: Transport (To Site)

	TERRA-3000	CEMENT
Freight Movement Weight	t	0,25
		120,00

**TERRA-3000 EMITS 479 TIMES LESS CO<sub>2</sub> THAN CEMENT DURING TRANSPORT TO SITE DURING STABILISATION PROJECTS.**

Global Cement Manufacture: CO<sub>2</sub> / t

- Global Low (0.70) t
- Austria Average (0.90) t
- Australia Average (0.82) t
- Global Average (0.87) t
- Global High (1.25) t

#### CO<sub>2</sub> DURING MANUFACTURE



#### CO<sub>2</sub> DURING TRANSPORT



\* COMPARISONS OF CO<sub>2</sub> EMISSIONS BASED ON PROJECT SPECIFICATION ENTERED IN TABLE 1.