



## CONSOLID TOPICAL

CONSOLID UK

Page 1

# 12 2003

### **2004 is looking around the corner ...**

**Time to reminisce about last year, which added further to a wide acceptance of the unique CONSOLID SYSTEM:**

#### **A short but important flashback to the year 2003**

This message is addressing everybody who read our unique CONSOLID SYSTEM for soil improvement. We can offer the very valuable pre-condition that simple informative laboratory tests will show in a reliable way, ahead of any field application, what the potential customer can expect in the field.

These informative laboratory tests are not only powerful, but also gives security and assurance that there will never be any complaint possible that the CONSOLID SYSTEM may not have worked properly. **In the last 30 years there was not a single case where our additives failed**; the few cases of complaints could very easily be explained as failures in the workmanship.

Our advice for 2004: Powerful demonstrations of the informative soil test will show you the confidence of all soil-related projects.

The first 6 issues of CONSOLID TOPICAL 2003 have been used to give you a comprehensive collection of all arguments, WHY our CONSOLID SYSTEM is unique:

**THE REASONS FOR SOIL STABILISATION****How the CONSOLID SYSTEM differs from all other methods in use for this purpose.**

The start of the NEW YEAR is a good opportunity to discuss fundamentals of our business – WHY soil stabilisation, or rather soil improvement, of low-class soils is becoming increasingly important and WHY it makes the unique CONSOLID SYSTEM so different from any other method used for soil stabilisation.

From all activities of the last century to improve soil performance, only two groups of products are under use today:

**BINDER or GLUES**, which try to bind soil particles artificially together by incorporating them in the soil mix - in particular cement, lime, asphalt and some polymers. What they have in common is the problem that they do not work with all types of soil; the ever changing specific surface of the treated soil makes it in practice impossible to apply the right quantity of binder, which is necessary if the binding effect shall be effective. It is really a physical problem you cannot overcome in the field.

No 2-2003 show you a comprehensive portrayal how the CONSOLID SYSTEM enables a permanent improvement of any treated soil. This upgrading applies to all kinds of soil types as classified under A-2-4 to A-7-6. The fact that any soil works like any other soil is the greatest advantage of our system - you only have to take care that the treated soil has an optimised sieve curve, by adding missing fractions, to obtain any desired loading capacity. And the increase in the loading capacity is substantial; measured in soaked CBR, the minimum improvement is 3 to 5 times and in more than 50% of all cases more than 5 times. This means that any earthwork can be realised with an optimum of 25% soaked CBR.

No 1-2003 was used to explain the reasons why the CONSOLID SYSTEM differs so extremely from any other method of soil stabilisation. It is important that you understand the real way in which way our system works. We do not add binders, nor do we hope for chemical reactions; we activate the treated soil to develop its capability towards induration or petrification. Only this approach makes it possible to get with all kinds of soil the same permanent improvement if they are treated with the CONSOLID SYSTEM.

**THE REASONS FOR SOIL STABILISATION****How the CONSOLID SYSTEM differs from all other methods in use for this purpose (2)**

Last month we started the Monthly Letters with an abstract of the CONSOLID SYSTEM, WHY it was developed and HOW it differs from other methods of soil stabilisation.

**The CONSOLID SYSTEM is unique in the world: it is without competition and can successfully be used with any kind of soil, and it can upgrade any low-class soil to risk free construction material.**

Your possibility is a huge one. You can with the CONSOLID SYSTEM replace the conventional construction materials, such as gravel, sand or crushed stones, for low-class in-situ soils, preventing the need of excavating and soil exchange to a high degree and achieving better results than before.

These results have to be proved. Many conventional testing methods for soils exist. Already a simple informative laboratory tests will show the difference between the same untreated and treated soil / soil mixes, which can be extended to any standard testing method, as long as you respect the modifications explained on the following pages.

**Therefore this letter deals with the possible improvements and HOW to achieve them.**

**THE REASONS FOR SOIL STABILISATION****How the CONSOLID SYSTEM differs from all other methods in use for this purpose (3)**

Last month we dealt with the possibilities of showing on laboratory test results, ahead of any field application, the unique effectiveness of the CONSOLID SYSTEM with any type of soil. This fact makes it possible to consider already in the design of any earthwork the possible upgrading of a treated, in-situ soil and opens the way to a

**Performance-based Specification.**

The design can make full use of the fact that treated in-situ soil has been upgraded by classes, increasing the loading capacity of the in-situ soil by the factor 3 to 5 and in more than 50% of all cases - especially with lower classes of soils - more than 5 times.

**WHAT DOES THIS MEAN?**

Certain CBR values (or comparable parameters) are required for certain types of roads. In the base course of rural roads, this is in most cases CBR 35%, whereas highways / motorways ask for CBR 80%.

Owing to the fact that the CONSOLID SYSTEM upgrades an in-situ soil 3 to 5 or even more times, you can realise these required figures already by using soils for rural roads, starting with an untreated soaked CBR of 5 to 7%, while for highways and motorways untreated soils with a soaked CBR value of 20% will allow to get with the CONSOLID treatment the required CBR of 80% and more.

No 4-2003 discussed the greatest enemy of stability - the influence of water - and how this can be reduced or eliminated. There are two main types of water attacking the stability - the meteor water (rain) and the capillary rise of water. The CONSOLID SYSTEM can bring them fully under control, if necessary even to an impervious state. This is necessary, e.g., if treated soil shall be used to line artificial lakes or landfill bottom layers against seepage. This effectiveness against the undesired influence of water without disturbing on the other hand the substantial improvement of the loading capacity of the soils is one of the remarkable advantages of soils when properly treated with the CONSOLID SYSTEM.

No 3-2003 leads to the possibility of using the CONSOLID SYSTEM for the upgrading of any kind of soil in the frame of the new policy of governments to get away from strict cross section in respect of selected materials to enable substantial savings by PERFORMANCEBASED SPECIFICATIONS. Any material can be used if it is secured that the desired loading capacity can be granted as a permanent figure. And this is possible with the CONSOLID SYSTEM, because with our unique method you can realise stability tailored to any requirement.

**THE REASONS FOR SOIL STABILISATION****How the CONSOLID SYSTEM differs from all other methods in use for this purpose (4)**

Going into the depth of soil instability, you will always be confronted with the sensitivity of all - especially cohesive - soils against **water**. Cohesive soils do not pose stability problems when dry, but their compressive and tensile strength deteriorates as soon as it is exposed to water. Therefore let us discuss this matter in details:

**Water causes instability of soils, especially if their content of clayey, silty fines is effective.**

**Water causes these fines to swell and destroy any stability.** This fact makes such soils unacceptable as sub-base and base course material and even in the subgrade they may cause severe problems. In conventional constructions such soils are excavated and replaced by better material. This expensive exchange is becoming more and more questionable due to the fact that the resources for exchange material are scarce or are already exhausted and the costs for depositing the excavated material in landfills are skyrocketing.

**SOIL STABILISATION CAN BE THE WAY OUT OF THESE PROBLEMS.**

... on the prerequisite that it is possible to upgrade the in-situ soil to risk-free construction material, as it is the case with the CONSOLID SYSTEM. And this leads now back to the water influence, which is the most visible negative effect against stable conditions. Water softens the soil from the top as meteor water (rain, floods, etc.) by seeping into the soil, but of equal importance is the capillary rise of water, which can for cohesive soils lead to full saturation and more and destroy the stability completely.

**THE REASONS FOR SOIL STABILISATION****How the CONSOLID SYSTEM differs from all other methods in use for this purpose (5)**

This time we will look at a special aspect of soil stabilisation with – the CONSOLID SYSTEM the difference in costs and the capacity of savings.

Due to the fact that the CONSOLID SYSTEM allows a complete change in the design of a road or earthwork, we have to discuss several aspects, which altogether lead to substantial cost savings already during construction.

- Using as much as possible in-situ soils saves a lot of costs.
- Upgrading sub-grade soil to sub-base and even base course, performance reduces the costs for excavation of sub-grade soil and disposal costs substantially.
- Less borrowed material will be required – another substantial saving factor.
- Converting the bridging effect of the embankment to the treated soil layers allows reducing the wearing course thickness considerably and reduces construction costs remarkably.

No 6-2003 comprised another very important argument - the LONG-TERM PERFORMANCE. For earthwork it is important that any treatment of the soil and will not fade away over time. The CONSOLID SYSTEM has now experience over 30 years and got during this time the confirmation that the treatment lasts and even improves over time to higher density and compressive strength with mod. AASHTO densities above 118%, leading to real mineral concrete. This effect confirms the fact that the CONSOLID SYSTEM really turns the treated soil towards induration and petrification.

These 6 issues are very valuable.

No 5-2003 dealt with the possible savings of the costs if conventional construction material like gravel-sand and crushed stones can be partly replaced with the in-situ soils, saving not only the costs of borrowed material but also the excavation and disposal of the in-situ soils. The savings can be substantial: already during construction savings of 20% plus those of the construction costs are possible. Under certain conditions these savings can go up to 50% if the conventional material has to be brought from far away.

**THE REASONS FOR SOIL STABILISATION****How the CONSOLID SYSTEM differs from all other methods in use for this purpose (6)**

We discussed many aspects why the CONSOLID SYSTEM outperforms any other method for soil stabilisation, and today we will discuss a further aspect, which is of greatest importance and the strongest argument for using the CONSOLID SYSTEM for the upgrading of in-situ soils – the **LONG-TERM-PERFORMANCE** of the treatment.

Being used mainly in the deeper layers of an embankment, any failure of a stabilisation can lead to severe damages of the entire construction – therefore the seemingly "cheap soil layers" can turn very fast into the most expensive ones if they are the reason for reconstruction.

Any soil stabilisation which tends to bringing only temporary improvement or getting fatigue over time should not be used, also in view of the fact that they all work satisfactorily only with certain types of soils.