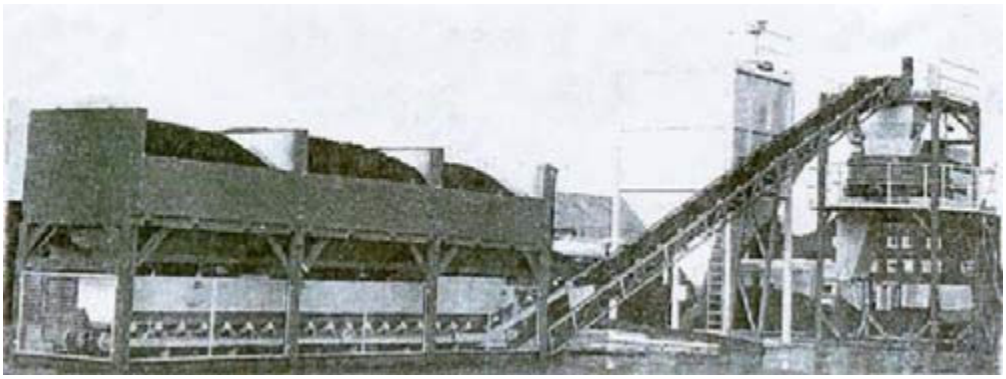
CONSOLID TOPICAL UK

9 2003

The Great Advantage:
THE CONSOLED SYSTEM CAN BE USED "IN PLANT"
pre-treatment of any soil mix "in plant" allows timely unlimited stockpiling of pre-treated material without any loss of effectiveness.

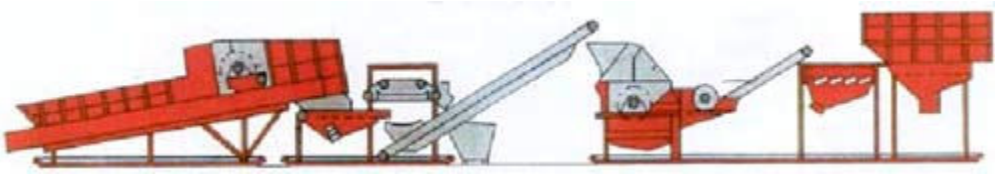
The CONSOLID SYSTEM offers two ways to be used on the site:
"**in place**", with the in-situ soil, using a soil mixer for the application of the additives;
And "**in plant**", using any stationary mixer to pre-treat the in-situ soil or soil mixes and stockpile the material until weather conditions or the site allow to use it, simply by placing, leveling and compacting, and saving in this way a lot of time on the site - thus prolonging the actual construction season in the field.



One of the great advantages of the CONSOLID SYSTEM is the possibility of premixing any in-situ soil or soil mix, stockpiling the treated material for unlimited time and still having the full effectiveness. Pre-mixing allows to use the bad weather periods to carry out jobs which otherwise could not be done, saving time in this way.

In quarries and gravel pits it becomes possible to compose by using any waste material in proper soil mixes that after treatment will always have the same quality parameters in respect of C.B.R., E-modulus or any other specification required. This offers a new range of ready-to-use products for the construction industry.

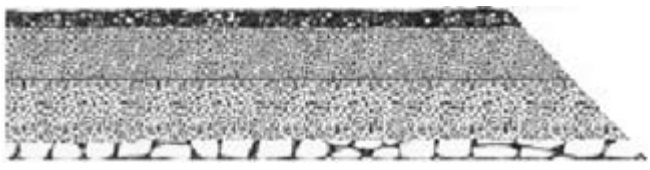
The specific character of the CONSOLID SYSTEM will allow to recycle and upgrade waste material which otherwise would be costly in disposing them, e.g. polluted material from road rehabilitation or the rehabilitation of railway tracks. Due to the fact that polluting ingredients can be immobilised by making the treated material impervious, it becomes possible to use such waste without the danger of harmful leakage.
In this manner you can easily conform to the rules of "Performance-based Specifications."



Pre-mixing has the great advantage that you become independent of the weather conditions:

- You can prepare the proper soil mixes, as found suitable ahead in your laboratory, taking into account the requirements of the site;
- You can mix even with higher moisture content which makes the procedure easier and respects the fact that the better the mixing process, the less additives are required. The quality of the mix can easily be checked and always remains on the same level.

We recommend treated layers of 250 mm, whereas the lower 150 mm usually receives
fewer additives than the top 100 mm.
Where required due to the traffic 400 mm
treatment will be the recommendation. Here again the lower 250-300 mm will be treated with fewer additives than the top 100-150 mm.



It is obvious that such differently treated layers can be built-in more accurately with premixed materials than sub-base and base course layers and also allow to make optimal use of any saving possibility in the design of a construction.

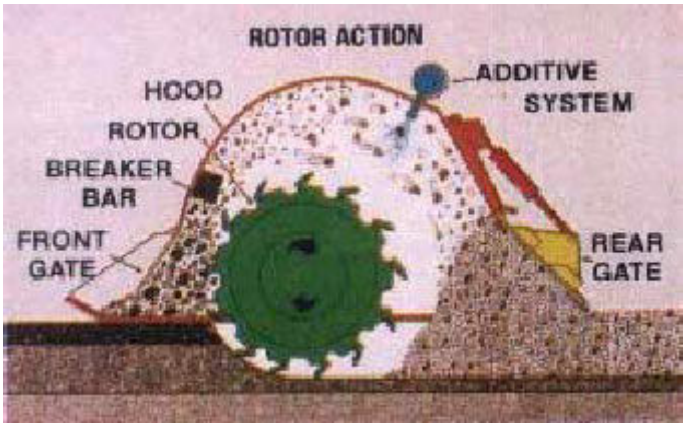
The graph shows how much a desired loading capacity on top with 100% will be reduced with the depth of an embankment. Taking in consideration that the proper CONSOLID TREATMENT increases the soaked C.B.R. by 3 to 5 times and more, you can imagine that any in-situ soil can be upgraded to the required stability.	**CBR 35 CBR 50 CBR 80** Distribution at Distribution at Distribution at 90° cm 60° 90° cm 60° 90° cm 60° 13 10 18 18 10 26 29 10 42 6 20 11 9 20 16 15 20 26 **5 25 9 7 25 13 11 25 21** 4 30 8 6 30 11 9 30 17 **3 40 5 4 40 8 6 40 12** 2 50 4 3 50 6 4 50 9 1.5 60 3 2 60 5 3 60 7

THE BETTER THE MIXING, THE LESS ADDITIVES ARE NEEDED ... and the better the results – therefore "in-plant" mixing can always be better than "in-place" mixing, but there exist machinery equipment which secure also "in-place" excellent results.

FOR THE APPLICATION OF CONSOLID AND CONSERVEX vacuum tank trailers offer the best and most economical solution (and can even be used for the production of CONSOLID).

Vacuum tank trailers are powered by a cardan shaft or hydraulic from a tractor and is to suck in water from any pond, river, etc. very quickly and apply the CONSOLID solution with high speed on the site. Also the loading of CONSOLID is easy by sucking in the product for the dilution with as much water as the soil can take up to get close to the OMC. Any other tank car can also be used and can apply the CONSOLID solution. Tank cars, which can apply this solution only by gravitation, require more time for sprinkling the necessary quantity of solution/water per m2.
A sprinkler bar can easily be adjusted to any vacuum tank trailer and secure very accurate applications of the CONSOLID solution.

FOR THE PROPER MIXING INTO THE SOIL PROFESSIONAL SOIL MIXER ARE REQUIRED, because the better the mixing, the better the result and the possibility of saving costs if less additives yield the required result.



Caterpillar

The **STEHR** soil mixer, attached to a heavy tractor, can give excellent performance and will be the most economical solution, compared with self-propelled soil mixers, which cost several times more. Equipment to be considered ...

What machinery equipment is required for the proper application of the CONSOLID SYSTEM?

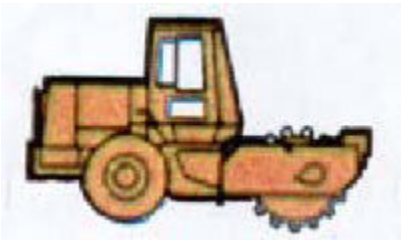
This question is often presented - there is no difference to conventional soil stabilisation methods - the additives of the CONSOLID SYSTEM must be applied in the adequate

quantity and properly mixed with the soil or soil mix. What equipment is needed on the site when working with **pre-mixed** material?

Due to the fact that the application of the additives has already been done during the premixing, you need the following equipment on the site:

The mixed material will be moved from the stockpile by truck to the site and applied there on the road directly or into a spreader box of a PAVER.

If the material is applied without paver then the treated material has to be levelled with the GRADER to the proper layer thickness. This step is repeated if two layers as sub-base and base course are applied, with intermediate rolling.



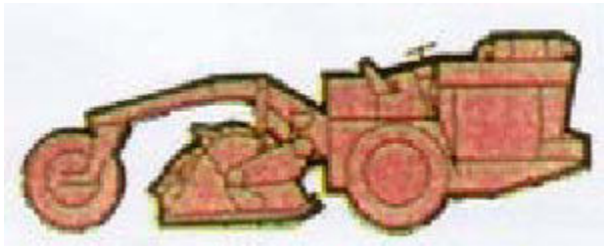
If the pre-treated material is properly applied, it may be necessary to sprinkle water onto the layer to bring the moisture content close to the OMC. Then compaction starts, if possibly first by a sheepsfoot or padfoot roller with or without vibration, followed by intermediate leveling with the grader and final compaction with a vibration roller or tire roller. Now the road is ready for the wearing course on top.

What equipment is needed if the CONSOLID SYSTEM is used "in place" with in-situ soil or for the rehabilitation of a worn road?
If the mixing process is carried out "in place", it needs more time than applying only the finally mixed material from a central mixing plant. In the following the single steps and the required equipment are described:

First of all the GRADER will rip off the in-situ soil and prepare it for the treatment. Larger stones will be eliminated before the treatment starts.

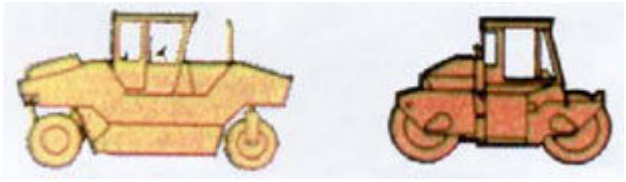
If necessary, missing fractions have to be imported to give the in-situ soil better mechanical strength and density. The missing fraction can usually be borrowed nearby. Thus clayey soil will be added if the soil is too sandy or too coarse; sandy or coarse material will be added if the in-situ soil is too clayey, which is always combined with too high a shrinkage potential. The imported material will be leveled with the grader.

THE APPLICATION OF CONSOLID AND SOLIDRY is carried out with a sprinkler tank car for CONSOLID and with a spreader box for SOLIDRY. For this purpose many types of equipment exist. In our advice you always find those equipment we prefer for this purpose, such as vacuum tank trailers for CONSOLID.



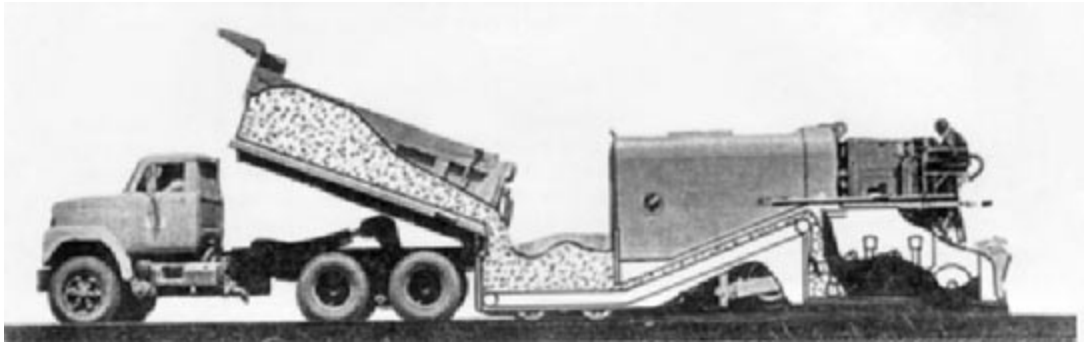
When applied, the additives will be intermixed with the proper professional SOIL MIXER as thoroughly as possible - the better the mixture, the better the result. The mixer is adjusted to the appropriate mixing depth and the soil mixed until the entire additive quantity disappears in the soil and the soil looks as before.

Intermediate rolling with a SHEEPSFOOT or PADFOOT ROLLER is recommended if more than a single layer is treated. Cohesive soils should always be rolled at first with a sheepsfoot or padfoot roller to get the kneading effect of this type of roller for dense packing, followed by a TIRE ROLLER or VIBRATING COMPACTOR with single or tandem drums.



THE CONSOLID SYSTEM can upgrade any layer in an embankment of a road or railway, e.g. subgrade, subbase or base course, but it should not be used as a wearing course.

WHY? Soil remains soil, even if its properties have been dramatically improved. To achieve this improvement you have invested, it would be nonsensical to let the unprotected soil surface be grounded away by mechanical abrasion. Sooner or later it will ruin your investment, which can so easily be protected by applying a WEARING COURSE on top of the embankment.



The WEARING COURSE can be:

- An asphalt pavement of 3-5 cm asphaltic hot mix concrete (long lasting)
- A thin reinforced layer of Portland cement concrete, (long lasting)
- A layer with paving stone of concrete or asphalt hot-mix, (long lasting);
- A double coating with asphalt emulsion, covered with small crushed stones (chips), (good solution and easy to repair if necessary);
- A sand seal, whereas an asphalt coating is covered only with sand (only 3 to 4 mm thick); (temporary protection);
- Application of any thin matrix of surface coating material for dust control, such as asphalt primer, copolymeric solutions in water, colourless coatings and similar applications (temporary protection but easy and cheap to renew).

Whatever is used prevents that the treated soil from being ground to dust and lost from polluting the surrounding, and saves the full value of the investment. Also the treated road will be safer, because cohesive soils, when becoming moist tend to produce a slippery surface.