The right partner even for the most specific applications:
Collaboration of FAE and Kulstad Maskin AS (Norway).

Fig.1 MTH 225: stabilization with lignin (Norway)

The FAE GROUP, a market leader in the design and construction of high quality professional machinery for the construction and land clearing sectors, is celebrating its 25th year of business.
The company can look back with great pride on the results it has achieved since 1989: 25 years of constant technological innovation, quality, product reliability and customer service. The FAE GROUP has proven itself the ideal partner for professionals that need to crush stones, grind layers of rock and asphalt, stabilize the soil (even at significant depths), clean-up forests and shred plant waste.

FAE technology is reliable and the quality of the components and materials used guarantee extreme robustness, high performance and efficiency over time. Professionals around the world recognize our qualities and benefits.

Even the Norwegian company **Kulstad Maskin AS**, chose to trust FAE and its technology.
Kulstad Maskin AS located in Vuku, Norway and owned by Morten Kulstad; Company specialises in road maintenance.

The harsh climate conditions during winter in Norway create significant damage in the road mantle. The soil can freeze up to two metres in-depth. Therefore it's essential that stabilization operations carry out professionally to create a solid compact layer that supports the bituminous mantle.
The binding agents commonly used in other countries such as lime and concrete in Southern Europe are not suitable for this special application.

FAE Group S.p.A. - Zona Produttiva, 18 - 38013 Fondo (TN) - Italy
Tel. + 39 0463 8400 00 - Fax +39 0463 8400 99 - info@fae-group.com

Two different techniques are usually employed to stabilize roads in Norway.
The first is to add gravel or stones of a specific size and mix them with the upper road layer. The second technique involves the use of lignin, a completely eco-friendly plant-based binding agent.
Lignin is the "binding agent" for trees from which it is extracted using a heat treatment. Then it's sold either as a powder or solution of 50% dry material. It has a specific weight of 1.25ton/m^3. As a solution, lignin influenced by environmental temperatures looks like dirty water at high temperatures though when cold it curdles.
In its dissolved form it has many advantages. However, is also used in a similar way and for similar applications as bitumen, absorbing most of the flexion created in the road structure by the passage of heavy vehicles and it keeps the dust away from dirt roads.

In Norway, Lignin is the ideal solution for stabilizing deep road layers. After the hardening process lignin maintains a certain amount of elasticity, it doesn't harden like cement. This drastically increases the road's load-bearing capacity and is essential for tackling the making of ice in the road structure during the winter months.

With respect to the traditional method of the "geogrid" or filling with gravel, the material derived from the previous paving layer is perfectly amalgamated with the new layer. When complete, the height and width of the road will be very close to the previous values.

Even the occasional need to crush granite stones led the Norwegian company **Kulstad Maskin AS** to choose the MTH made by FAE, a heavy-duty machine with high levels of strength and reliability. The crushing chamber is internally lined with HARDOX and is easy to replace without having to remove the rotor. The chamber is also equipped with utensils, tungsten carbide inserts, extremely high levels of hardness for extremely reduced wear and unparalleled long life.

Fig. 2 The MTH is able to grind layers of rock, crush stones, grind asphalt and stabilize the soil even when rocks are present.

The MTH is the best product in the FAE range in terms of technology and productivity. Designed for used with tractors of up to 400 HP and is able to grind layers of rock, crush stones, grind asphalt and stabilize the soil, up to a maximum working depth of 50 cm.
Kulstad Maskin AS uses the MTH mainly for grinding asphalt and stabilizing soil where stones are present.

Fig.3 and 4 Grinding the asphalt layer

Works proceeded steadily at an operating speed of about 500/600 metres per hour. This rare and excellent level of speed is possible thanks to the operating depth of the machine and the MTH's variable geometry crushing chamber. This innovative design solution guarantees the best crushing results. Thanks to the mobile rotor, which adjusts hydraulically from the tractor cabin, the volume of the crushing chamber (where the soil mixes) increases based on the working depth. By penetrating into the soil with only the rotor, the traction forces are lower and fuel consumption is reduced. This allows for faster operating speeds which in turn saves time.

The counter blade in HARDOX and the adjustable grille on the rear bonnet allow for a granulometry of the output material lower than 35mm.

The stabilization process with lignin in a solution of 50% dry material, involves 3 stages:

- addition of the solution at a dose of 4.5 l/m^2 and mixing up to 10 cm in-depth
- addition of the solution at a dose of 4.5 l/m^2, mixing up to 20 cm in-depth and compacting with a roller
- distribution of the solution at a dose of 1 l/m^2 in order to create a surface layer

Once the hardening stage is complete, the new asphalt layer is ready to lie.

FAE Group S.p.A. - Zona Produttiva, 18 - 38013 Fondo (TN) - Italy
Tel. + 39 0463 8400 00 - Fax +39 0463 8400 99 - info@fae-group.com

Fig.5 Addition of lignin, in a solution of 50% dry material

Fig.6 Deep stabilization

Fig.7 MTH, grader and compacting roller

The MTH's multi-task heavy-duty head not only allows Morten Kulstad to meet excellent end results, but it allows them to work with agility in limited space. The MTH can reach corners and areas that are difficult to reach for self-propelled machines, and it allows agile and rapid transfer from one site to the next.

Fig. 8 Easy and rapid transfer from one site to the next

FAE Group S.p.A. - Zona Produttiva, 18 - 38013 Fondo (TN) - Italy
Tel. + 39 0463 8400 00 - Fax +39 0463 8400 99 - info@fae-group.com