

# INNOVATIVE SOLUTIONS FOR SUSTAINABLE ROAD INFRASTRUCTURE



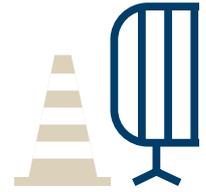
**LIME  
SYSTEM**

**FASSA  
BORTOLO**

ONE OF THE MANY PROPERTIES OF LIME IS THAT IT CONTRIBUTES TO SOIL CONSOLIDATION AND STABILISATION.  
**THE ADDITION OF LIME TO CLAYEY AND SILTY SOILS IMPROVES THE GEOTECHNICAL CHARACTERISTICS OF THESE SOILS.**



# SOIL STABILISATION



Soil stabilisation using lime is a well-established practice involving the addition of calcium oxide, either dosed on its own or in combination with cement, to clayey or silty soils to reduce their plasticity and to allow optimal compaction in a cost-effective way. In general, the treatment with lime dosage alone is carried out on some soils of Group A2 and on soils of Groups A6 and A7, while the dosage of lime-cement mixtures is carried out on some soils of Group A2 and on soils of Groups A4, A5 and A6.

Calcium oxide (quicklime) is added to the soil that is being stabilised in a given percentage and it has a twofold advantage:

- through the hydration process, it absorbs water chemically (up to 1/3 of the weight of the added lime) and, since the hydration reaction is highly exothermic, it will also dry out the soil.
- The silica and alumina in clayey soils react with the calcium to form calcium and aluminium hydrates. These reactions are similar to those that occur in cement when it hardens and last for years.

## THE REACTIONS OCCUR THROUGH 2 DISTINCT PROCESSES:

**1**  RAPID ION EXCHANGE IMPROVES THE CHEMICAL AND MECHANICAL CHARACTERISTICS OF THE SOIL, THUS CHANGING IT

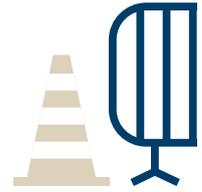
**2**  SLOW LIME/SOIL POZZOLANIC REACTIONS KNOWN AS STABILISATION/SOLIDIFICATION

The soft burning of the limestone carried out by Fassa produces lime that has high calcium oxide content and high reactivity, which are optimal characteristics for the soil stabilisation process.

Fassa Bortolo lime products for soil stabilisation:

- **FASSASOIL 102XS**
- **FASSASOIL 123XS**

# ROAD WORKS



During road works, it is **necessary to use a product to facilitate the work while limiting soiling on the construction site** without using only calcium carbonate, as is usually the case, with the unpleasant discomfort for operators and drivers in the vicinity of the construction site caused by dust.

When using carbonate filler (i.e. micronised calcium carbonate), a special paving machine is required, thus adding a construction vehicle. Furthermore, when the product is spread on the ground, a dust cloud is easily generated, which can create safety problems for motorists and operators and increase the amount of inhalable dust in the work area.

**THE NEW FASSAROAD SOLUTION SOLVES THIS PROBLEM  
BY PREVENTING THE BITUMEN FROM BEING REMOVED BY  
CONSTRUCTION VEHICLES.**

**FASSAROAD** IS A **SUSPENSION** BASED ON **SUITABLY MODIFIED MILK OF LIME** THAT IS USED TO ACHIEVE **CONSIDERABLE ADVANTAGES**:

- ready to use
- easy to handle, use, manage, etc.
- safe use
- withstands prolonged storage (months)
- reliable
- easily pumpable, does not settle

- **FASSAROAD H**
- **FASSAROAD HF**

are the two Fassa Bortolo products based on hydrated lime and hydrated lime with filler, to be added directly to the asphalt mix, offering the benefits mentioned below

## DOSAGE PER SQM

“Fassaroad is diluted at a ratio of 1 volume of stabilised concentrated milk of lime per 10 volumes of water.

The milk of lime obtained in this way is spread at a dosage of 250 g/sq.m. on the coat, at a stage following the breaking up of the bitumen emulsion”

Unlike most mineral fillers, **hydrated lime** is chemically active and consists of solid particles with high porosity. Because of these characteristics, it performs in asphalts as an **“active filler”** capable of reacting synergistically with both aggregate and bitumen, helping to increase the service life of the mix.

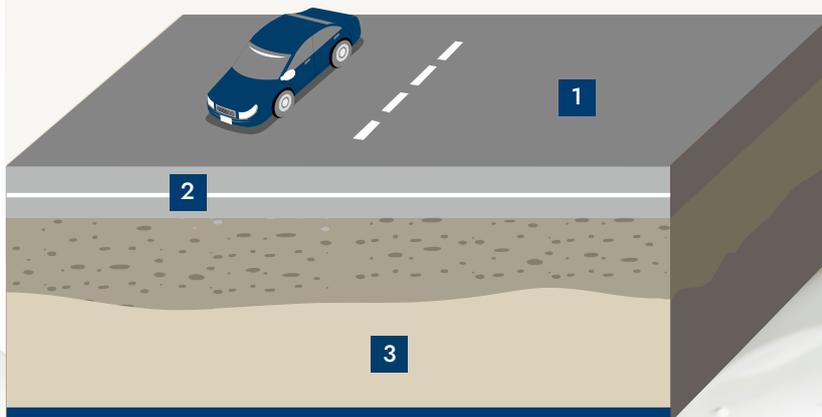
### THE MAIN ADVANTAGES

OF USING LIME INCLUDE:

- improves the bond between bitumen and aggregate
- increases resistance to freeze-thaw cycles
- reduces stripping
- acts as a mineral filler
- improves crack resistance at low temperatures
- reduces the oxidation processes typical of many bitumen types resulting in reduced ageing phenomena
- in the presence of clay, it reacts with it, consequently improving the moisture resistance of the mix
- hydrated lime reacts with the highly polar molecules in the bitumen, promoting the formation of more stable and less soluble compounds, improving the mix's resistance to moisture
- reduces rutting phenomena
- reduces the formation of cracks in the road surface

### ADDING 1 TO 3% OF HYDRATED LIME DURING BITUMEN PREPARATION:

- improves deformation resistance
- benefits viscosity at high temperatures, especially during the early stage, counteracting cracking and the build-up of permanent deformation
- extends the average life of road works and counteracts cracking at low temperatures



1 FASSAROAD H/HF

2 FASSAROAD

3 FASSASOIL

# SERVICES



CONTACT US AT  
[sistemacalce.fassabortolo.it](http://sistemacalce.fassabortolo.it)

## KNOW-HOW AND SERVICES FOR A FULLY COMPREHENSIVE PARTNERSHIP

Fassa Bortolo products are the result of experience in the field and continuous research aimed at creating tailor-made solutions based on the specific production cycle and customer needs. The guarantee of a very high quality product is combined with constant assistance, both from a technical and logistics point of view, provided by a team of experts and specialist technicians offering comprehensive service and constant support. With its broad range of services, Fassa Bortolo is able to meet the increasingly diverse needs of its customers.

### What can Fassa Bortolo offer?



#### CUSTOMISED PRODUCTS

Having direct control over the supply chain, thanks to the quarry it owns, and being a primary producer, Fassa Bortolo is able to customise the product according to the customer's technical requirements, whether physical or chemical. As a result of many years of experience in supplying lime to very different markets and applications, our specialist technicians can create customised products suitable for any need.



#### SOLUTIONS FOR PRODUCT STORAGE AND DOSING

With the expertise it has developed in the building industry, Fassa Bortolo has also created, for the Lime Division, systems for storing and dosing pulverized and pebble air lime. These systems are suitable both for production needs as well as for non-routine or routine maintenance directly in the customer's plant, thus enabling operational continuity. Given the nature of the material, it is important to ensure that the properties of the raw material are not compromised: this is why our range of silos has been designed to ensure that finished product quality is maintained. Lastly, we offer the opportunity to use our range of unloading systems for transferring air lime from the silo to final use: from screw conveyor to pneumatic transport with our conveying systems.



#### DEVELOPMENT OF CUSTOMISED EQUIPMENT

With a view to improving the service provided to the customer, Fassa Bortolo assesses the construction of customised systems and/or special projects for the lime product. A joint study with the customer, consisting of site inspections and feasibility studies, is followed by a design stage where the technical requirements are combined with the solutions available within the budget.



## **DRAFTING OF SPECIFIC TECHNICAL REPORTS**

When requested by the customer, our technicians can carry out a technical inspection of the plant in order to propose the best solution that meets the requirements. The Lime Division can count on both plant and product solutions: our technicians can propose the leasing/sale of equipment for lime storage and dosing and, at the same time, identify the product that is best suited to the customer's plant conditions and the most efficient for the type of process selected.



## **ANALYSIS OF MATERIALS**

Leveraging on the experience of our technicians and the equipment in our Fassa I-Lab, we are able to analyse products in a variety of ways:

- mineralogical and crystallographic analyses using an X-ray diffractometer (XRD);
- compositional analyses using an XRF spectrophotometer and an optical emission spectrometer (optical ICP);
- analyses of porosity and surface area using a gas porosimeter;
- surface analyses (including compositional) using a scanning electron microscope (SEM);
- reactivity analyses using appropriate equipment (as per EN 459 standard);
- analyses of grain size using mechanical screening and laser granulometer.



## **TRANSPORT**

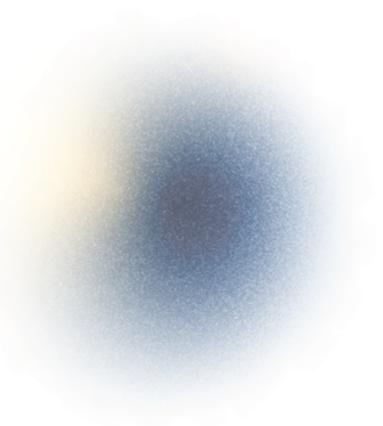
We offer a speedy and efficient transport service that always guarantees goods are delivered in the manner and within the timeframe agreed with the customer.



## **ASSISTANCE**

With our decades of technical experience with machinery, we not only offer assistance, but are also fully available to help solve specific problems.

- check out <https://sistemacalce.fassabortolo.it/en/chi-siamo/>



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