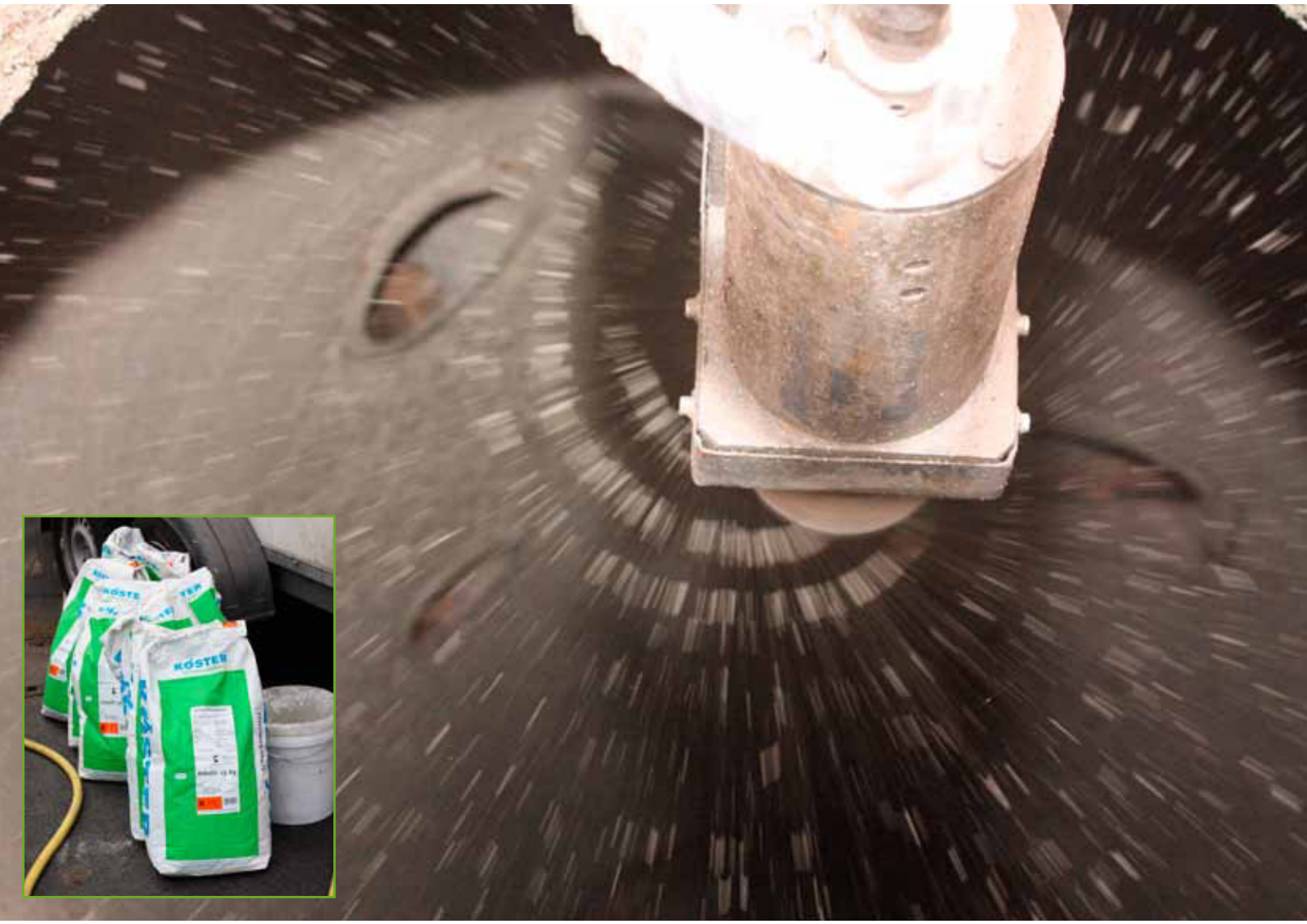
KÖSTER
Waterproofing Systems

INTERNATIONAL INFORMATION

SEPTEMBER 2012

KÖSTER Sewer and Shaft Mortar...



... during a successful test application with a special spraying machine for shafts.

1. KÖSTER Sewer and Shaft Mortar - machine application for shaft restoration

World-wide sewers and shafts are one of the largest underground infrastructures in developed and developing countries. In Germany, for example, the total length of the sewer system is approx. 490.000 kilometers. From day to day these structures are exposed to challenging environments with high mechanical and chemical stresses, leading to damages and therewith resitricted service quality. Repair and protection materials basically have the following tasks:

- protect the environment against loss of sewage water into the ground water
- prevent ground water from penetrating into the sewer system (drainage effect)
- prolong the life time of sewers and shafts in order to reduce financial impacts on municipal budgets

Technical challenges on repair / protection products

- *moist / warm climate (promoting corrosion and setting a difficult application ambience)*
- *frequent temperature changes (thermal stresses)*
- *aggressive substances in the water and abrasion due to sediments in the water*
- *positive and negative side water pressure*

KÖSTER Sewer and Shaft Mortar provides

- *High resistance against mechanical abrasion*
- *High chemical resistance*
- *Fast curing also in moist and warm surroundings*
- *Good bonding properties on all mineral substrates*
- *Application in one layer from 4 mm (minimum for a waterproof layer) to 3 cm (for reprofiling works)*

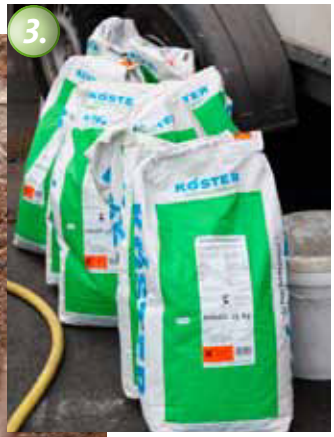
During its development the material was constantly tested and improved together with specialized applicators. Since its introduction it has received very good feedback throughout the market.

In order to test its aplicability by machine, KÖSTER conducted a test application in 2011. Also taking into account the feedback of the test applicators the first impressions appeared satisfying and very promising. In summer 2012 Mike Ebbinghaus, KÖSTER Application Technician in Germany, inspected the test application in order to provide measurable feedback (see last picture). The following case study shows the single steps from substrate preparation until quality control:

1. & 2. The substrate is prepare by high pressure water jetting (approx. 500 bar, depending on the site conditions)

3. KÖSTER Sewer and Shaft Mortar (25 kg bags)

4. The substrate after water jetting. Break outs, voids are repaired. Old steel stairs have to be cleaned and treated with KÖSTER Z1 / Z2 Corrosion Protection.



5. The material is mixed inside a mortar pump and then pumped into a special application tool. This tool is a rotating spiral, which literally shoots the material onto the...

6. ...prepared substrate. this tool can be driven downwards and upwards in the shaft, therwith coating the shaft walls easily and very fast.

7. The ready coated shaft. A comparably smooth and homogeneous surface is achieved.

8. One year after application pull-off tests were conducted, in order to test the quality of machine application.

Technical data

Density of fresh mortar	*1,8 kg / l*
Compressive strength (24 hours)	*> 18 N / mm²*
Compressive strength (7 d)	*> 35 N / mm²*
Compressive strength (28 d)	*> 50 N / mm²*
Bending tensile strength (24 h)	*> 3,5 N / mm²*
Bending tensile strength (7 d)	*> 6 N / mm²*
Bending tensile strength (28 d)	*> 7 N / mm²*
Pot life (20°C)	*approx. 20 min.*

Mixing

25 kg of KÖSTER Sewer and Shaft Mortar with 5.0 – 5.5 l water. Minimum mixing time is 3 minutes.

Consumption

Approx. 1.8 kg / l void as repair mortar
Approx. 18 kg / m² per cm layer thickness

Packaging

25 kg bag