

Kniele GmbH, 88422 Bad Buchau, Germany

# Innovative mixing plant for ultra-high-performance fibre building materials

■ Felix Kniele, Kniele GmbH, Germany

The Swiss company Implenia AG, based in Glattpark (Opfikon) in the canton of Zurich, is a leading multinational construction company and property services provider and stands for innovation and efficiency in the construction industry. With over 9000 employees, the company develops, realises and manages living spaces, working environments and infrastructure projects in Switzerland and Germany. Implenia is also active internationally in tunnelling and related infrastructure services. Implenia pays particular attention to the use of ultra-high-performance fibre building materials (UHFM). These construction materials are characterised by high durability and optimised material properties, which can reduce road closures and congestion times. This is a significant advantage in view of the increasing volume of traffic.

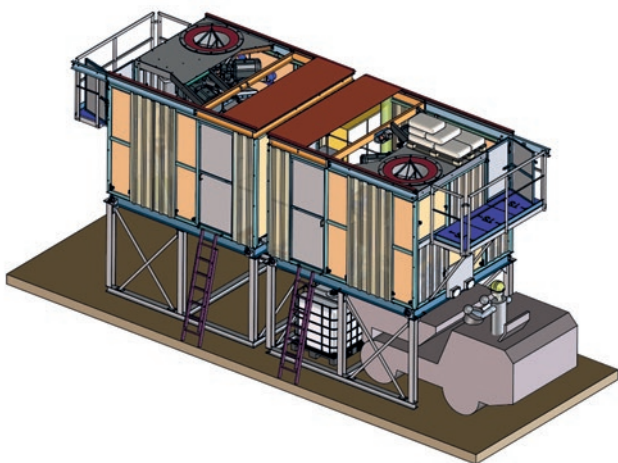
## A partner for innovative mixing technology and special machine construction

Kniele GmbH is specialised in producing high-quality mixing plants and one of the leading companies in the field of concrete mixing technology. After being commissioned by Implenia, Kniele began planning and realising a mobile double mixing plant for UHFM towards the end of 2022. The

aim was to develop a compact and flexible plant that would meet the demanding requirements on construction sites. A short assembly and disassembly time, a compact design and the use of a high-performance mixer for very high mixing quality were of central importance. The plant was to operate with an output of five to six cubic metres of UHFM per hour and should also offer corresponding cost savings thanks to its mobility by means of a low-loader without the need for a permanently required tractor unit. A fully automated batching process and its own power generator were to ensure efficiency and self-sufficiency. Dumpers were to be used to collect the concrete. The plant is fed with big-bags containing a ready-mixed material with steel fibres to ensure consistent mixing quality. The medium-term plan was to use the new UHFM special mixing plant to also produce for pumping and spraying processes.

## Mobile double mixing plant with cone mixers

The special plant supplied by Kniele GmbH utilises state-of-the-art technology and includes numerous innovative components. At the heart of the mobile double mixing plant are the two Kniele KKM750/1125 cone mixers with 750 litre ready concrete output, which have been specially designed



3D model of the double mixing plant



The special plant supplied by Kniele GmbH utilises state-of-the-art technology and includes numerous innovative components.



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The plant is fed with big-bags.

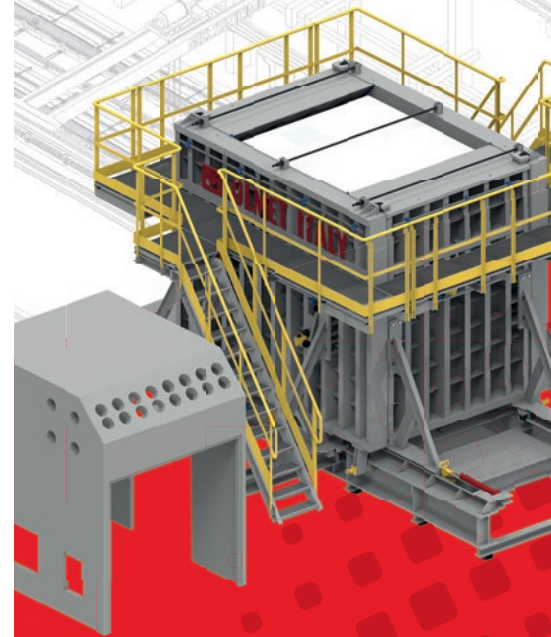
for high-performance building materials and offer the required production capacity of five to six cubic metres per hour. The two symmetrically designed mixing plants can be operated either together or separately, which allows a high degree of flexibility. The Kniele cone mixers are equipped with a special outlet seal that provides a reliable seal during the production of suspensions. The speed of the mixing tools can be individually adjusted to the respective type of concrete using the built-in frequency inverters. Small or special components are added manually via a manual feed hopper, while the big-bag filling hoppers with ripper knives and discharge aids enable efficient feeding of the bags.

Both mixers were equipped with a water dosing system and corresponding pipes. Bikotronic GmbH carried out the electrical cabling and control of the system, while Kniele produced the housing with Plexiglas panelling, folding roofs and access doors. The mixers themselves are designed as scales to enable precise weighing of the raw materials while minimising the installation height. A special support frame, which is installed on site, allows dumpers to drive directly under the mixer outlet and collect the ready-mixed concrete. An admixture weigher from Würschum GmbH with dosing pumps is used to dose the necessary additives. The plant was successfully commissioned in early 2024 and handed over to Implenia.

### Successful use in a bridge construction project in Mély

The construction of a new bridge over the cantonal road in Mély was an outstanding example of the efficiency of the mobile double mixing plant. The client planned to replace a temporary bridge with an integral structure with free banks and abutments that would accommodate future bridge superstructures. The use of UHFM as a deck slab proved to be a decisive advantage, as the ultra-high-strength fibre-reinforced concrete was able to reduce the bridge's dead weight by up to forty percent. This enabled the construction time to be shortened by more than three months, so that the structure was completed within a year.

The sixteen prefabricated cross girders further accelerated the construction process. The UHFM carriageway slab was produced outside the motorway area, while the longitudinal beams and the bridge slab were concreted in one continuous operation. The mobile double mixing plant achieved a mixing capacity of 5.4 cubic metres per hour. Finally, the finished, prestressed supporting structure was precisely positioned on the prepared supports using self-propelled transporters, so-called SPMTs. Roland Strebel, Project Manager at Implenia, emphasised the successful and early completion of the project. He explained that the efficient adaptation of the UHFM consistency to different components and the high production output of the system were key success factors.



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Kniele cone mixer KKM750/1125

**Conclusion: Innovative and efficient mixing technology for UHPC**

The mobile double mixing plant from Kniele GmbH has proven to be a highly innovative and efficient system for processing UHFM. Through various project applications, in which Implenía has already produced several hundred cubic metres of UHFM, a great deal of experience has been gained and handling with the new plant has been optimised. The respective product formulations were then adjusted and set more precisely to the standardised UHFM grade, in terms of quality, for the specific machine.

The options for customising the consistency, the high throughput of the system, the flexible use and the high mixing quality thanks to the integration of a unique mixing technology are particularly noteworthy. The efficient production of large quantities of UHFM while maintaining the highest quality is a unique selling point that sets Implenía apart from the competition with the double mixing plant. ■



View inside the cone mixer

FURTHER INFORMATION



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