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New separations for Microtunnelling and Pipejacking

MAT Mischanlagentechnik GmbH, a company based in Immenstadt in the Allgäu region of Southern Germany that was founded in 1990, is a subsidiary of the BAUER Group specialising in the development and manufacture of mixing and separation technologies designed for foundation engineering.

In the early nineties – then still trading under the name of BAUER, later under the name of MAT – the company built the first desanders and separation plants for Microtunnelling applications. Up to the present day, more than 60 plants have been supplied to one of the most renowned German manufacturers of tunnel boring machines. Apart from that, MAT has succeeded in selling another 40 plants to further German and international tunnelling contractors.

MAT says its separation plants

feature a high level of reliability combined with a high degree of efficiency.

The technologies developed within the framework of the worldwide foundation engineering projects conducted by the Bauer company through tough and challenging conditions have been effectively and efficiently transferred to the field of Microtunnelling right from the start.

To offer this market a more optimised product, a new double-deck screening machine allowing the multi-stage, space-saving and effective separation and dewatering of slurries has been developed in close cooperation with key customers.

This new double-deck screening machine forms part of the BE-275-60 and BE-425-60 modular systems that – among other things – stand out due to the fact they can be assembled incredibly fast at the

construction site, reducing set-up times to a minimum.

All plants and systems can be optionally extended by modular desilter units and/or the tried and tested GS coarse screen.

For the purpose of offering its customers solutions for separating fine and ultrafine particles, MAT has developed the new BD-90 decanter centrifuge for tunnelling. This has been undertaken in close cooperation with experienced specialists and process engineers.

This centrifuge may be combined with a fully automatic MAT flocculation unit and is characterised by an extremely high level of material throughput and a particularly high degree of resilience and protection against wear.

A considerable number of these machines are already operational on international projects, so MAT fairly claims that it has managed to



successfully launch this new development onto the global market.

With its new double-deck screening machines and tunnelling decanters, the Allgäu-based company stresses that it is optimally positioned to bring fresh momentum to the micro-tunnelling and pipe jacking industry, while taking a significant step forward together with the customer by capitalising on its well-proven and yet innovative technology.

The new Spraymec 5070 VC

Normet introduced its new concrete sprayer Spraymec 5070 VC with Tier 4 Final (Stage IV) engine at the Euro Mining exhibition in Tampere, Finland on 20-21 May.

The Spraymec 5070 VC is designed for medium capacity spraying works and it can be seen as a “little brother” of the Spraymec 8100 VC as it uses the same high performance carrier but comes with somewhat lower capacity spraying features as its “big brother”.

New features include the new spraying boom SB307 providing good reach in tunnel profiles up to 7m. The boom is equipped with self-lubricating slide pieces and roller to

minimize wear and tear. All the boom movements are pressure compensated and have proportional functions allowing the operator to create a smooth and homogeneous tunnel lining.

The Spraymec 5070 VC uses Normet's low pulsation concrete spraying pump (NSP30) with a theoretical concrete output of 28m³/h and FAD 10m³/min/7bar screw –type compressor which gives reliable and sufficient air supply for medium capacity spraying works.

The same intuitive nozzleman's interface is available for the Spraymec 5070 as is standard for the Spraymec 8100. This includes the operator being able to carry out all spraying functions from the radio remote control and follow

spraying process parameters through a turntable and movable multi-colored display placed on the front of the machine. Service convenience is arranged via easy and open access to all service points.

Highly accurate accelerator dosing system either with a mono-type screw pump or optional low-pulsation Normet LPP-D peristaltic pump is synchronized automatically with concrete output

NorSmart control system can log all spraying process and carrier data such as concrete and accelerator volume, dosing percentage, pumping speed, change of process parameters, engine and compressor hours, hydraulic oil system pressure and temperatures etc. The NorSmart system also provides full fault diagnostics.

The recorded data can be delivered to supervisory checks via USB drive or machine data can be sent out to an external server via WLAN and GPRS.

The available engine options for the Spraymec are Tier 3 (Deutz) and Tier 4 Final (Cummins).

The Tier 4 Final technology utilizes SCR (Selective Catalytic Reduction) and DEF/Ad-Blue (Diesel Exhaust Fuel) urea technology for exhaust after treatment.

The new Spraymec 5070 VC is available for factory deliveries in Q4 2015.



Stockholm solution

The Söderledstunnel in Stockholm has been completely renovated and the fire-protection measures simultaneously improved. The work involved lining the structural concrete in the ceiling areas with 20mm thick Aestuver Tunnel fire-protection boards that have been specially developed for use in underground transport systems. The Aestuver T fire-protection board is a non-combustible, purely mineral-based, hydraulically bonded fire-protection board composed of glass-fibre reinforced lightweight concrete of construction material class A1. In addition to the high temperature requirements, resistance to water and de-icing salts in accordance with ZTV-Ing was the primary decisive factor for selecting the boards. The material characteristics of the Aestuver boards and their associated ease of installation ensured rapid progress of the construction work.

The Söderledstunnel is one of Stockholm's main traffic routes. With a length of 1,580m this transport artery, which was completed in 1999, is essential for maintaining the smooth flow of traffic in the city. The tunnel's technical specifications no longer correspond with today's requirements, which meant that it had to be completely renovated. Improving the fire-protection measures was a key focus of the overall works.

For structural reasons the fire-protection measures were originally intended to be executed in a thickness of between 25 and 60mm. Aestuver – together with the specialist fire-protection company subsequently engaged to perform the work, Täby Brandskudds Teknik (TBT) of Odenplan, Stockholm (the general contractor engaged to carry out the renovation) – introduced the idea of using Aestuver Tunnel fire-protection boards. There were four key points in favour of installing the Aestuver T fire-protection board:

- The boards could be fitted to all sections of the tunnel with a uniform thickness of 20mm.
- The installation speeds were significantly faster because drying times did not need to be taken into consideration. This meant that the period of time the tunnel was closed to traffic could be minimised.
- Other work could be carried out concurrently with the fitting of the fire-protection lining. During and following the application of render, it would have been impossible to perform other work in parallel.
- An appealing appearance could be achieved thanks to

the uniform, flat and pleasantly light grey surface. There were also additional benefits: Due to their material composition, the boards from Fermacell Aestuver have proven themselves for use in underground transport systems in particular. The company say they are always the first choice

can be cleaned where necessary, for instance using a high-pressure jet washer.

The high degree of compressive and tensile bending strength resulting from the board's structure, and the tested resistance to wind suction also predestine the tunnel board for use in the highly stressed tunnel



for high-temperature applications, e.g. in accordance with ZTV-ING. Suitability for this field of application has been proven at temperatures of up to 1,350°C – even at fire loads pursuant to the internationally recognised RWS curve.

Aestuver T Tunnel fire-protection boards are manufactured of glass-fibre reinforced lightweight concrete panels. The combination of the lightweight perlite aggregate for the core layer and the glass-fibre reinforcement in the final layers ensures high structural strength and resistance to frost and water. The boards can therefore be washed down and the tunnel

sector. Furthermore, Aestuver T fire-protection boards are extremely lightweight – a feature which makes their installation significantly easier. At the same time the composition of the board – with no combustible components – prevents the release of toxic or visibility-reducing gases, should fire break out.

Depending on the intended application, Aestuver T fire-protection boards are available for underground transport systems in thicknesses of between 10 and 60mm with standard dimensions of 625 x 2600mm. In this particular application, boards with a

thickness of 20mm were used.

The ceiling area that was lined covered some 15,000m². A further 8,000m² of underground ceiling area was also lined in the tunnel entrances/exits. It was initially intended not to line some areas with the Aestuver boards. However, it was possible to convince the awarding authority that lining the whole of the tunnel ceiling would facilitate rapid repair of the structure following a fire, thereby significantly reducing the risk of complete tunnel closure. The awarding authority was also pleased with the finished visual appearance, which was further enhanced by the excellent installation work performed by TBT.

For the installation of the boards different methods were selected depending upon the substrate. The boards were fastened in-place directly into the concrete over large areas, using self-tapping concrete screws. The benefit of this method is that the boards can – if necessary – be removed again with relatively little effort, and then screwed back into place later.

In other areas, the Aestuver Tunnel fire-protection boards were installed using self-tapping sheet-metal screws on a metal substructure made of stainless steel Omega profiles.

All of the boards were butt-jointed and the joints formed as cross-joints. The joints – for the boards fitted directly to the concrete and those fitted to the metal substructure – were backed with 100mm wide strips. This form of construction offers various benefits. For instance the backing strips protect the joints from fire penetration. This means that even small joints in the area of the butt joints are no problem.

It was possible to complete the construction works, including the installation of the 23,000m² of Aestuver boards, in just 18 weeks.