

Masa GmbH, 56626 Andernach, Germany

# Concrete paver production with Vision

**Although Metara Co. Ltd. is still a young Saudi Arabian company, but - without any doubt - is one of the largest concrete paver producers on the Arabian Peninsula. As a licensee of Metten Consulting GmbH, the start-up company was able to benefit from the know-how of the family business from Overath / Germany, which has been successful for many years, right from the start. Metten Stein+Design is regarded as one of the internationally leading concrete paver factories in terms of innovation, quality and product design. Metten Stein+Design has also been active in the international licensing and consulting business for more than 25 years.**

Even before Metara was founded in 2014, the future company owners had become aware of Metten Stein+Design products used in Saudi Arabia. An ever-increasing demand and the associated demands on transport logistics finally led Al Modon Al Arabia Holding Co. Group - one of the leading companies in the fields of infrastructure, contracting, construction and real estate in Saudi Arabia - to come up with the idea of setting up its own production facility directly in Saudi Arabia.

Metara relied on the expertise of Metten for the layout of the plant, the selection of the right suppliers, the implementation

of high-quality standards and new technologies in the field of surface treatment and coating. The plant resulting from these considerations was planned and constructed entirely with the German machine manufacturer Masa GmbH and is considered to be trend-setting for the Arabian market.

Since 2018, Metara has been producing selected Metten products under licence at their state-of-the-art factory located in Sudair Industrial City (about 120 km from Riyadh, Saudi Arabia). Architects, landscape architects and engineers rely on the quality of Metara products to implement the gigantic Saudi industrial and development projects.

Metara laboratory applies extremely strict quality criteria when selecting the coloured natural sands and natural stone chippings that make up the later concrete paving stones, as the quantity of aggregates is almost inexhaustible. The specific properties of these materials are combined in complex recipes to achieve the excellent quality of Metara pavers.

Inside the factory, Metara's success is based not at least on an optimally designed concrete pavers production plant. The components for dosing and mixing the concrete, for paver production and for sensitive handling come from Masa.



*View of the new production plant in Saudi-Arabia.*



*Assembly phase - The curing area with a rack plant from HS Anlagentechnik as well as the Masa finger car, elevator / lowerator and intermediate finger car are already in place.*

10 silos for aggregates and two silos designed as big bag stations store the raw materials for the concrete mix. The moisture content of the aggregates is monitored by means of probes and the subsequent addition of water is thus regulated accordingly. The charging scale with 6000 kg weighing

capacity supplies the concrete mixers. Both the colour dosing, the intermediate silo solution in the mixing process of the face mix concrete, the special version of the bucket conveyor and the Multi Color System are designed for the special colouring of the Metten products.



*Assembly progresses: Mixing area with double bucket conveyor.*





*The 8-colour dosing system FLEX 70-1 from Würschum GmbH.*

The 8-colour dosing system Flex 70-1 from Würschum GmbH is suited for C-pigment and G-granulate in order to achieve very high dosing accuracy. The dosing takes place from Big-Bags. Two of the 8 colour positions are additionally designed for powder pigments. This allows a flexible combination of all

colour types for the multi-colour products. This in turn means that the colour formulations can be very good produced. The ink scale is equipped with a separate pressure/transmitting container in order to obtain fast dosing cycles. The ink charge is pneumatically conveyed to the two Masa mixers via a diverter valve. The mixers are equipped with dust filters to ensure dust-free production. The Masa mixing plant, consisting of the two concrete mixers PH 1500/2250 and S 350/500, delivers high-quality concretes for later production. The freshly produced concrete is transported by bucket conveyor to the Masa XL 9.1 concrete block making machine as required.

The machine, as one of the key points of the concrete paver production line, is equipped with various components that go hand in hand with optimum concrete paver production. During the production cycle, the vibration force can be adjusted independently of the speed, since an amplitude-controlled drive of the vibrators is used. To simplify and accelerate the straightening times, the machine is equipped with a fully automatic mould change. Other notable features include a solid frame construction with four hard chrome-plated guide columns (ø 120 mm) for exact parallel positioning of mould and compaction head, forcibly synchronous mould guidance for exact demoulding of the products, silo level measurement in the main mix and face mix silos with load cells and the integration of a height limit system for height-accurate production. The machine is equipped with a hydraulic compaction head lock and was additionally equipped with a drive for



*View into the Masa XL - The face mix concrete is dosed directly into the filling box via a silo flap.*





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Masa GmbH  
Masa-Str. 2  
56626 Andernach  
Germany  
Phone +49 2632 9292 0

Masa GmbH  
Osterkamp 2  
32457 Porta Westfalica  
Germany  
Phone +49 5731 680 0

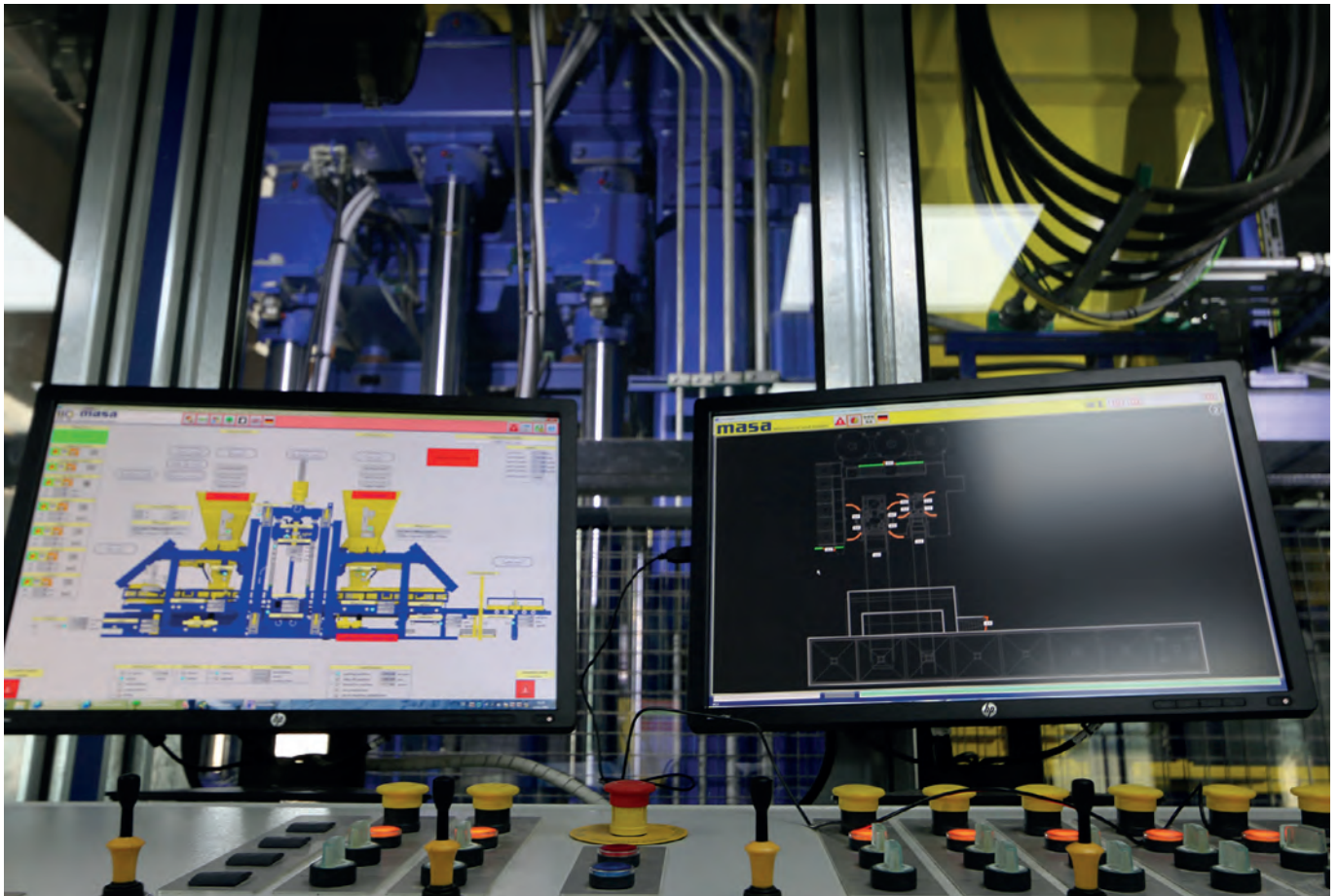
Masa Concrete Plants India Pvt. Ltd.  
#5B, KIADB, Bommasandra Ind. Area  
Attibele, Bangalore 560 099, India  
Phone +91 80 2628 3888  
Mail [info@masa-india.com](mailto:info@masa-india.com)

[info@masa-group.com](mailto:info@masa-group.com)  
[service@masa-group.com](mailto:service@masa-group.com)  
Service Hotline +49 2632 9292 88

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*Everything at a glance - The entire plant is operated by the Masa FAST plant control software. A view of the XL concrete block making machine is always possible through the windows.*

moving the main mix filling unit. The uniform operation and visualization of the plant components is carried out via the "Factory Automation System Tool" developed by Masa.

The versatility of the Masa XL 9.1 gives customers plenty of scope for creativity. The operators at Metara, on the other hand, have a high level of training and are therefore able to take full advantage of these possibilities.

The production pallets used are Assyx DuroBoards® with dimensions of 1400x1150x50 mm, which have also been used by Metten in Overath since 2007 and still support their very high product quality today. The decision in favour of Assyx production pallets was therefore only logical.

The Assyx DuroBoard consists of a Kerto-Q LVL veneer laminated wood core from Metsä Wood in Finland. Kerto-Q has a general building inspectorate approval as construction timber. This means that the manufacturing process is regularly checked and thus guarantees the high consistent quality. The wood blanks are sawn out of endlessly produced long, strongly pressed laminated veneer boards, the so-called cakes. This leads to a high homogeneous vibration transmission, evenly distributed over the entire production pallet.

The wood core is protected by a 3 mm thick Baydur® air- and waterproof polyurethane coating. This extremely abrasion-resistant and weather-resistant plastic makes it suitable for use in all climate zones. The complete waterproof coating predetermines the Assyx DuroBoard for use under extreme moisture and wet conditions without influencing its properties. Unlike steel, polyurethane does not corrode and can therefore also be used to wash out stones without any problems.

Another small secret is the area directly behind the block making machine: On the fresh side, the product can be given a unique character through a variety of processing options. There are virtually no limits to the inventiveness of the process. The operator can individually design the surface by washing out, curling variants and coating using state-of-the-art robot technology.

Metara leaves nothing to chance, which is why the focus is always on consistent product quality. To this end, the integrated quality control system can determine and display the paver density for each production cycle. The paver density can be determined by knowing various parameters of the pavers. The weight of the products is the difference between the weight of the empty pallet and the total weight of the full pro-



*Quality that impresses: During an audit, the participants convince themselves of the high product quality.*

duction pallet. The electronic weighing device for the empty production pallets is built into the production pallet feed of the block making machine and determines the weight via load cells. The electronic weighing device for full production pallets is installed in the walking beam conveyor of the wet side. The paver height measurement by R & W enables the non-contact measurement of the paver height by laser and thus supplies the required parameters. A downstream visual quality assurance system ensures that only high-quality products are fed into the curing process.

The curing chamber plant from HS Anlagentechnik has a total capacity for 5280 production pallets (4928 production pallets + 1 empty chamber). The plant thus represents a resilient link between the wet and dry sides, which is adapted to the process. The integrated Masa ventilation system can qualitatively support the curing process of the products by creating uniform climatic conditions in the curing chamber. The residence time of the products in the chamber can be reduced and the occurrence of primary efflorescence can be reduced.

High-quality products require sensitive handling. To ensure that this principle can be optimally taken into account, an intermediate layer dispenser has been installed on the dry side

between the centering device and the doubler (both components are completely equipped with servo-controlled drives). In the layout design, a possible future expansion of the line was also taken into account so that a further surface treatment line could be integrated both inline and offline.

Metara's high quality standards not only extend to the actual production of the concrete pavers, but also aim to ensure that the end products are ready for dispatch and that they are delivered to the end consumer in perfect condition. With the Cuboter, Masa offers the technology and know-how to remove complete paver layers from the return transport and precisely assemble them into a paver cube on the subsequent cube transport. The robust Cuboter has been designed to be energy-efficient and to optimize operating costs. It has a high load-bearing capacity over long distances and can easily handle varying pick-up and set-down heights with its servo-operated lifting unit. Masa has also been convinced for many years to use a servo-driven stacking and clamping system to combine the advantages of speed and precision.

The awareness for a safe and gentle transport of the end products is also reflected in the fact that the system is equipped with a transport pallet grab including a moveable





*Masa paver washing unit with 3 stations.*



*The integrated Masa ventilation system can qualitatively support the curing process of the products by creating uniform climatic conditions in the curing chamber.*

lifting/lowering unit that can carry transport pallets in various sizes. The upstream infeed conveyor also serves as a buffer for the transport pallets. A top sheet dispenser, a horizontal strapping machine and a vertical strapping machine are also integrated in the cube transport area.

The described plant ring is closed by a proven Masa system: The cross transport with grab transports the cleaned and turned production pallets back to the block making machine or can temporarily store up to 420 production pallets in stacks at the designated places. With this production pallet storage system, different cycle times on the wet and dry sides can be compensated. The fact that the production and handling sides can work independently of each other gives flexibility in the process and is one of the great advantages of this cross transport solution.

A further advantage for Metara is the fact that Masa machines are equipped with energy-efficient drives and are operated with optimized consumption.

All in all, the implementation of the project represents a major win-win situation for Metten and Metara. The vision of having pavers with the corresponding know-how manufactured in the Arabian region was realised. Metara can set new impulses in the market and successfully fall back on Metten's proven solutions. A new era of concrete paver production has probably begun, in which the focus is increasingly on sustainable and high-quality concrete paver surfaces. The Arabian market will in future adapt to the European market in terms of standards and demand. With this plant in Saudi Arabia, an important foundation has been laid for being able to adequately meet these requirements. ■



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FURTHER INFORMATION



Metara Company Limited  
P.O. Box 250098, Riyadh 11391, Saudi-Arabia  
T +966 11 2774743, F +966 11 2774743 ext. 100  
[info@Metara.net](mailto:info@Metara.net), [www.Metara.net](http://www.Metara.net)



METTEN Consulting GmbH  
Hammermühle, 51491 Overath, Germany  
T +49 2206 6030, F +49 2206 60380  
[info@metten.de](mailto:info@metten.de), [www.metten.de](http://www.metten.de)



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Masa GmbH  
Masa-Str. 2, 56626 Andernach, Germany  
T +49 2632 92920, F +49 2632 929212  
[info@masa-group.com](mailto:info@masa-group.com), [www.masa-group.com](http://www.masa-group.com)



ASSYX GmbH & Co. KG  
Zum Kögelsborn 6, 56626 Andernach, Germany  
T +49 2632 947510, F +49 2632 9475111  
[info@assyx.com](mailto:info@assyx.com), [www.assyx.com](http://www.assyx.com)



R&W Industrietechnik GmbH  
Graf-Heinrich-Str. 20, 57627 Hachenburg, Germany  
T +49 2662 941434, F +49 2662 941441  
[info@r-u-w.de](mailto:info@r-u-w.de), [www.r-u-w.de](http://www.r-u-w.de)






HS Anlagentechnik C.V.  
Veldkuilstraat 53, 6462 BB Kerkrade, The Netherlands  
T +31 45 5671190, F +31 45 5671192  
[info@hsanlagentechnik.com](mailto:info@hsanlagentechnik.com), [www.hsanlagentechnik.com](http://www.hsanlagentechnik.com)



Würschum GmbH  
Hedelfinger Straße 33, 73760 Ostfildern, Germany  
T +49 711 448130, F +49 711 4481340  
[info@wuerschum.com](mailto:info@wuerschum.com), [www.wuerschum.com](http://www.wuerschum.com)



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ASSYX GmbH & Co. KG · D-56626 Andernach  
Phone: +49(0)2632 - 94 75 10 · Fax: 94 75 111