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# For a better India: KEF Infra One Park launches production

On the Indian subcontinent KEF Holdings is pursuing a vision as ambitious as it is unique: state-of-the-art production methods are to lay the foundations for a better and more equitable India. High tech in the terms of "Industry 4.0" is to be used for the massive expansion of the education, health, residential and commercial sectors. The company is convinced that this expansion can succeed only if the major part of the materials and installations are pre-fabricated centrally in specialised industrial parks. Such a park - the first of its kind - was formally opened at the end of 2016 not far from Bangalore under the name of "KEF Infra One Park". Five manufacturing areas played an important role in its design and one area was particularly important: the precast concrete plant.

"When giving back is at the centre of your actions, the possibilities for growth and improvement are endless." This statement sums up the basic principle of the founder of KEF Holdings, Faizal E. Kottikollon's commitment to India. With the company and the associated foundation Kottikollon and his wife, Shabana Faizal are pursuing an ambitious goal: by means of modern, efficient, sustainable technologies massively to expand the Indian infrastructure and thus improve the quality of life for the people. The emphasis in this is particularly on education, health and accommodation.



*In the KEF Infra One Park near Bangalore the majority of that which is required for the construction of residential and commercial buildings is being produced.*

## A success story: taking a vision back to India from the Emirates

Faizal E. Kottikollon's success story began in the mid-1990's. He had immigrated to the United Arab Emirates, where in 1997 he founded Emirates Techno Casting (ETC), a foundry for the manufacture of valves for the oil and gas industry. Thanks to an innovative production concept, the company flourished and as the years went by, became one of the Top 3 foundries in the world. In 2012 ETC was finally sold to Tyco International. Thereupon Faizal E. Kottikollon and Shabana Faizal took the decision to invest the capital in the Faizal & Shabana Foundation and the setting up of a company in India. Since then the principle of giving back has been at the heart of all their activities.

KEF Holdings itself was registered in Singapore in 2012 and today is active in five different areas: infrastructure, health, agriculture, education, metal and investments. The visionary backbone of the company formed its own foundation. It was set up in 2007 by the founder and his wife and the foundation has made it its business to become involved in numerous ini-



*Faizal E. Kottikollon, founder and President of KEF Holdings and his wife, Shabana Faizal: by means of state-of-the-art technology infrastructure should be massively expanded.*



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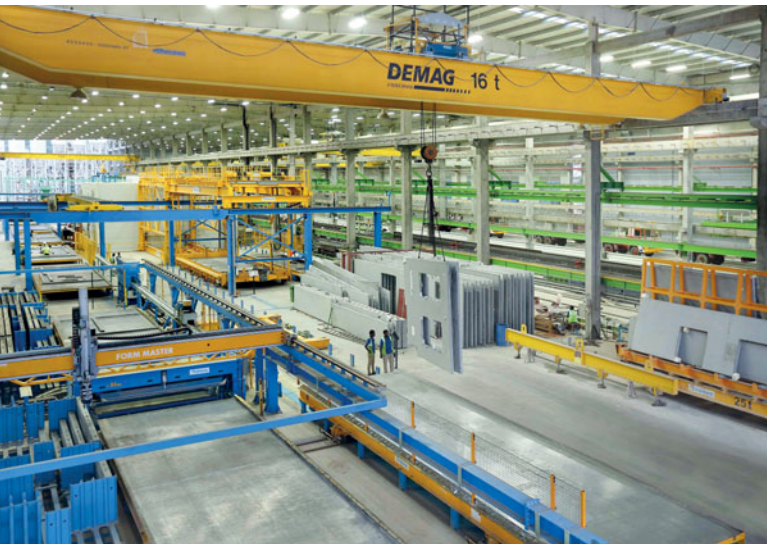
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*Fast and of high quality: KEF Infra manufactures various wall elements using the recently installed highly-automated carousel system.*

tiatives and programmes for the expansion, conversion or new build of schools and hospitals and to organise fund-raising campaigns for under-privileged persons and victims of natural disasters. One of its aims is to create affordable, high-quality accommodation and to construct commercial parks.

### **An industrial park unique in the world**

This basic idea of making India a better country was the main-spring for the construction of KEF Infra One Park in Krishnagiri not far from Bangalore. The concept was that in this industrial park everything required for the construction of dwellings, commercial buildings, hospitals and schools could be manufactured. The aim was not only to reduce construction time it-



*Thanks to their efficiency the three systems installed for the manufacture of reinforcement (the picture shows the mesh welding plant) contribute to optimum production continuity.*



*Shuttering and deshuttering have also been automated. This not only improves the quality of the end products and the rate of production, it also increases safety at work.*

self, but also to reduce the time for fitting out building with bathrooms, kitchens and furnishings.

KEF Infra One Park was officially opened in December 2016. There are a total of 5 different production areas, where precast concrete elements, prefabricated bathrooms and modular building technology is manufactured, plus furniture, aluminium fittings and windows. More than 1,000 people work on the 60,000 m<sup>2</sup> site.

### **In the key role: precast concrete elements**

The production of precast concrete elements plays a key role. "Construction in precast concrete is highly attractive, since very complex structures can be built in half the time," states



*An automatic concrete spreader places the fresh concrete precisely and at a steady rate on the pallet.*



Faizal E. Kottikollon, founder and President of KEF Holdings. Furthermore, according to Kottikollon, production under controlled conditions maintains quality at a consistently high level and ROI is also higher than with traditional construction methods. However, the decisive factor for KEF Infra is time. "We are able to complete projects quickly and to schedule; this is a very important point for property developers, for instance."

### Development of the plant concept together with Progress Group

In 2014 KEF Infra began to hold discussions with a variety of suppliers of carousel systems. The choice finally fell on the Progress Group, whose subsidiary companies, Ebawe Anlagentechnik, Progress Maschinen & Automation and Tecnom were commissioned to devise the technical solutions. "The production plant is the result of close, successful collaboration" is the satisfied comment from Faizal E. Kottikollon "We have succeeded in developing a plant concept tailored to the market." Since mid-2015 massive, double and sandwich walls, as well as structural precast concrete elements have been produced.

We have deliberately invested in high-tech and software solutions, because we are convinced that the construction industry needs new approaches and new pathways in the spirit of Industry 4.0", explains Kottikollon. "In this process, technology is the catalyst for the changes required."

### Fully automated shuttering and deshuttering

Consequently, KEF Infra decided completely to automate individual operations, which are normally performed manually in India. For instance, the shuttering and deshuttering process has now been taken over by the Form Master shuttering and deshuttering robot. The process starts with a storage robot, which removes the shutter from storage and passes it to the shuttering robot. Guided by CAD specifications, this positions the shutter on the pallet and activates the magnets. At the end of the production process the pallet is scanned, the shutter released, removed and delivered to the cleaning system. When the shutter has been returned to the store by the storage robot the cycle is complete.

In Kottikollon's opinion, the use of this automated solution has brought KEF Infra many advantages. "Thanks to the Form Master we can not only produce faster, we can also spare our employees almost all physical stress." The company founder also believes that right at the start of the production process the shuttering robot lays the corner stone for high-quality precast concrete elements.

### Highly efficient integral manufacture of made to measure mesh

The manufacture of all the made to measure mesh also contributes to very high production continuity. Developed by

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*The Meitra Hospital is the first health facility in India to have been completely constructed by the prefabricated construction method. The 205-bed project in Kozhikode (Kerala) was completed within 21 months.*

Progress Maschinen & Automation, a subsidiary company of Progress Group, three different plants are used for the production of bespoke mesh, lattice girders, and stirrups.

The M-System BlueMesh mesh welding plant produces mesh from the coil and in accordance with individual specifications. Its special features are its particularly high degree of efficiency and its low requirement in space and energy - features which integrate well into the corporate philosophy with its emphasis on sustainability. The lattice girders required for the production of double walls are produced by a Type VGA lattice girder welding machine. For the manufacture of stirrups from the coil, together with the EBA S automatic stirrup bender, KEF Infra uses a compact, high-performance system, which cuts and bends the wire with high precision.

**Automated concrete spreader conserves resources and improves quality**

The use of an automatic concrete spreader, which distributes the concrete over the pallet with precision, further conserves resources. This avoids uneven spreading and also prevents too much concrete from being discharged. In KEF Infra's pallet circuit the concrete spreader has also been fitted with a second bucket for a second type of concrete or a second colour of concrete.

**Special formwork for structural precast concrete elements**

As well as the carousel system with the integral manufacture of made to measure mesh additional special formwork has been installed by Tecnocon, another subsidiary company in the Progress Group. The 5 m to 120 m long system is capable of producing staircases, columns and pre-stressed girders.

**Software solutions facilitate "Industry 4.0"**

The e<sup>pro</sup>bos<sup>®</sup> ERP system, developed by the Progress Group is used for controlling systems, and for monitoring and optimis-



*In 2016 KEF Infra had already completed its first commercial construction - also completely constructed in precast concrete. The first two floors of the ten-storey office building were completed in only two months.*

ing all the business and production processes. This makes a substantial contribution to the optimum coordination of all processes, starting from sales, calculation, project management and installation planning right up to logistics, materials management, controlling and Human Resources. This modern equipment enables KEF Infra to implement the Industry 4.0 concept, the core elements of which are intelligent production, networking and transparency.

The production processes themselves are controlled by the ebos<sup>®</sup> MES system. This software continuously accompanies all the phases in the production process and by means of numerous tools facilitates the planning, controlling and monitoring of production. In addition, process sequences can be retrospectively played back in detail and investigated. In this way potential bottlenecks are detected and productivity increased.

**Direct BIM integration**

Since KEF Infra is one of the first companies in India to use BIM level 6, the software has another advantage for it. BIM (Building Information Modelling) systems are directly integrated. This means that any production or supply deadlines or project and material costs can be directly linked with the building model. This is indispensable for a transparent overview. "All this allows us to plan, design, build and maintain the most diverse buildings extremely efficiently," states the founder, Faizal E. Kottikollon.

**First major project already completed**

Just recently, the first of several major projects for the construction of a hospital in Kozhikode in the Federal State of Kerala has been finalised. This is the first hospital in India to have been built entirely by prefabricated construction methods. The installation, known as Meitra, was constructed within 21 months. In terms of the average therefore, the construction period was more than halved. The pilot project, which cur-



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rently provides more than 205 beds, will be expanded to some 500 beds in a second construction phase.

A milestone was also achieved last year in commercial construction: in Bangalore KEF Infra completed a ten-storey office building. This project also used exclusively precast concrete elements from in-house production. Once again, the short construction period was impressive: the two first floors with a total area of almost 20,000 sq. m. were completed within only two months.

According to KEF Holdings this is just the beginning - they have plans for the construction of further industry parks. Top Indian politicians have also noticed the company's commitment. The Indian Prime Minister, Narendra Modi expressed his conviction that KEF has the potential to assist the Indian government in pending projects in the residential and infrastructure construction sectors. By 2022 alone as part of the Housing for All programme the construction of 20 million dwellings at affordable prices is envisaged. ■

### FURTHER INFORMATION



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