

Power and Free Conveyor Increases Productivity

The use of a state-of-the-art power and free conveyor system has allowed a Turkish radiator manufacturer to improve the efficiency of its production processes. The robust, durable conveyor connects several of the company's welding lines fully automatically with the dip painting and surface coating zones and a packaging line.

In order to meet the rapidly growing demand for its products, the Turkish radiator manufacturer Elba has been constantly improving its production processes. In 2001, a fully automated conveyor system replaced the original welding line and al-

lowed newly designed flat radiators to be produced. These new products are easy to use and to keep clean and provide more efficient heating in the home. Over the years two more welding lines were installed and in 2013 Elba increased its productivity to a

total of 3,419,000 metres of heating units per year. However, the radiators were still being coated using a traditional continuous conveyor system. In order to exploit the full potential of the increased productivity of the welding lines, in 2016 the



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After being loaded, the radiators and panels are sorted and transferred first of all to a buffer zone where they can be stored temporarily and take up very little space.



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The radiators and panels are transported to a large allocation buffer before passing through all the phases of the production process

company invested in a new coating system, together with a state-of-the-art overhead power and free conveyor (Duomatic 323) from Louis Schierholz.

The compact conveyor, which covers two storeys, is directly connected with two of the three welding lines and provides a flexible transport system for

the radiator components in the painting and surface coating zones. For ergonomic reasons, the radiators are loaded from the welding lines onto the packaging line using a partially automated process. As a result, the production staff no longer need to handle the large, heavy components.

Maximum flexibility in the material flow

In contrast to the regular cycle of the previous overhead conveyor, the intelligent power and free system can transport the components on any one of a number of routes. A variety of different stoppers, track switches and changes of chain circuit allow the components of the radiators to be sorted by size or batch, diverted or stored temporarily in one of the system's many buffer zones during the production process.

This makes it possible to achieve the perfect balance between the different levels of availability of the welding lines (65% to 75%), the surface coating zone (98%) and the packaging line by making use

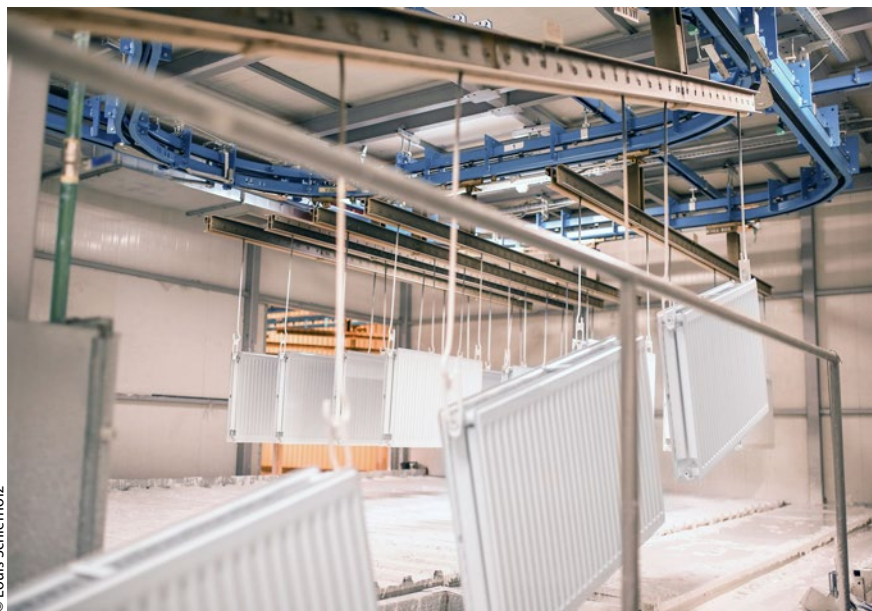


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Every minute radiators totalling ten metres in length are transported on descending and ascending sections of the conveyor through a dip tank for painting.

of the various buffer areas. The radiators no longer need to be manually sorted by type and size and stored temporarily on the floor, which reduces the amount of additional handling and the space required in the production area.

Efficient handling

The radiator components are transported from the welding lines to the two partially automated loading areas on hooks attached to the conveyor's 4.3-metre-long load bars, which are designed for parts up to 4300 x 160 x 950 mm in size and

with a maximum weight of 250 kilograms. Depending on their size, several radiators can be moved using one trolley. A total of 600 trolleys are available for transporting radiators and panels along the conveyor, which is 1800 metres in length. In a third loading area the smaller radiator panels are loaded onto the conveyor. All three loading areas are managed from a network of user-friendly stationary input terminals and easy-to-use touch screens. After being loaded, the radiators and panels are sorted and transferred first of all to a buffer zone where they can be stored temporarily and take up very little space.

Sustainable, phased pretreatment process

From the buffer zones in the three loading areas, the radiators and panels are transported to a large allocation buffer in the pretreatment area of the surface coating zone, where they are collected before passing through all the phases of the production process (Figure 2). The components then travel in batches through the very time-consuming pretreatment process. In seven different areas, they have particulate residues removed and are cleaned, rinsed and dried.

Elba has been looking for an environmentally friendly and also cost-effective pretreatment solution for some time. Initially a zinc phosphating process was used, which required the installation of an expensive recovery system in order to reduce its environmental impact. The subsequent nano-ceramic-phosphate process dispensed with the need for the recovery system, but made the application of a consistent coating more difficult and resulted in a more complex pretreatment process. The new surface treatment system with the power and free conveyor allows the company to use an environmentally friendly phosphate solution (Bio Zentech pH 7) that is applied cold as part of the seven-stage pretreatment process. This helps to reduce energy costs and guarantees a long service life for the radiators.

Project data

User:	Elba in Manisa in Turkey
Components:	Radiators and radiator panels
System:	Schierholz power and free, Duomatic PF 323
Capacity:	122 trolleys per hour
Size of components:	Length x width x height: 4300 x 160 x 950 mm
Weight of components:	Maximum of 250 kg
Chain length:	1800 m
Number of drives:	12
Number of chain circuits:	11
Speeds:	5 to 12 m/min, frequency regulated
Number of trolleys:	600

Special features:

- Speed of 10 m/min. in the painting and powder coating areas of the surface treatment zone
- Dip painting and surface coating in one production process
- Compact conveyor system in a very small space

Different coating methods combined in one process

After this the radiators and the panels move to the dry-off oven where they spend ten minutes at a temperature of 120 degrees Celsius. They then normally pass through two separate surface treatment processes, because the radiators also have to be painted. The new conveyor system allows the two methods to be combined in one process by means of a space-saving bypass section. This means that the radiator panels are removed before the painting process, stored and then returned to the conveyor in a batch at a later stage. Every minute radiators totalling ten metres in length are transported on descending and ascending sections of the conveyor through a dip tank for painting. After this they spend around 30 minutes in the flash-off zone and the paint curing oven.

The radiators and panels are then powder coated in a spray booth in a continuous process. Depending on the type of component, the conveyor travels at a speed of between five and ten metres per minute. In the powder oven the powder coating is cured at a temperature of 200 degrees Celsius for just under 20 minutes.

After the coating process, the trolleys loaded with radiators, which have been buffered at an angle, pass slowly through the cooling zone. The radiators and panels are separated in two unloading areas and automatically transferred to the packaging line in a continuous process.

Automatic empty mode

The new conveyor at Elba is in operation over three shifts. At weekends or during free shifts, a night mode function ensures that specific areas such as the pow-

der booth, dip tank and powder oven run "empty" after the production processes have finished. The trolleys with the radiators are collected closely together in a range of buffer zones. The company is already planning to connect its third welding line to the efficient power and free system. //

Contact

Louis Schierholz GmbH
Michael Seeger, Sales Manager
Bremen, Germany
Tel. +49 421 8406 0
m.seeger@schierholz.de
www.schierholz.de



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