

Flying aqualack-production

The transport technique on air cushions for mixer containers

In the most modern aqualack plant in the world, the transportation of mixer containers on air cushions is computer controlled. With the biggest project yet in the company history, Herberts GmbH stands for their location Wuppertal and a flexible, environmentally friendly and economic production.

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Last year Herberts GmbH opened the new aqualack plant in Wuppertal. In this plant, 64 workers produce up to 15.000 tons paint for the automobile industry using the most

modern automation and testing techniques to assure quality. What was yesterday place for mass production, today the objective is to produce more tints in large and small

quantities in the shortest possible time. These quantities are produced exactly. This flexibility is made possible by using a modular process in a closed system. This enables flexible adaptation to current requirements and optimal usage of the system capacity. So, for example, the half-finished products are no longer further processed in fixed mixers. Instead, mixers with an integrated agitator are used. These containers have a capacity of 20m³ and are filled through two automatic dosing stations (fig.1) and subsequently driven to the wait position, where the quality is controlled.

The two dosing stations are able to dose from 20 g up to 20 t of half-finished products. The process of dosing, agitating and quality control is repeated often as it is necessary to reach the desired tone and technical characteristics of the finished product (varnish/paint) for automobile production, industry and

repairs. After the final quality control the mixer is moved to the filling station.

Air cushions make a new transport concept possible

It is the transport system for the half or fully manufactured products that enables an optimised production process with less and short movements. In this case, it is a system of automatic guided vehicles on air cushions designed and built by the company Delu in Nürnberg. This system enables to move the mixers to the desired position, from the preparation for production to the final process

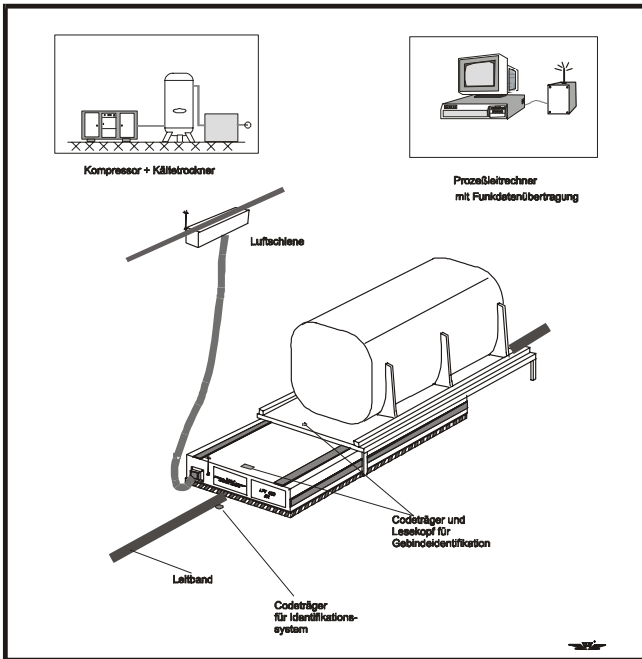
The advantages of this new system among others are:

- reduced size of the transporter (only a little bigger than the base of the mixer),
- high manoeuvrability made possible by the air cushions principle. In this way, it is possible to achieve optimal use of the production area,
- reduced energy consumption due to the almost total reduction of friction,
- the demands on the carrying capacity of the floor are less than with conventional transport as the pressure is distributed over a relatively large area,
- there are no shakes and vibrations during the transport process.

The transport system consists of an automatic guided vehicle on air cushions for ground stock mixers up to 10 tons and two transporters for paint mixers up to 32 tons load. In addition to this, there are installations as for example, automatic supply rails, radio-data communication devices and process control computers. These installations control the communication for the process



Pic. 1: A paint-vessel is moved into the dosing station.



Pic. 2: Schematic drawing of the automatic guided transport system

control system and co-ordinate the co-operation of the single components (pic.2). Amongst others, these cell computers carry out the following functions:

- Receive drive orders from the process control system. The plausibility of the orders is checked immediately. This plausibility check is transmitted per radio to the corresponding automatic guided vehicle on air cushions. This only happens if the automatic guided vehicle is free and waiting for an order. If it is not free, then the new order is saved.
- Sending of answer telegrams to the process control system. These telegrams inform the system whether the order has been successfully carried out or not. If it is necessary they send an error message.

- Co-ordination of two automatic guided vehicles on air cushions for moving in difficult areas, in such a way as to prevent a collision.

- Control of the air supply rails, so that the hose connection always follows the vehicle.

- Opening and closing of the door of the cleaning cabin, when it is required by a transport order.

There are two fundamental operating modes for the transporters:

- FTS-Modus: function as an automatic guided vehicle. It automatically executes driving orders.
- Operator-Modus: an operator walking beside the automatic guided vehicles (pendant control) controls it by means of a control panel.

Some emergency strategies were also complemented in order to keep the availability of the transport system as high as possible. This was to enable continuation of production in

the case of a technical defect. For this reason, a portable pneumatic control panel was assigned for moving the transporter (emergency control). A quick and wide defect diagnosis is also possible. The modular design of the system enables also damaged components to be replaced very easily.

The vehicles follow the guide-tapes which are embedded in the floor. These guide-tapes are scanned by sensors. All guide-tape intersections are equipped with codes. These codes are read by a non-contact identification system and they are used to give information of the position of the vehicles. The chassis of the mixer are also coded so that it is possible to check if the correct container is being transported.

As protection against collisions of the vehicles, they are equipped with two laser scanners. These scanners secure operator protection and also the protection of the system. The scanned area is divided into two zones: a warning field, which reduces the speed of the vehicle in the case of a damage and a protection field which immediately actuates an emergency stop. The electric power supply of the on board control electronics is guaranteed with storage batteries, which are charged by an air driven generator.

The transport system was designed for use in an explosive area according to EEx11A T3, zone 1 as the whole system is used in an aqualack plant (although water-soluble varnish contents only 5 to 10 % solvent).

The construction of the new aqualack plant has prepared Herberts GmbH for the future. „The flexible production concept of the aqualack plant offers solid foundations for a changing market,“ says Horst

H. Hölzlein, manager of AutomotiveSystems. The new transport technique of the company Delu GmbH has contributed very much to the reduction of production costs through a structured production with a high degree of automation. This reduction of costs contributes to securing the plant in Wuppertal and consequently to keeping jobs in the long-term.

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