

Bag handling enters the digital era

In many countries feed is transported in bulk. However in areas where logistics are a bottleneck or farms are relatively small much feed is still transported in bags. 'Small' products or single feed ingredients are also often transported in bags. So there is quite an industry involved in this sector, and this industry is evolving quickly.

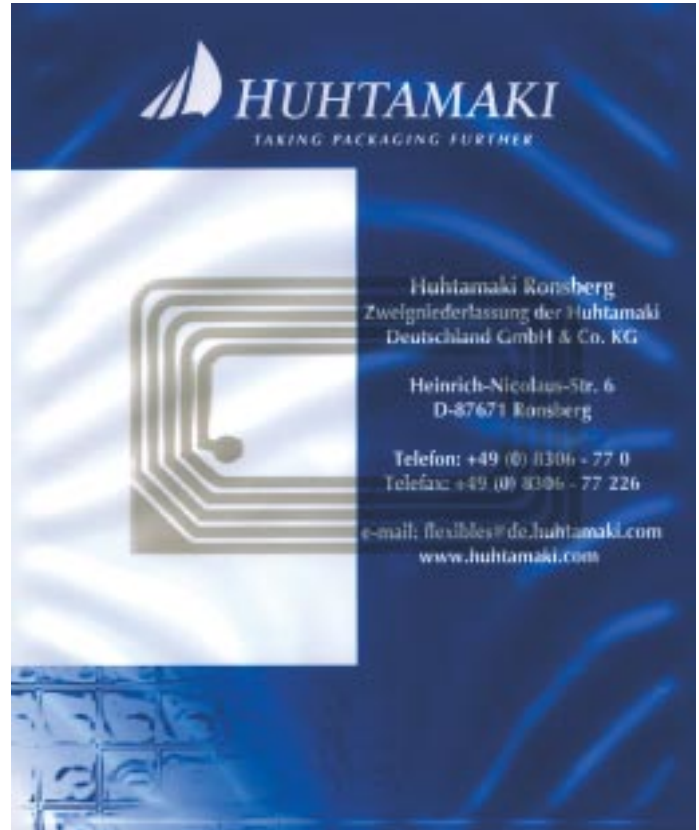
By Dick Ziggers

Only a few years ago, no one would have guessed at the rapid pace at which packaging machinery would go digital. On the contrary, it seemed that switch cabinets would need to become ever larger with the increasing pace of electronisation. Bus systems, which drastically reduce the number of cables needed, plus decentralised computers have meant this development has been halted. Nowadays, a freestanding switch cabinet is no longer necessary in the packaging industry. Digital packaging machinery takes up even less space than its mechanical or electromechanical predecessors.

Automated packaging

Although the above paragraph does not directly refer to the animal feed industry (maybe petfood as an exception) companies dealing with a lot of bagged products could learn from the developments going on in the food industry. Ultimately feed is also food. At Interpack 2005, held in Dusseldorf, Germany from 21 to 27 April the crème de la crème of the packaging industry presented their latest developments in this field. On 16.5 ha of exhibition space over 2,600 exhibitors showed their latest packaging machines and appliances, packaging materials, means and aids and confectionary machines and plants.

The age of automation in the packaging industry began about 20 years ago. All-mechanical machinery was equipped with a programmable logic controller (PLC) for the logic functions and a mechanical line shaft for the drive. However this first generation was not very flexible. Shorter product life cycles and range diversification, especially in the food sector, prompted ever-louder calls for greater flexibility.



Radio frequency identification will soon replace the barcode system. RFID can already be printed on a surface with a special printer.

In the second generation, electronic drive systems took over an increasing number of functions from the line shaft. Logic functions were still controlled by PLC systems.

Control and drive technologies proved the key technology in the packaging machine construction industry. Today, fully electronic, third generation (Gen3) machines boasting all the advantages of servo technology are setting new standards. Digital packaging machinery offers not only better output and greater flexibility, but also additional features like tele-maintenance, integration into the ERP (Enterprise Resource Planning) system of a company or evaluation of production data.

The logic functions formerly performed by PLC are losing their significance. Electronic motion functions now dominate. The number of servo engines is increasing with the demands for flexibility. Motion control is integrated into Gen3 controls and is no



Interpack 2005 in Dusseldorf, Germany - the world's largest show for the packaging industry stretched over more than 16 ha of exhibition space. (Photo: Dick Ziggers)



Laser guided vehicles can do the warehousing and have moved people to the control board. (Photo: Dick Ziggers)

longer necessary as external PLC. This means physical and logical interfaces are no longer required as they were in the past due to the different programming languages and systems. Some firms have been setting trends in this field since the mid-1990s with integrated motion control and logic solutions for the packaging machine construction industry.

Standardisation

Today, the controls for packaging machinery to cater to individual customer demands are still very heterogeneous and are characterised by the developments of individual manufacturers. Standardisation would not only make key components from different manufacturers interchangeable, but would also free users of their dependence on manufacturer-specific expertise. So-called open control architecture would promote still greater flexibility here.

Internationally coordinated automation concepts are being elaborated by the OMAC (Open Modular Architecture Controls) working group for packaging machinery. Those initiating the working group were machinery users from the branded product industry who collaborate within the OMAC alongside machinery builders and technology suppliers. The aim here is to make the hardware for automation systems interchangeable in the medium term. The next step should then be to harmonise the different systems for communication between machines and to standardise the operating philosophy.

Inter-communication

Another trend is system solutions, which allow automation technology (AT) to communicate with information technology (IT) and its standards via data networks. This means corporate information networks and vertical data integration are possible from the pilot and control stage through to the production stage. Joint communication standards facilitate the processes from diagnostics and tele-maintenance to the Internet and logistics for spare parts purchasing. This means the flow of information from digitalised packaging machinery can be utilised for more efficient production including up and downstream business processes.

With tele-maintenance the rapid exchange of information saves working time and travel costs. When mechanical malfunctions are remedied online downtime is reduced.

Digital packaging machinery equipped with a wireless system that can link up with external transport vehicles to control the automatic supply of packaging material is, of course, still a vision of the future.

Hands-free

In a modern bag-filling unit physical labour is no longer needed. The whole process of bagging, palletising and warehousing can be done with automatic machines or robots. Where palletising is still a manual job, the lifting of the bags can easily be lightened with pneumatic equipment. Lifting bags, a poor

Processing



Modern palletising units can reach capacities of up to 1,200 bags per hour. (Photo: Newtec)

positioning of the goods and a high working pressure quickly create physical problems. Even relatively low weights (10-15 kg) can cause severe repetitive strain injury (RSI) problems.

Palletising nowadays has developed into high-speed units with capacities up to 1,200 bags per hour (at 25 kg = 30 tph). Destacking pallets is done automatically and following bag dimensions, pallet dimensions, number of bags per layer and number of layers per pallet. Modern software automatically ensures safe packing of the bags on the pallet. Only when bags from three or more lines have to be stacked a robot comes into play, but for single units a robot is too slow and too expensive.

The operator only has to make sure that enough pallets are in place for loading and that full pallets are removed. However, it could also be that the operator only has to control the system from behind the control screen, because pallet supply and full pallet removal is automated as well. Automatic guided vehicles and, in particular, laser guided vehicles are able to adapt easily or with the minimum impact on existing plant design.

Tracking and tracing

Full automation of systems makes tracking and tracing easier. After all, computers and robots do not make mistakes unless their programming is incorrect, and that is still the work of humans. Bar coding is an efficient means to track and trace products. However in this age of rapid change this system tends

Using a vacuum lifter to move bags can significantly improve working conditions and reduce RSI-like injuries. (Photo: Schmalz)



to be on its last legs. Radio frequency identification (RFID), the contactless identification technology applicable to an entire logistic chain is currently creating a buzz in the retail world. And why could this system not be adapted in the feed industry?

The world's leading retailers, spearheaded by Metro Group in Europe and Walmart in the USA, are currently pushing for the introduction of the technology set to improve processes at every link in the logistic chain. At present the focus is on tagging logistical units with chips. But item tagging, which entails fitting individual sales units with chips, is also already a reality.

Much like bar codes, RFID or transponder technology is a means of contactless data transmission; only it is based on electromagnetic fields. Chips store information that can be transmitted via antennae. The data is received and analysed by reading devices. Similar to the familiar bar codes, the information contained on the storage medium attached to a product can be called up without the item being in line of sight. Batch reading makes it possible to scan the data from all of the tags simultaneously within the receiver's range.

Under the electronic product code (EPC) concept, each item packaged for sale is allocated its own identification number. Stored on passive tags, these numbers can be called up in the production process, as goods are received or shipped, during order picking, from products on store shelves as well as at checkout points. ●