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Digmesa

Smart production supply with autonomous mobile robot

Swiss company Digmesa AG has developed, manufactured, and distributed flow sensors for fluids for 38 years. Headquartered in Ipsach, the company has about 60 employees and offers a wide range of mechanical flow sensors as well as sophisticated contactless ultrasonic flow rate measuring devices. With technical expertise, qualified personnel, and built-in flexibility, Digmesa is keen on fulfilling the particular desires and needs of their customers. Flexibility was also a central theme in the implementation of the Open Shuttle project.

DIGMESA SWITZERLAND

Sector & Business	Manufacturing; producer of flow sensors
Location	Ipsach, Switzerland
Application	Brings empty containers to the injection molding machines and transports finished pieces away
Number of shuttles	1 Open Shuttle
Load carrier	Container 400 * 300, 15 kg (up to 50 kg possible, 110 lbs.)
Performance	6 cycles / hour
Path segments	30 m (98 ft.)

The Open Shuttle solution was implemented within only 4 months.

To supply the injection molding machines with empty containers the Open Shuttle uses the available space efficiently.

① The KNAPP solution at a glance

At Digmesa Polyform, an Open Shuttle brings empty containers to the injection molding machines and transports the molded parts to their next stop. The solution starts at the flow racks installed at Digmesa. Here, there are 60 channels (15 rows with 4 levels) serving as a buffer area with a FIFO storage strategy. A KNAPP PLC application controls the solution completely without the need to connect to a Host system.

① The flow racks comprise 60 channels on 4 levels. The Open Shuttle transfers the molded parts automatically to the allocated channel, then removes empty containers and brings them to the injection molding machines.

② The Open Shuttle supplies the six injection molding machines with empty containers from the flow racks and transports the finished parts away.

“The project at Digmesa is a very good example of how rapidly an Open Shuttle solution can be implemented. Thanks to the great work done with Digmesa, it only took us four months between order placement and project acceptance.“

Christian Brauneis
Vice President Business Unit Industry
KNAPP

The Challenge

In combining the locations of the two subsidiaries, Digmesa Polyform AG and Digmesa AG, processes and production for both companies had to be restructured and moved to a new hall. As part of this relocation project, they wanted to automate the transport processes supplying the injection molding machines and free up employees for activities that create value. Along with the automation, a third shift will also be added.
Before the sites were combined, these processes were carried out manually. The search was on for an easily expandable solution that would use the available space effectively, and that could also cover the task of organizing all the orders. The window of time available for the implementation was also relatively tight since they had to meet the deadline for moving. There were just four months available to install the solution.

② The process

Six injection molding machines produce components which then fall into containers. Digmesa Polyform maintains an article data base, which includes a fill weight for containers, defined target channels and other information. When a machine is refitted to make a new part, the employee records the change on a panel at the KNAPP PLC. Once the employee has completed the entries, the injection molding machine can begin to produce it. The Open Shuttle brings empty containers from the flow racks to the machines, picks up the filled containers at the machine, before finally bringing them back to the flow racks, where they are put in the allocated channel according to the FIFO principle.

(1) The Open Shuttle places the empty container on the first accumulation stop (left) in front of the injection molding machine. When the target weight for the container at the second accumulation stop is reached, it is conveyed to the third stop and can be picked up by the Open Shuttle.

(2) The Open Shuttle has an integrated lifter which allows it to adapt automatically to the right height for placing the completed parts in the flow racks. From the other side of the flow rack, employees take the containers and bring them to the assembly machines.

(3) The Open Shuttle transports every tenth container to a check station. There, the RFID transponder is read and quality is checked.

(1a) How orders start

The Open Shuttle receives an order through the KiSoft Fleet Management System to convey empty containers to an injection molding machine. It moves to the flow racks to pick up one or two empty containers. The containers are all equipped with an RFID transponder in which the order data is saved, and when empty, are buffered in 12 channels. The Open Shuttle takes the empty containers to the production area, where six injection molding machines produce the components.

(1b) Transfer of the empty container

A short conveyor with driven rollers and three accumulation stops is located in front of every injection molding machine. The first accumulation stop functions as the infeed for the new empty container, and this is where the Open Shuttle unloads the container. As soon as the production order starts, the container is conveyed to the second accumulation stop. Here the finished pieces – all of the same kind – fall directly from the machine into the container. This second accumulation stop is also equipped with a scale. When the target weight is reached, the container is automatically conveyed to the third accumulation stop, which is also the pickup location. The data associated with the order (machine, item, date etc.) is transferred from a transmitter located at the pickup location to the RFID transponder, ensuring the traceability of the products.

(2) Return transport of the finished components

As soon as a container is ready at the pickup location, the Open Shuttle receives a transport order and picks up the container. The container, which is now filled with unmixed parts, is taken by the Open Shuttle to the channel in the flow rack assigned to the item, where the FIFO principle applies. From there, the components are treated manually. An employee reads the RFID transponder, takes up the container and brings the parts to the assembly machines for the final assembly of the flow meters. The empty containers are placed in the channels designated for empty containers and are ready to be used again.

(3) Quality assurance in process

One of the big advantages that the flexible transport system has is that it can be changed and adapted as needed. So, Digmesa Polyform then integrated a process for quality assurance. The robot transports every tenth container from each injection molding machine to the check station and drops it off. The RFID transponders are read during the quality check and the data is immediately visible in the quality control program. Digmesa Polyform can adapt this type of random checking at any time.

“Thanks to the Open Shuttle, we’ve not only optimized our processes, but also our storage quantities.“

Stefan Schneider
CEO
Digmesa AG

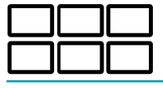
“The technology of the KNAPP solution was really what convinced us. Our need for adjustable height, clear pathways and flexibility were fulfilled in the best possible way. As early as during the project development phase, we knew that KNAPP was a really good fit for us. They are a very dynamic and competent partner with whom we were able to quickly make our ideas a reality.”

Stefan Schneider
CEO
Digmesa AG

Advantages of the Open Shuttle transport solution

Rapid implementation
Thanks to the flexibility of this solution, the Open Shuttle projects can be implemented rapidly. The installation, any changes to the process or layout can all be made on-the-fly, without requiring a system shutdown.

Scalability
Additional shuttles can be added to a fleet within hours and can immediately start transporting.



Flexible software solution

Depending on what is needed, Open Shuttles are connected to an existing software landscape and connected with the Host system for order management. They can also run through the KNAPP PLC control system as an independent system.

Best use of space on shared transport paths
When all types of traffic can share the same paths, whether people, forklift trucks or driverless warehouse vehicles, no extra space is needed. This means existing pathways are optimally used. Thanks to their intelligence, the Open Shuttles avoid obstacles and other vehicles fully automatically.

The Open Shuttle transports every tenth container to a decentral check station.
Thanks to the integrated lifter the Shuttle is able to place containers at differnet heights.

“The flexibility we gain by using this system is incredibly valuable. We didn’t have to install anything in production for the Open Shuttle. All it needs is the general travel paths and nothing more.”

Dominik Huber
CEO
Digmesa Polyform AG

Moving forward together

Currently at Digmesa, production is organized in two shifts. The next step is to introduce a third shift. In the meanwhile, Digmesa and KNAPP are keeping in contact: The KNAPP Service Desk team is just a phone call away during shuttle operating hours, offering troubleshooting and advice. Digmesa is also considering beefing up their production by adding more injection molding machines. For this, another Open Shuttle will be installed to supply the machines.

At a glance

Flow rack	60 channels, 15 rows with 4 levels, 20 small load carriers per channel, 3 channels for quality assurance, 12 channels for empty containers
Software	KiSoft FMS, PLC control system by KNAPP, no connection to the Host system
Load-handling device	Roller conveyor
Work stations	6 short conveyors for pickup and delivery at the injection molding machines
Special features	RFID technology for traceability
Implementation	November 2020

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