

New logistics concept

A newly developed logistics concept ensures the smooth transport of PE granules for Basell Polyolefine GmbH (formerly Elenac) at its Wesseling location. Their conveyance on potentially 20,000 paths is parameterized and controlled by the process control system with the patented "dynamically distributed step sequence".

Following polymerization, extrusion and degassing, the actual production of polyethylene (PE) in Wesseling near Cologne is finished. But the granules which come out of the extruders still have a long and many-forked path ahead of them before being loaded into silo vehicles or reaching automated bagging machines. A dense network of pipes, which connects several bunker farms with a total of around 700 collecting, intermediate and loading silos, provides for almost 20,000 different transport paths – and therefore requires a continuous automated transport system. With the modernization of the bulk material transport of various production units, Basell Polyolefine GmbH rationalized the flow of materials and optimized the existing logistics. Unnecessary transport stages were dismantled and paths were shortened, thus increasing the efficiency of the plant. The previously necessary and very time consuming manual encompassing of the pipe systems is no longer required. Where previously internal and external logistics were separate – the former transported the granules to the central bunker farm, the latter conveyed the products for filling – they are now combined in a single logistics concept. Waeschle GmbH in Weingarten, which was commissioned to undertake the reorganization, gave the task of producing the control system for the polyethylene logistics to ProLeiT. The latter had to ensure that its automation would enable the staff of Basell Polyolefine GmbH to control the polyethylene to filling or processing stage on their own. This meant that the hitherto central operation of the logistics constructions had to be decentralized. The plastics manufacturer placed particular value on being able to undertake changes of topology in the system without the use of programming equipment. The expansion of bunkers or switch points should be notified to the system via parameters. The result is a completely innovative process control system which, by means of its ActiveX technology, ensures absolutely continuous object orientation up to control level. Individual objects can be designed from the PC up to the input/output control level. The object-oriented

approach of the new technology makes it possible to preserve existing control hardware.

A new module is being put to use for the special requirements of transport logistics with ProLeiT TF-FL (Technologische Funktionen – Förderlogistik = Technological Functions – Transport Logistics) whose technological functions allow the visualization of the transport. This is based on the principle of the patented "dynamically distributed step sequence": Planning for the plant can be undertaken directly at the PC without the planner having to know the assignment of bunkers or switch points to the underlying control systems. This means that all bunkers, switch points, cellular wheel sluices and paths can be parameterized directly using standard software such as MS Excel, or directly via the process visualization server. Parameterization independently of the control system is also possible using the integrated IDS configuration client – a component of ProLeiT IDS (Industrial Data Server), which could also provide the basis for a future operating data recording system. Elenac saw the benefits of the system even before it was wholly in operation. Planning took place directly at the PC without a programming device, causing only a brief shutdown of production. It was possible to undertake a detailed test of the planned capabilities at ProLeiT and operate the system in a short period, because the system simulates individual plant areas by a simulation of the missing elements and existing paths.

The equipment used at Basell Polyolefine GmbH for the process control system is based on commercial personal computers made by Siemens-Nixdorf, and network components, as well as 14 type S7-400 stored programmable controls by Siemens. MS Windows NT 4.0 is used as the operating system, and MS SQL Server 6.5 is installed as the database. All controls are linked by a 10 Mbit Ethernet network, which is partially based on fiber optic and copper cable; connection is by 10BaseT. Communication between the PCs and controls, which is based on the Siemens H1 protocol, is effected by a redundant H1 bus with three fiber optic cables as well as 14 redundant process busses with optical link modules. 700 silos, linked by a dense network of pipe bridges, switches and material locks: the complex and variable topology of the PE conveyor plant at Elenac makes great demands of the logistics design and the installed automation components. Planning for the PE conveyor plant can be undertaken directly at

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the PC without having to know the assignment of the bunkers or switches to the underlying control systems. Basell Polyolefine GmbH places great value on the fact that members of staff themselves control the granules to the filling stage. The operation of the logistics complexes was decentralized for this purpose.

Specialized in conveyor logistics

The ProLeiT OS-NT process control system works in a strictly object-oriented way. The TF-FL module for the display of conveyor logistics is new.

Benefits for the user:

- Parameterization of bunkers, switches, cellular wheel sluices, etc., using standard software or the process visualization server;
- Changes are possible without programming equipment;
- Object-orientation allows the use of existing control hardware;
- Simulation of those parts of the plant not yet integrated;
- Commissioning entails only short production shutdown