



ZLFS - ZERO LEVEL FOUNDATION SYSTEM

Major innovation in the manufacture of floor plates for production plants

The foundations to be constructed on site are a complex task when building a new production plant. For plants with automated processes and robotic components, the dimensionally accurate production of tracks, channels and foundations places significant demands on the construction company. Concrete tolerances of +/- 1mm can only be achieved to a limited extent with traditional formwork construction. Anchor plates, strip foundations, empty conduits, cable trays for actuators and sensors, guides for energy guiding chains and displacement measuring systems must be precisely measured, adjusted true to size and permanently fixed.

Any component mounted on the base plate generates interfering or crushing edges. These hazardous areas are secured via light barriers, fences, platforms, access scanning, rolling and lifting gates. The susceptibility to disruption and costs for these measures are high. For this reason, in many production facilities, the movement of machines and production pallets in manual work areas is monitored manually via touch operation. This tactile operation causes a corresponding amount of work on the part of the operators for each movement. No work can be done during the transport time. In terms of safety, the operator is also dependent on the user, as it cannot be ensured that the user is monitoring the danger zone when pressing the button.

Advantages of the ZLFS

- ✓ 1. The precise, time and cost-efficient production of the base plate with all installation parts for the machines within the base plate
- ✓ 2. Transport movements without crushing and leading edges
- ✓ 3. Continuous longitudinal and transverse transports without complex safety technology
- ✓ 4. Ergonomic workplaces
- ✓ 5. Reduction in investment volume for the production plant
- ✓ 6. Reduction of maintenance and cleaning costs

Sommer Anlagentechnik GmbH has, therefore, developed the Zero Level Foundation System ZLFS.

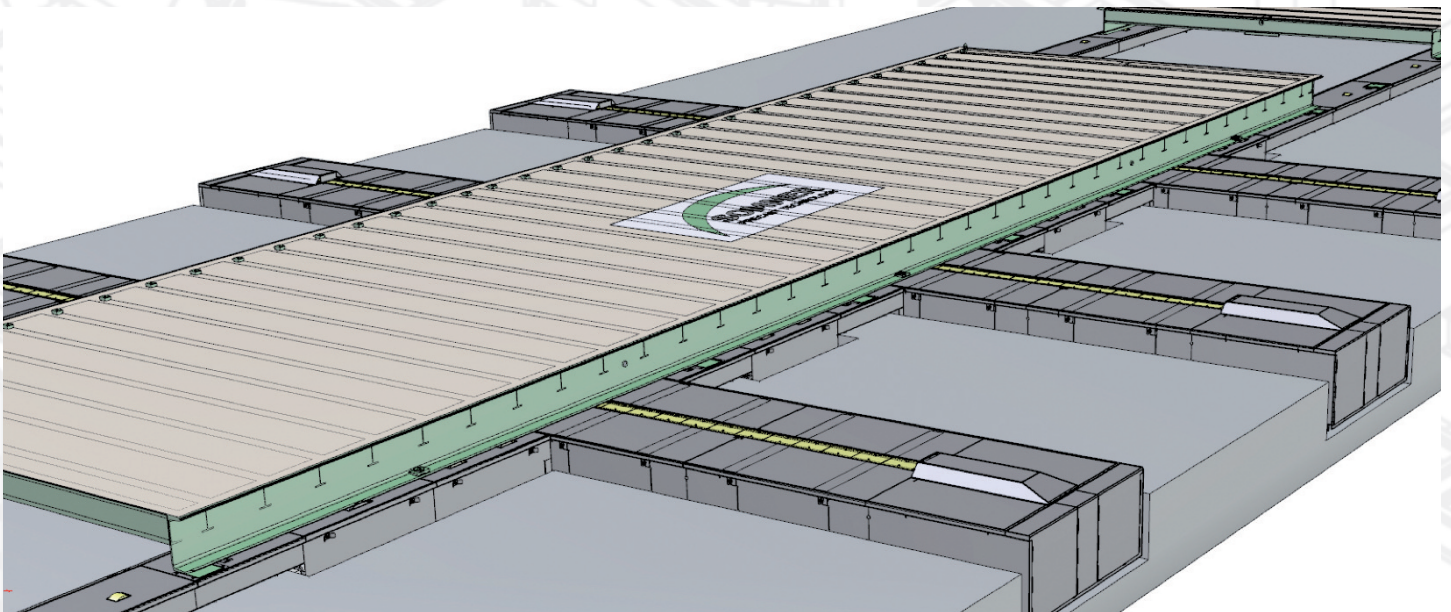
A European patent application for the ZLFS has been filed under EP21159084.9 with priority from 24.02.2021.



General description

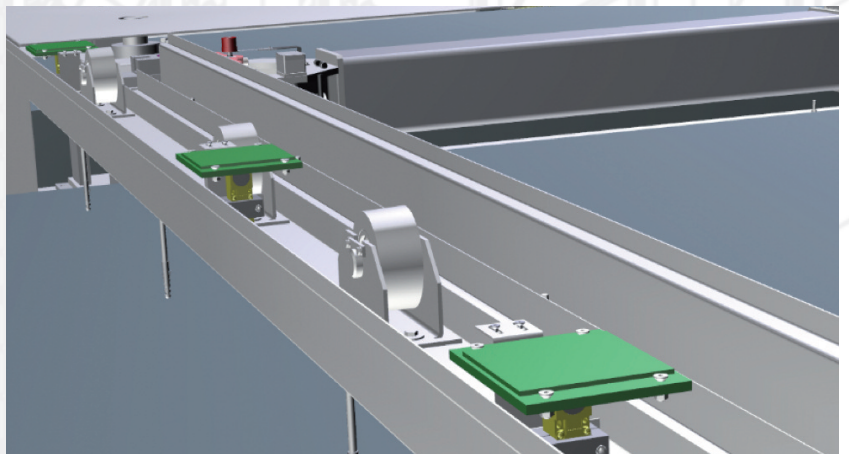
- ✓ ZLFS are made of sheet steel. The sheet thickness, heights and widths vary according to the dimensions of the built-in parts.
- ✓ All fastening elements are incorporated in the tubs with the defined accuracy.
- ✓ The ZLFS are connected to each other after adjustment on the clean layer and form a unit before concreting the base plate.
- ✓ Connecting elements in intersections or outlets and empty pipes to operating elements, sensors are located within the base plate.
- ✓ The highest point of the ZLFS is the levelling edge for concreting the base plate.
- ✓ After the base plate has hardened, all built-in parts are screwed into the ZLFS.
- ✓ The tubs are freely accessible from above.
- ✓ Power, control and media cables are inserted into separate areas.
- ✓ After mounting the actuators and sensors, wiring and installing the pneumatics and hydraulics, steel cover plates are inserted from above. The covers can be driven over.

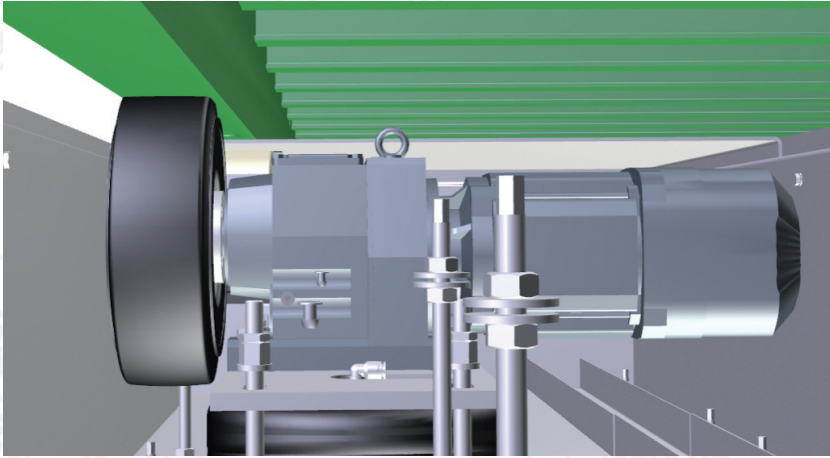
Overview ZLFS



ZLFS s for roller blocks, sensors

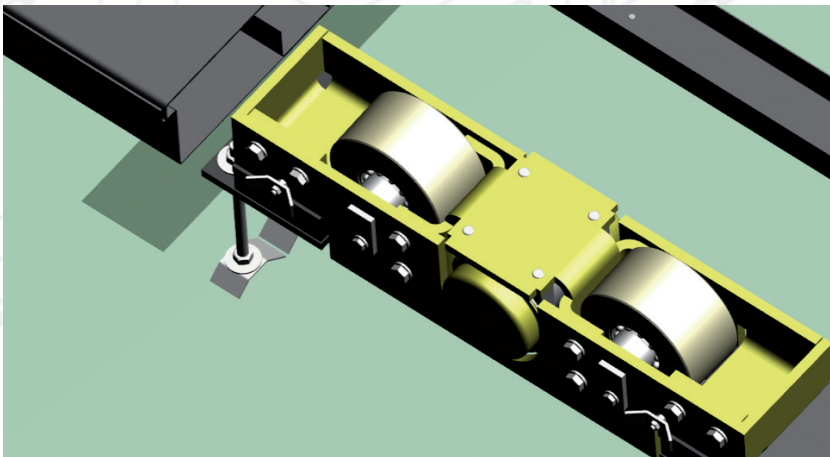
The roller blocks are connected to the ZLFS via screws. The track rollers can be self-centring or with flanged rollers. When using conical rollers, the required lifting height of the automated guided vehicle (AGV) is reduced. Tracking in the longitudinal direction ensures that the defined distance between the pallets is maintained. Even in the event of a mechanical blockage, the sensor system detects the situation and stops the further transport of the pallets.





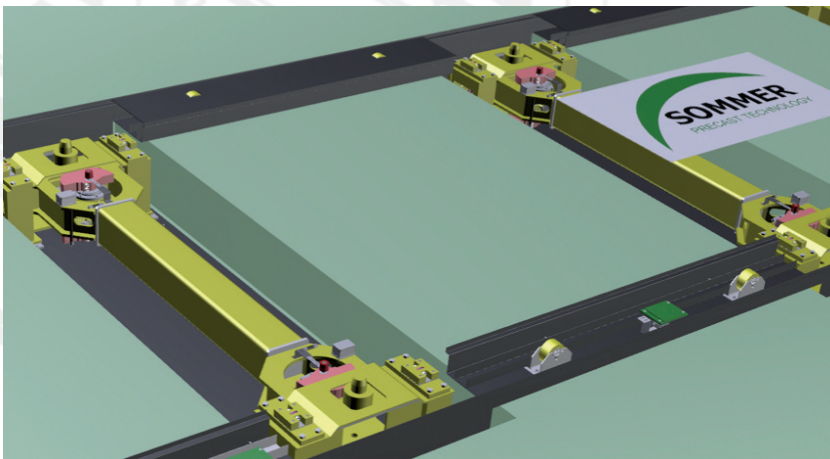
ZLFS m for friction wheels

The friction wheel drives are protected and located below the machining level.



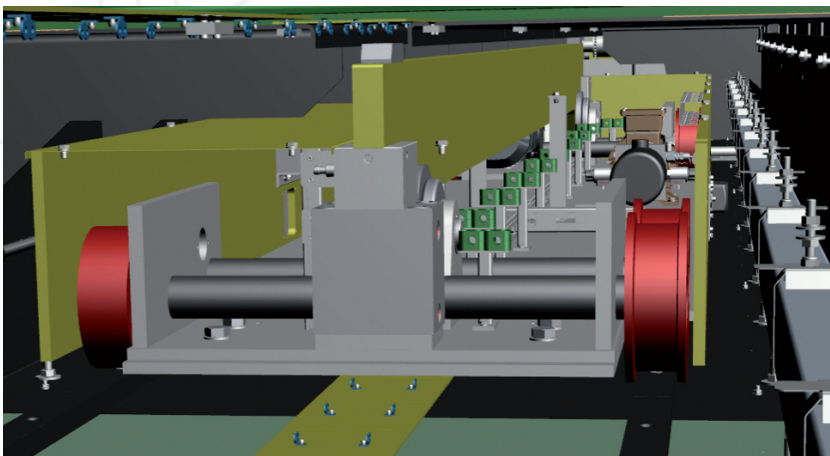
ZLFS I for compaction systems

All compaction systems can be installed in the ZLFS. Due to the recessed arrangement, each unit is encapsulated and thus reduces noise emission. Depending on the compaction system, such as high frequency, vibratory compaction in a X/Y/Z axis, horizontal X/Y axis, the connection between the compaction unit and the pallet is made via ballasted, vacuum, magnet, cone or clamping systems



Horizontal compression X/Y axis

Swing beam for Horizontal Compacting HC



ZLFS xl

Automatic Guided Vehicle (AGV) travel within the base plate in the ZLFS xl. The AGVs move to the pick-up position in a lowered state. After reaching the position, the lifting beam is lifted and presses against the pallet, transport units or elements via the cover segments. Movement to the next lateral station in the raised state of the AGV takes place automatically as soon as the transfer position is released. The current collector rail with integrated absolute travel measurement ensures the exact positions and synchronous running of all AGVs in use. The rotating cover chain is moved synchronously via the AGV drive when the AGV is raised.

Safety and control description

- | The ZLFS enables the automated transport of production tables (pallets) within a production plant.
- | The transport level of the pallets is only a few millimetres above the hall floor.
- | Crushing edges, shearing points, leading edges etc. are avoided due to this system.
- | Automatic movements without barriers and safety devices are, therefore, feasible.
- | The movement of the tables is also possible in a continuous sequence.
- | The components required for transport with actuators, sensors, sub-distributions, power supply lines with power and control lines, etc. are arranged in a protected form within the base plate.

Automatic transport operations

Functional description – longitudinal travel:

The operator releases the transport via a touch command. The pallet moves to the next station in automatic mode at the defined speed. If the specified minimum distance is not maintained, the transport is stopped automatically. The minimum distance is monitored by sensors. The journey is only reactivated in automatic mode after it has been released again.

The minimum distance between pallets during travel is defined by the distance between 2 position messages. The distance between the sensors is calculated by the maximum transport speed and the stop ramp setting. Several pallets can also be transported together in groups.

Only when all pallets of a line have been manually released is the transport operation carried out in automatic mode for all pallets at the same time. Monitoring of the respective minimum distances also takes place in group mode.

Functional description – Lateral travel:

The operator gives the transport release via touch command. The Automated Guided Vehicle (AGV) drives onto the pick-up station in the lowered state. Each AGV is positioned via a displacement measuring system. At least two AGVs lift the pallet and move synchronously to the target position in automatic mode when the target position is released.

ZLFS – The complete solution

1. Concept development mechanics and electrics
2. Creation of a safety concept for the entire plant
3. Hazard analysis and residual risk assessment
4. Coordination with the employers' liability insurance association and/or other authorities
5. Specification of the load data from the machine description of the respective circulation components
6. Preparation of load data for any required single or strip foundations
7. Preparation of the specifications for the on-site clean layer
8. Design and manufacture of the ZLFS
9. Delivery and assembly of the ZLFS
10. Checking and approval before concreting on site
11. Mounting the actuators and sensors in the ZLFS components
12. Wiring up to the transfer to the main distributors of the system control
13. Assumption of overall responsibility for the construction of the base plate

SOMMER- ZLFS - A foundation on which you build