

# THE TRUE MAKER

SPECIAL MACHINES  
HEAVY LOAD HANDLING

CONVEYOR  
SYSTEMS

INTRALOGISTICS  
WAREHOUSE SYSTEMS

SILICON  
PROCESSING

ENGINEERING





## THE FIVE BRAND VALUES

The five brand values subsume the attitude, the philosophy, the mission statement. That is why we are passionate about your tasks. We are committed to you, and we'll do everything we can to ensure that you get the perfect solution.

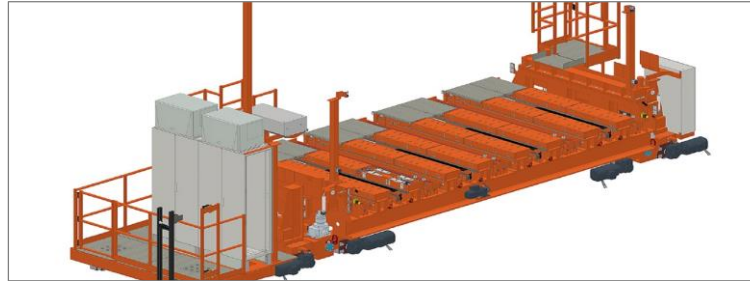
With knowledge, ideas, solutions, efficiency and inspiration.



## Example

### Fully automatic rail loading

Save time on the tracks.  
Heavy loads easily and  
precisely loaded.



## Facts and figures

250 stacks per day  
Payload: 20 tons

Alztec team:  
2 design & engineering staff  
8 assembly & commissioning staff  
2 electrical & control engineering staff

Main components:  
1 self-loading railcar  
170 meters of rail  
1 safety features & equipment  
1 plant control system including  
visualization

## The task

Unloading  
Loading

An automotive plant is receiving battery modules by rail in stacks weighing up to five tons and shipping batteries in stacks weighing up to five tons. The plant's requirement: fully automated unloading and reloading of the arriving mixed-freight trains comprising up to six railcars per train.

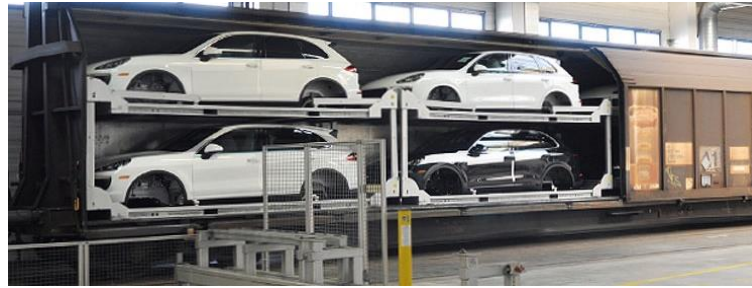
## The solution

Alztec develops and supplies the self-loading railcar designed to unload stacks of modules or batteries in packs of 3 or 4 from the train and to reload the train with identical cargo. The system moves loads of up to 20 tons at a speed of up to 2.0 meters/second. The self-loading railcar features a loading device. The system is designed for fully automated unloading of approx. 250 stacks per day and fully automated reloading of approx. 250 stacks per day, in two shifts.

## Example

### Cross-plant material flow of vehicle bodies

This is where the connection comes into play. Over 400 vehicles are moved per day. What matters is the bottom line from factory to factory.



#### Facts & figures FACTORY A / B

Capacity: 420 pcs./day

Alztec team:

- 7 / 8 EE in design
- 12 / 14 EE in assembly / commissioning
- 8 / 5 EE in electrics / control engineering

Main components:

- 2 / 1 loading cars
- 2 / 2 storage servicing equipment
- 3 / 2 unstacking module for car bodies
- 50 / 90 storage slots for car bodies
- 0 / 30 m conveying track
- 1 / 1 plant control including visualization
- 1 / 1 storage management system
- 1 / 1 factory control linkage

#### The task

Conveying  
Storage  
Loading  
Handling

In the automobile factory A, complete car bodies for SUV's are produced. At factory B, these car bodies are completed with engines, driveline and exhaust systems to constitute the finished vehicle. The task was to bring the car bodies in the proper sequence as efficiently as possible from factory A to factory B.

#### The solution

From the factory production line continuously car bodies are transported to the shipping point, by the interaction of the 3 stacking modules and the 2 storage servicing equipment. The proper loading order for the train is established and stored temporarily in the warehouse for shipment. As soon as the train enters the station and is ready, the two loading cars start to displace the readied car bodies and fully automatically put them for loading into the train.

By installation of the loading plant, it was possible to increase the total output by 180 vehicles per day.

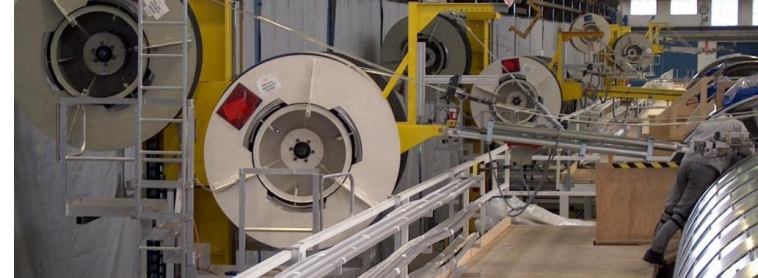
The core of the plant in factory B is the approximately 13 ton loading wagon, which ensures that the interim storage facility is always full so that the shunting and waiting times of the incoming trains are intercepted.

Another main task in this project was the separation of the car bodies and the subsequent stacking and return of the empty load carriers. This problem was solved by the Alztec Engineers with the development of stacking and unstacking modules as well as a corresponding conveying linkage in between.

## Example

### Winding machine for coil wound heat exchangers

We've got the hang of it!



## Facts and figures

Capacity: up to 450 tons

Alztec Team:

- 4 employees design
- 4 employees installation and commissioning
- 4 employees electricians and control

Main components :

- 1 rotating device master
- 1 rotating device slave
- 1 coil carriage
- 1 rail system for coil carriage
- 1 four bar linkage for quadruple winding
- 4 feeding and straightening unit
- 1 winding head 4-fold
- 1 feeding and straightening unit
- 1 control system based on Siemens PLC

## The task

Coil wound heat exchangers are used to liquefy natural gas for transport.

Up to 3,000 km of individual tubes, through which the refrigerant flows, are wound onto a core tube with a length of up to 30 m,.

## The solution

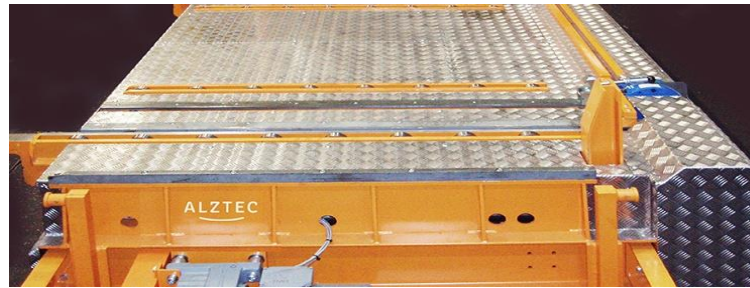
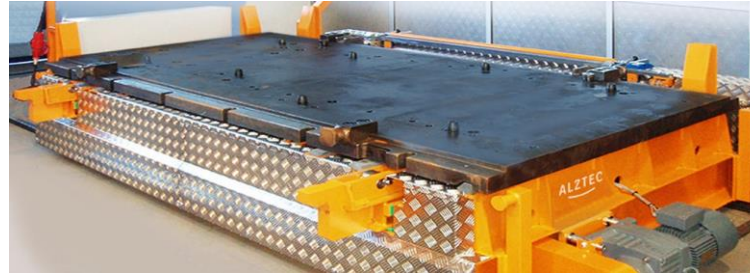
The core tube rests on rotating devices at each end. One of them is equipped with drives and the other is designed as a follower. A retainer device prevents longitudinal movement of the core tube. The individual tubes are fed to the bundle via a coil carriage which carries four coils simultaneously. The tubes pass through a drive and straightening device to the quadruple winding head. The rotation of the bundle and the travel motion of the coil carriage cause the tubes to be wound in a spiral. The movement of the coil carriage and the rotation of the bundle are automatically synchronized.

Optionally, the winding machine can be equipped with laser systems that project jigs onto the bundle for the workers.

## Example

### Tool changing wagon up to 20 tons

Heavy weights easily moved.



### Facts & figures

Capacity: 20 tons

Alztec Team:

- 2 EE in design
- 1 EE in assembly guide

Main components:

- 1 tool changing wagon

### The Task

Handling

Tools of a press should be changed fast, precise and safely.

### The solution

The tools in the tool warehouse are removed from the storage area with the help of an indoor crane and placed on the tool changing wagon. The tool changing wagon runs on rails and the tool for the appropriate press is activated by pressing the dead man's switch for the corresponding press.

The Positioning in front of the press is automatically controlled via inductive sensors. After the tool changing wagon has been locked on the ground, the roll bracket extends out. The tool is pushed in the tool holder of the press by a linear chain.

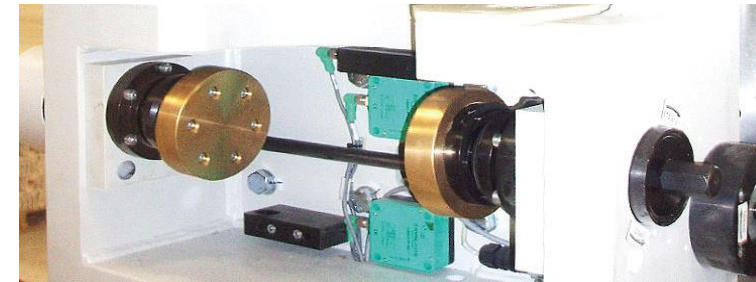
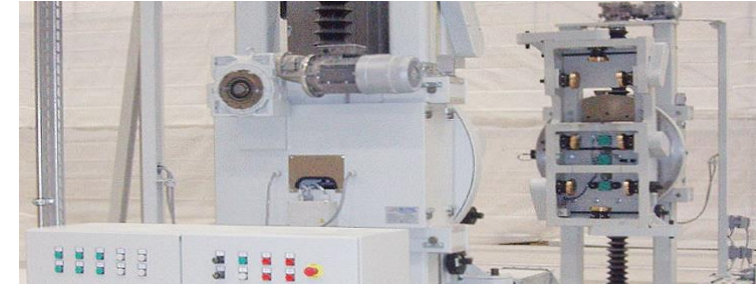
Once the tool is in position, first the linear chain and then the roller console moves back to the tool changing wagon. Then the lock can be opened and the tool changing wagon can be driven into the parking position.

## Example

### Lifting, rotating device for wind energy gears

For efficient rotating 8 categories of heavyweights weighing up to 32 tons.

Easy as a breeze.



## Facts & figures

Capacity: 32 tons

Alztec team:

- 2 EE in design
- 3 EE in assembly / commissioning
- 2 EE in electrics / control engineering

Main components:

- 3 lifting, turning devices each composed of
- 2 chassis
- 2 lifting units
- 2 turning unit
- 2 clamping jaws
- 1 plant control including visualization

## The task

Conveying  
Storage

The Alztec customer is setting up assembly lines for wind turbine gearboxes at two locations in Germany and one location in China. During the assembly process, various areas should be made accessible for the employees. To do this, the torque arm to the partially assembled gearbox to the wind turbine, parts which can weigh up to 32 tons, have to be rotated several times.

## The solution

The lifting and turning devices consist of a lifting unit with a trapezoidal thread spindle drive and a turning unit, which is driven by an internally toothed slewing ring. To pick up the components, the lifting and rotating devices are automatically moved together on a rail. The mounting jaws have two different mounts for two different gearbox designs. A total of eight different gear types can be turned on the systems. The control is semi-automatic. This means that the system only moves when the operator presses the consent button. If he releases the button, it stops.

## Example

Handling with conveying technology for dip-coating plant

Submerged engine blocks.



### Facts & figures

Capacity: 5.000 kg

Alztec Team:

- 2 EE in design
- 4 EE in assembly and commissioning
- 1 EE in electrics and control engineering

Main components:

- 1 handling module
- 60 m conveying track
- 1 plant control incl. visualization

### The task

Handling  
Conveying

Various types of engine blocks with a weight of up to 5,000 kg shall be painted after a warm-up phase by a dipping bath in the furnace.

### The solution

The engine blocks are transported using conventional roller conveyors and a distribution car. The handling developed specially for this application is the central element of the plant. While the engine block is transported by the roller conveyor to the grapple on the left-hand side, the right-hand grapple moves towards the engine block and locks it between the holders. The handling system lifts the engine and moves it over the painting basin. After the rotating function has been started, the engine block is moved into the painting basin. After a preset time, the handling system retracts and the engine block remains above the painting basin for a predetermined time to drain off. Subsequently the engine block will be transferred again to the conveyor system, which transports it out for approval.



## Example

### Conveying equipment for a foundry

In perfect shape for a foundry.



### Facts & figures

Capacity: 360 pcs./day

Alztec Team:

- 4 EE in design
- 1 EE in assembly guide

Main components:

- 28 roller conveyors
- 5 distribution cars
- 4 corner conveyors 2 lifters
- 1 tilting device
- 1 jacket lifter
- 1 jacket lifter with brush

### The task

Conveying  
Storage

A foundry requires for the transport of the pallets with a "Jacket", a conveying system which transports the pallets with the molds and the sand from the loading area via the casting station in a cooling station to the demolding station.

### The solution

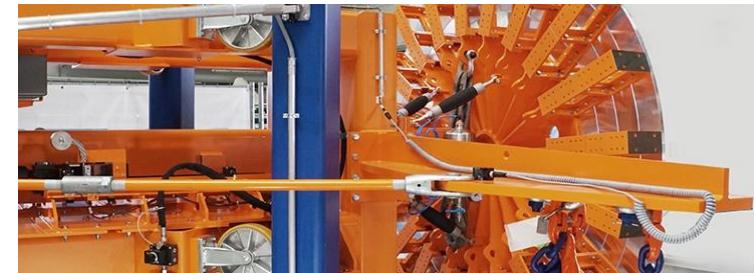
Massive roller conveyors essentially ensure the transport of the pallets with Jackets. The corner transfer units were fitted with chain conveyors on a Pneumatic lifting gear. The distribution of pallets with Jackets in the cooling off station, as well as larger crossway distances were covered by distribution cars. Differences in height were overcome with Chain hoist lifters.

The core of the system is the Jacket Lifter with Pallet Tipper with the integrated cleaning function. In this station, by lifting the Jackets, the sand is drained into the vibration chute below. During lifting, brushes reach the inner sides of the Jackets and clean the latter from adhering sand. Once the Jackets are cleaned, the pallet is tilted by 90° so that the molds that are placed on it slide into the vibration chute. A rotating brush then cleans the sand residue from the pallet.

## Example

### Compaction device up to 250 kN

Using high pressure  
to bring it in shape.



## Facts & figures

Capacity: 25 tons

Alztec Team:

- 3 EE in design
- 2 EE in assembly and commissioning
- 2 EE in electrics and control engineering

Main components:

- 1 compaction device

## The task

Handling

Aluminum packages (circle segments) should be placed inside a cylindrical container with a diameter of up to 3,500 mm and a length of 7,000 mm so that the levels can be compressed. The goal is to install multiple levels into this container. The Production parameters must be logged via sensors.

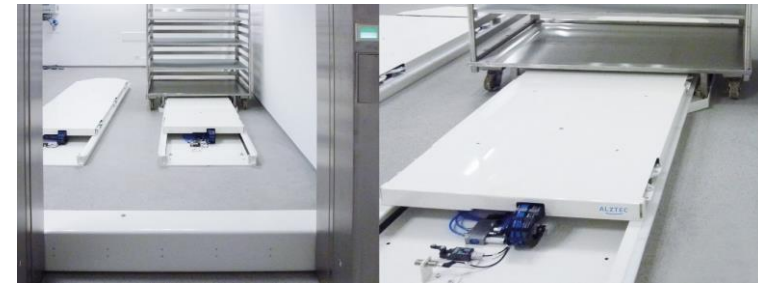
## The solution

A machine was developed that compacts several circular segments with a massive aluminum plate into one level. The diameter of the Press Plate is variable through the circular segments which can be adapted to the diameter of the container. The compression force can be set to a maximum of 250 kN and is logged by the compression load cells. Furthermore, the height of the compression device in relation to the container can be adjusted hydraulically. The immersion depth of the compacting device can be up to 7,000 mm. The system runs on a rail system and can, if necessary, be stowed in a sea freight container. The system can be adapted to accommodate any changes in requirements, e.g.: higher compaction pressure or larger compaction diameter.

## Example

### Automated Medicine Transport

We transport your medicine  
cleanly from the clean room  
to the shipping department.



#### Facts & figures

Capacity: 12 trolley/hour

#### Alztec Team:

- 1 EE in design
- 2 EE in assembly/commissioning
- 2 EE in electrics/control engineering

#### Main components:

- 3 floor shifting systems
- 1 wall shifting system
- 1 system control including visualization

#### The task

##### Conveying

Raw products must be transported via a cleanroom airlock (gray room) from goods receiving to production and from production back to shipping (goods receiving).

The products must be transported in the clean room on trolleys, whereby the trolleys may only be moved in the clean room and gray room.

#### The solution

Three floor-mounted transfer systems for longitudinal transport, each with three buffer positions, and a wall-mounted transfer system for transverse transport were installed in a gray room. With the toothed belt-driven transport systems, the trolleys are moved on their own rollers by pneumatic carriers.

The trolleys from the clean room can be loaded on two lines (line 1 – full trolleys, line 2 – empty trolleys). Depending on the requirements of the operator at the loading/unloading point, a trolley is transported in front of the transfer point. After opening the door, the operator loads or/and unloads the wagons and sends them to the pickup point on the third line. From there, the trolleys are removed manually. When a line is full, this is indicated to the operators in the clean room and in the goods receiving area visually and with a signal tone.

## Example

### Connecting conveyor systems

Conveying, stacking, separating battery modules. Charged with benefits.



### Facts & figures

Tact time modules 3,5 s  
Tact time battery 33 s  
Load capacity 2,5 / 5 tons

Alztec team:  
12 design & engineering staff  
50 assembly & commissioning staff  
25 electrical & control engineering staff

Main components:  
380 meters chain conveyors  
21 rotary tables  
10 distribution cars  
13 staple-/latch modules  
3 frame storages  
4 module handlings  
300 sqm platform with stairs and railings  
1 system control including visualization

### The task

Conveying  
Staple  
Separate

Battery modules in load carriers are to be automatically unloaded from a truck, repacked from a stack of 7 to a stack of 4 and fed to a warehouse repacked and fed into a warehouse. Production should retrieve the battery modules, assemble them into a vehicle battery and transport them back to the warehouse in stacks of 4. Here, stacks of 7 should be packed again and automatically fed to the truck. In addition, the empties and basic pallets must be handled.

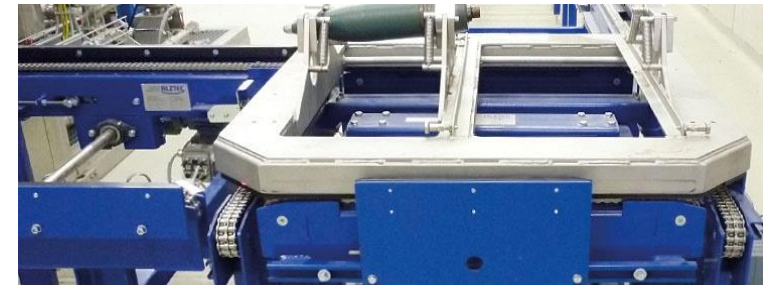
### The solution

An automatic truck unloading system brings the stacks of 7 on a base pallet to a frame store. There the stacked into stacks of 4 and the base pallets are stacked 5 high. The finished stacks are moved to the warehouse and reported to the higher-level control system. When battery modules are called off from production, they are taken from the warehouse and moved to the module handlers via the conveyor system. There the load carriers are there, the load carriers are fed individually to the handling units, which recognize the module position by camera and transfer them to the production conveyor line. Empty load carriers are loaded with a finished battery, which is fed from production, brought together in stacks of 4 and transported to the warehouse. As required, stacks of 4 batteries are removed from storage, restacked into stacks of 7 and automatically loaded into the truck.

## Example

### Conveying system for load carrier in the ATEX area

Dynamically clearing the way.



### Facts & figures

Capacity: 400 pcs./day

Alztec team:

- 4 EE in design
- 6 EE in assembly / commissioning

Main components:

- 150 meters roller conveyors
- 12 corner conveyors
- 2 turning devices
- 2 lifting devices
- 1 handling device

### The task

Conveying

In explosion-proof areas, load carriers shall be transported from one production space to the next.

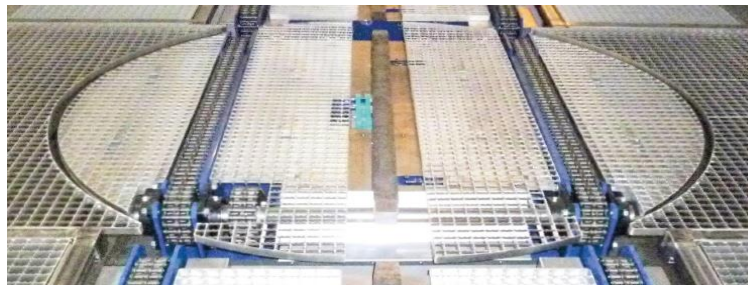
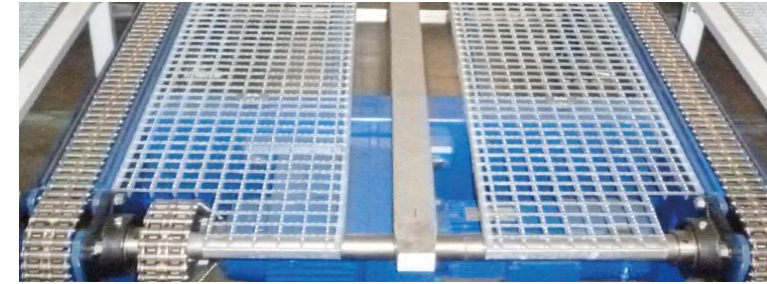
### The solution

By the use of proper material pairs, chain conveyors, rotary tables and lifting unit have been developed which by their operation cannot generate any ignition spark. The equipment crosses various areas (fireproof zones) secured by fireproof gates. In a production area, the handling portal removes the product from the load carrier and puts the latter into the processing station. Thereafter the portal removes the component again from the station and puts it again into the load carrier. In order to be able to enter the equipment for maintenance work also inside and to provide it with material from manual lifting cars, a lifting unit with pneumatic control has been developed and installed. Alztec has assumed in this project the complete layout design, the mechanical Engineering as well as the manufacture and installation of the components. The customer took care of the electrical installation and of the control engineering.

## Example

### Heavy load conveying equipment 8 tons

Load carriers on track.



### Facts & figures

Capacity: 300 pcs./day

Alztec team:

- 2 EE in design
- 4 EE in assembly / commissioning

Main components:

- 16 chain conveyors
- 2 distribution cars
- 2 rotary tables
- 1 tilting table
- 1 lifting table

### The task

Conveying

For the paint finishing system, the Alztec customer needed conveyor technology that endlessly transports load carriers with heavy components in a rectangle.

### The solution

For this purpose, the robust chain conveyor technology with two strands is selected. A centrally arranged rail guides the load carriers on the conveyor system. To protect against paint dust, the sensors are positioned in the middle of the chain conveyor so that they are covered by the load carrier in the stop position.

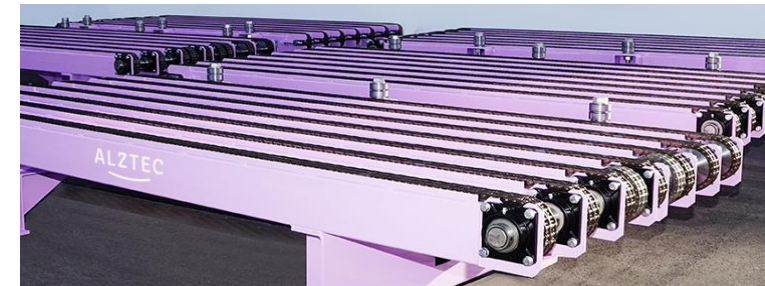
Turntables in the system allow the components to be processed on both sides. At the beginning and at the end of the painting line there are distribution trolleys, which transfer the load carriers to the parallel return line or take them over from it.

Alztec develops the construction of the complete conveyor technology and the maintenance corridors, as well as their installation at the end customer. The general contractor installed and commissioned the electrification and control technology.

## Example

Heavy load  
conveying  
14 tons

We also will supply  
the correct color.



## Facts & figures

Capacity: 14 tons

Alztec Team:

- 1 EE in design
- 1 EE in assembly and commissioning

Main components:

- 5 chain conveyors

## The task

Conveying

The applicable conveying equipment was needed for the feed and the removal of steel sheet parts to a flame cutting equipment.

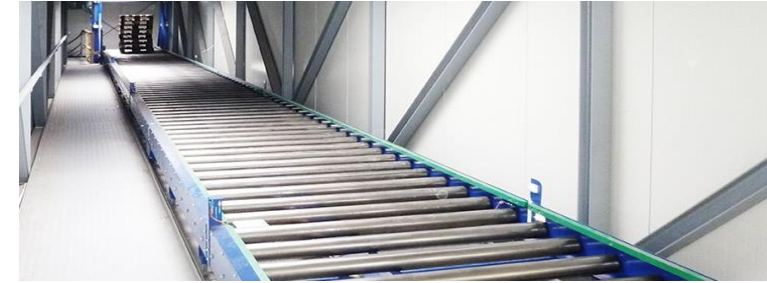
## The solution

Due to the large variety of sheet metal parts, our team of engineers designed, in close cooperation with the customer, a seven-track chain conveyor. The cherry on the cake for this project was provided by the very interesting color scheme of the customer. After the test run in our factory, the chain conveyors were installed, electrified and commissioned by the end customer.

## Example

### Conveying plant with lifters

We span roads.



#### Facts & figures

Capacity: 720 pcs./day

Alztec Team:

- 2 EE in design
- 3 EE in assembly and commissioning
- 2 EE in electrics and control engineering

Main components:

- 60 m conveying track
- 2 lifters
- 1 rotary table
- 1 plant control incl. visualization

#### The task

Conveying

A road separates the production and the shipping area. Due to the increasing traffic and the continuously increasing production numbers, a transport by forklift across the road is no longer the ideal solution.

#### The solution

An integrated bridge connects the two roadsides. On both sides a lifter was installed, each of which can accept two pallets. The transfer points are designed in such a way that they can be served by forklifts as well as hand pallet trucks.

The control engineering has been designed to transport the products from one side to the other and on the empties from shipment back to the production.



## Example

Heavy load conveying  
16 tons

Gentle giants



### Facts & figures

Capacity: 400 pcs./day

Alztec Team:

- 2 EE in design
- 3 EE in assembly and commissioning

Main components:

- 12 m 6-track chain conveyor
- 30 m roller conveyor
- 1 hydraulic lifting gear

### The task

Conveying

Piles of metal sheets are to be automatically stacked in the manufacturing cell and then transported via a conveyor system to the intermediate storage.

### The solution

The sizes and weights of the metal plate stacks presented the Alztec engineers with the challenge of designing the conveying means in a way to ensure that the stacks could be transported without failure, despite the weight and distortion factor.

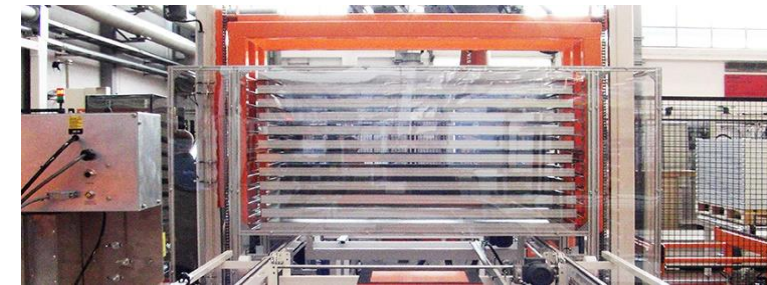
For this purpose, chain conveyors with six tracks, driven on both sides, were designed for the longitudinal transport. The cross transport was implemented by roller conveyors with closer divisions and multiple support rolls below the carrying rolls. The corner conveyor included a hydraulic lifting gear that can lift and lower the chain conveyors with six synchronized hydraulic cylinders.

Alztec supplied and installed the conveying system at the final customer. The manufacturer of the sheet metal plates took over the electrical installation and the control engineering.

## Example

### Conveying technology for solar modules (steel design)

Smooth transport of glass and solar modules.



### Facts & figures

Capacity: 1.440 pcs./day

Alztec Team:

- 4 EE in design
- 4 EE in assembly and commissioning

Main components:

- 137 toothed belt conveyors
- 23 eccentric lift gears
- 12 centering devices
- 6 lifting tables
- 3 rotary tables
- 12 FILO buffer
- 17 chain conveyors
- 2 distribution cars

### The task

Conveying

The production of a solar module requires many manufacturing steps. The task was to develop a universal conveying design by which glass and solar panels can be transported from one manufacturing position to the next.

### The solution

Two and three strand toothed belt conveyors transport the glass and the solar panels smoothly through the plant. Corner conveyors and rotary tables approach the individual manufacturing cells. Centering devices and lifting tables ensure the correct position of the glass and solar panels during production.

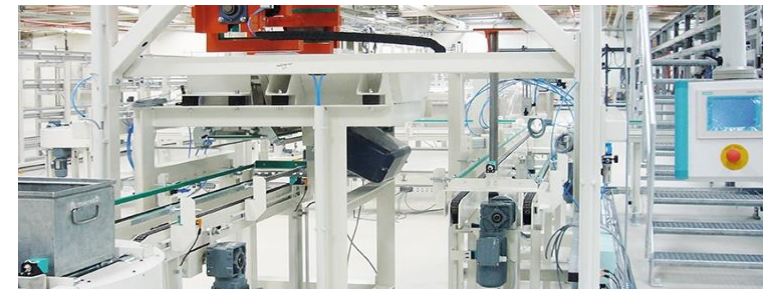
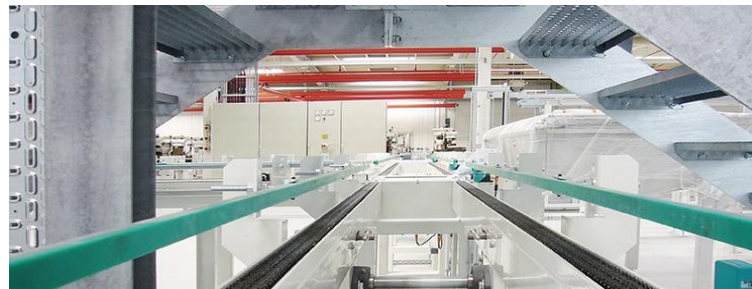
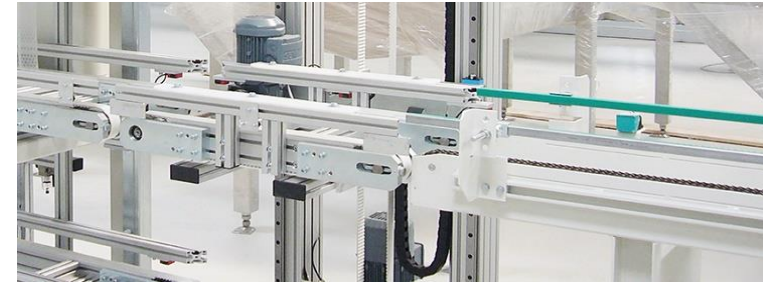
In order to be able to maintain production figures at a high level in a manufacturing cell, and to relieve the system in the event of delays, special FILO buffers (first in – last out) were developed and installed in advance.

Our company was “only” responsible for the construction and production of conveyor technology as well as their mechanical and electrical installation. The manufacturing cells and the complete sequence control were taken over by a general contractor.

## Example

### Box conveyor technology

The right product  
in the right box  
in the right place.



### Facts & figures

Capacity: 720 pcs./day

#### Alztec Team:

- 12 EE in design
- 8 EE in assembly and commissioning
- 4 EE in electrics and control engineering

#### Main components:

- 160 m conveying track
- 4 lifters
- 12 rotary table
- 4 transfer units
- 1 tilting units
- 2 turning stations 1 Cover handling

### The task

#### Conveying

In a galvanizing workshop, the non -treated parts were delivered by the customers in Bito-boxes. In the plant, these must be put into special baskets so that they then can pass several dipping baths. After the galvanic treatment, the parts have to be put back into the cleaned Bito-boxes.

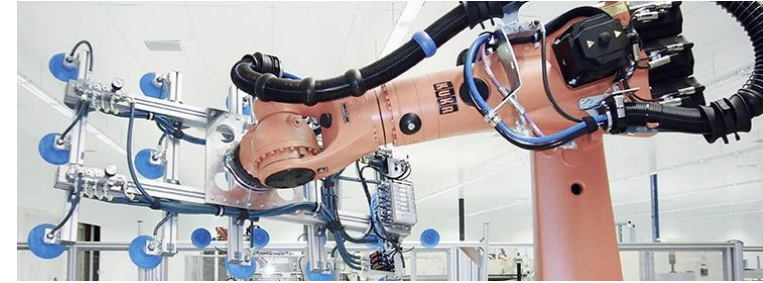
### The solution

For the conveying of the Bito crates and baskets, chain conveyors were used throughout. Rotary tables implemented all direction changes in the plant. The transfer units include a gripper to accept the boxes or baskets, a lifting station with transverse chassis for the transfer to the funnel and a rotary unit that puts the parts into the funnel after which the parts are transferred into the boxes or baskets. Alztec designed the complete Conveyor technology including the rotary tables, lifters, tilting station, turning station and cover plate handling. After the production of the components at well-known manufacturer companies, we installed the complete mechanics at the end customer. The electrics and the control technology were carried out by a general contractor.

## Example

### Conveying means for solar panels (aluminum design)

From the glass to the solar panel.



### Facts & figures

Capacity: 1.440 pcs./day

Alztec Team:

- 4 EE in design
- 2 EE in assembly and commissioning

Main components:

- 53 timing belt conveyors
- 8 eccentric lifting gear
- 3 centering devices
- 2 rotary tables
- 4 assembly design
- 2 tilting tables

### The task

Conveying

A conveying technology was required for the manufacture of solar panels, which would transport the semi-finished panels from one manufacturing position to the next.

### The solution

For a smooth transport, timing belt conveyors were developed, which can transport the glass up to the finished solar panel. Depending on the required position of the products, the crossings and branching connections in the conveying systems were implemented with corner conversions or rotary tables. For the transfer of the glass or panels to the robots, assembly devices with suction features were designed and installed at several points in the plant. A worker implemented the quality control at the end of the manufacturing line. For this application, the solar panel was automatically assembled and placed on a non-driven roller conveyor, on which the employee could then carry out the inspections. After the control, the panel was automatically laid down again and transferred to the packaging area. Alztec supplied and installed the complete mechanical and electrical installation of the conveying technology for this project. The plant control system was implemented by the general contractor.

## Example

### Packaging plant

Cardboard boxes brought into shape.



### Facts & figures

Capacity: 720 pcs./day

#### Alztec Team:

- 2 EE in design
- 3 EE in assembly and commissioning
- 2 EE in electrics and control engineering

#### Main components:

- 7 roller conveyors
- 3 chain conveyors
- 2 rotary tables
- 1 corner conveyor
- 1 hydraulic lifting table
- 1 strapping machine
- 1 stretch wrapper
- 1 automatic labeling device
- 1 plant control incl. visualization

### The task

#### Conveying

Cardboard boxes filled with product, which are placed on CP pallets, have to be strapped, wrapped in clear stretch film and labeled for shipment.

### The solution

For the transport of the cardboard boxes on pallets, roller conveyors were almost exclusively used. These have the advantage that when strapping and stretching, the pallets can be easily pushed into the correct position.

The automatic strapping machine, the stretch wrapper and the labeling device were selected by our technicians and integrated into the system in such a way to guarantee flawless functioning. The components have their own control system, which communicates with our main control and ensures of the proper sequence.

## Example

### Heavy-duty applications

Heavy weights.  
Minimal space.  
High redundancy.



### Facts & figures

Capacity: 500 stacks/day  
Payload: 2.5 tons

#### Alztec team:

- 4 design & engineering staff
- 16 assembly & commissioning staff
- 8 electrical & control engineering staff

#### Main components:

- 2 aisles, single, deep
- 2 stacker cranes with telescope
- 2 aisles, multiple, deep
- 2 stacker cranes with satellite
- 2 plant control systems including visualization
- 2 warehouse management systems

### The task

Conveying  
Storage

Battery modules or vehicle batteries as well as basic pallets and empties should be able to be stored at two locations. In both warehouses, products should be able to be loaded and unloaded at the front and rear. The stack weights range up to 2.5 tons.

### The solution

For maximum redundancy both warehouses feature two aisles each. A long and a narrow warehouse are designed as single deep structures each. Both stacker cranes are equipped with telescopes. The second warehouse with its square footprint features two aisles and multiple deep shelves. The lifting platform on the stacker crane is equipped with a charging station to allow wireless satellite movement into the channels. Both stacker crane types are designed for handling payloads up to 2.5 tons.

**Example**  
**Automated warehouse**  
**Commissioning in a big way!**



**Facts & figures**

Capacity: 250 pcs./day

Alztec team:

- 10 EE in design
- 20 EE in assembly / commissioning
- 8 EE in electrics / control engineering

Main components:

- 3 aisles with
- 8 stacker cranes with telescope
- 9 lifters
- 1 double-distribution trolley
- 5 distribution trolleys
- 4 staple-modules
- 230 meters conveyors
- 900 load carrier
- 48 commissioning gates
- 1 system control including visualization
- 1 warehouse management system

**The task**

Conveying  
 Storage  
 Handling

Plastic parts are painted in an automotive plant. The end customer's requirement is to provide the more than 600 possible different parts (in unmixed containers) in a specific order in picking containers and to store as many containers as possible (unmixed, empty and full picking containers).

**The solution**

The unmixed container arriving at the goods receiving area is measured fully automatically and placed on a load carrier with a staple-module. Given the large number of containers, it was challenging to securely grip all of them and turn them so that the opening would later face the worker. The load carrier incl. product is transported to the corresponding storage area on the 1st floor. On the ground floor, picking is carried out by the customer's employees. At 6 stations, the station lifter provides the corresponding unmixed containers according to a predefined sequence. The employees remove parts from the containers provided one after the other and fill a picking container. Each of the 6 stations has its own range of parts and geometrically different picking containers. The finished picking containers are transported by a double distribution truck and returned to the warehouse via a lifter and stacker crane. There, the picking containers are waiting to be called off to the assembly line, fed to it, emptied and returned. In order to cover the high cycle time, a total of 8 stacker cranes are used on 3 rails, each 150 m long.

## Example

### Dynamic commissioning

Just in sequence –  
when every second counts –  
at 424 storage bays.



### Facts & figures

Capacity: 1.440 pcs./day

Alztec team:

- 12 EE in design
- 16 EE in assembly / commissioning
- 6 EE in electrics/ control engineering

Main components:

- 6 rack alleys
- 6 rack servicing equipment
- 170 meters shuttle high-level track
- 6 shuttles
- 150 meters conveying track
- 1 lifter
- 2 stacking modules
- 1 plant control including visualization
- 1 warehouse management system

### The task

Conveying  
Storage

In order to supply the production line of a luxury car manufacturer with the necessary parts, a fully automatic system is required. The workers at 424 variable storage locations are always provided with the appropriate components enabling the pre- commissioning of these components.

### The solution

Alztec plans and supplies the complete material flow system tailored to the assembly sequence of the final assembly line. One of the main requirements are the speed and the reliability of the rack servicing. In order to satisfy the elevated speed requirements of 4.5 m/s at a load capacity of 1,000 kg; the rack servicing equipment specifically has been designed for this application. In order to guarantee the required reliability. It has been equipped with redundant motors.



## Example

### Automatic storage system for small load carrier containers

Always the appropriate components in the right place.



### Facts & figures

Capacity: 3.100 pcs./day

Alztec team:

- 6 EE in design
- 12 EE in assembly / commissioning
- 4 EE in electrics / control engineering

Main components:

- 4 rack alleys
- 4 rack servicing equipment
- 2 robots
- 14 racking modules
- 8 lifters
- 1 automated cover handling
- 250 meters conveying track
- 1 plant control including visualization
- 1 warehouse management system

### The task

Conveying  
Storage  
Handling

In order to pre-sequence a production line for gear assembly, an automatic storage system was to be set up in an automobile plant.

The aim is to have a fully automatic supply and collection by the tugger train.

### The solution

In addition to the usual requirements that an automatic warehouse has to meet, the challenge here was to develop a stacking/unstacking module that optimized the storage technology of the incoming stacks before storage and sorted the individual small load carrier containers that had been mixed up from production into stacks that could be picked up.

Alztec engineers successfully implemented this as well as the subsequent connection of an additional aisle and two robot cells for loading a washing machine.

## Example

### Packaging plant for granular silicon

Highly compact packaging under pressure.



## Facts & figures

Capacity: 5.000 tons/year

Alztec team:

- 5 EE in design
- 8 EE in assembly / commissioning
- 6 EE in electrics / control engineering

Main components:

- 2 packaging plant
- 80 meters bag conveying means
  - 1 clean room lock
  - 2 robot cell
  - 1 box lifter / closing
- 30 meters box conveying engineering
- 5 labeling
- 25 meters pallet conveying engineering
  - 1 stretch binder
  - 1 plant control including visualization
  - 1 material management system

## The task

Conveying  
Handling

A Chinese-American joint venture company was looking for a special solution for compact, automated packaging of granular silicon. The silicon granules are delivered through a pipeline with a special coating and should be packed in bags of 10kg ( $\pm 10g$ ) with a vacuum of 200 mbar. At the end of the system, fully automatically packed cartons are to be output on weatherproof packed pallets. A throughput of at least 200 bags per hour is required.

## The solution

The silicon granules produced in a new process can now be packed fully automatically using the special Alztec system. The Alztec team achieves the task with two VFFS (VERTICAL FORM FILL and SEAL) packaging systems, in which the bag is first made from foil material, then filled, evacuated and finally sealed.

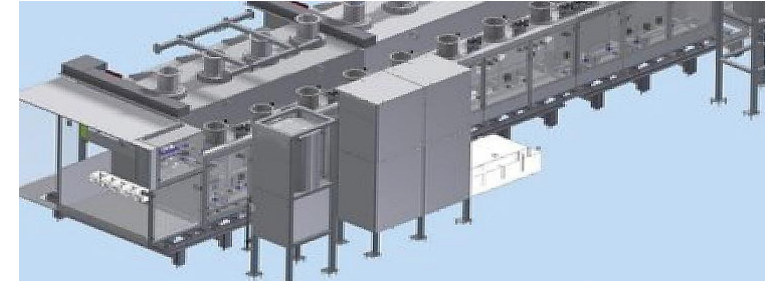
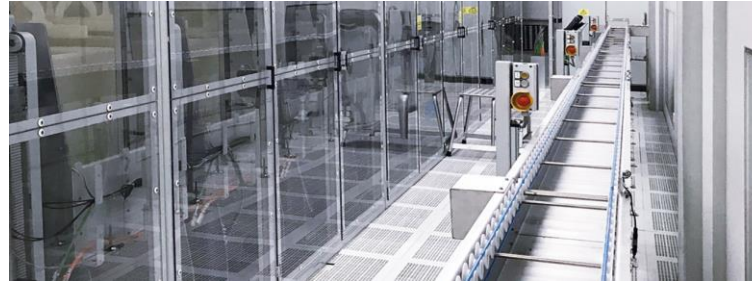
The material is double-bagged, both bags are labeled and, after checking the weight and metal, they are packed into cartons by a robot. The carton is then stacked on a pallet by another robot. The filled pallet is weatherproof packed and can be removed with the forklift at the end of the system.

A special challenge was the coating of parts that come into contact with the product with silicon nitride and the high negative pressure in the bag, which could be solved by the Alztec know-how.

## Example

### Processing plant for polysilicon

Parts per trillion – highest purity – unique Alztec process.



### Facts & figures

Capacity: 4.000 tons/year

Alztec team:

- 8 EE in design
- 10 EE in assembly / commissioning
- 6 EE in electrics / control engineering

Main components:

- 1 high voltage impulse breakage
- 1 screening equipment
- 150 meters basket conveying
- 300 etching baskets
- 1 etching plant
- 1 drying plant
- 3 bag packaging plant
- 1 plant control including visualization
- 1 warehouse management system

### The task

Conveying  
Processing

The world's largest producer of polysilicon wants to automate the breaking, sorting, cleaning and packaging of polysilicon and increase the purity of its product. The facility is intended to process 4,000 t of high-purity polysilicon for further use in the electronics industry. The customer material is brought to the system in logs of approx. 70 kg each. In the end, the broken and cleaned polysilicon should come out of the plant fully automatically in bags of 5 kg ( $\pm 50$  g). Additional requirements are the high purity  $< 500$ ppt and the exact material tracking according to SEMI criteria.

### The solution

Alztec designed and supplied this revolutionary system including the material management system. The high level of purity was achieved using special materials and patented processes.

The crushing of the polysilicon is realized by non-contact high-voltage pulse breaking with 200 KV and 5 Hz, which already ensures a high purity of the polysilicon at this stage. In a next step, the crushed material subdivided by a special wet screen equipment into various fractions is filled into several etching baskets. Some  $\mu\text{m}$  of the surface are eroded by wet chemical processes through a connected etching plant, ensuring thereby a maximum cleanliness. Finally, the ultra-clean material will be dried and packed into PE double bags.

## Example

### Automation and material flow for a polysilicon factory.

Alztec makes factories run – all over the world.



## Facts & figures

Capacity: 8,000 tons/year

Alztec team:

- 8 design & engineering staff
- 16 assembly & commissioning staff
- 8 electrical & control engineering staff

Main components:

- 2 silicon harvesting plants
- 330 containers for silicon rods
- 1 high-bay warehouse for containers
- 4 crushers / 2 extraction systems
- 180 meters of handling section for boxes
- 1 high-bay warehouse for boxes
- 6 packaging plants
- 110 meters of handling section for bags
- 1 final packaging system
- 4 control systems including visualization
- 1 materials management system

## The task

Conveying  
Storage  
Handling

A factory for the production of high-purity polysilicon for the solar industry was planned in the Middle East. In order to ensure the highest quality despite the lack of local specialists, this factory was planned to be predominately automated. Until now, the processing in other factories worldwide has been mainly manual, so Alztec will be introducing new developments and concepts in many areas.

## The solution

Alztec finds unique techniques for the automated processing of polysilicon that meet the highest purity requirements for the solar sector. In addition, a complete material management system with batch tracking is supplied.

The entire factory is equipped with Alztec systems, from harvesting the silicon from the CVD reactor to final packaging of the polysilicon ready for sale.

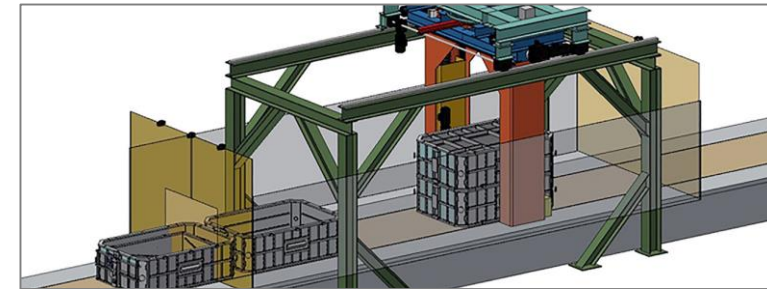
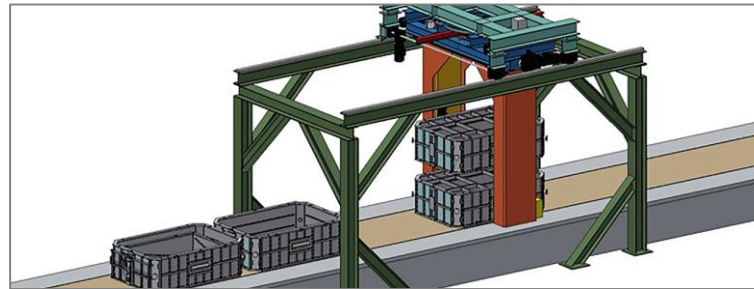
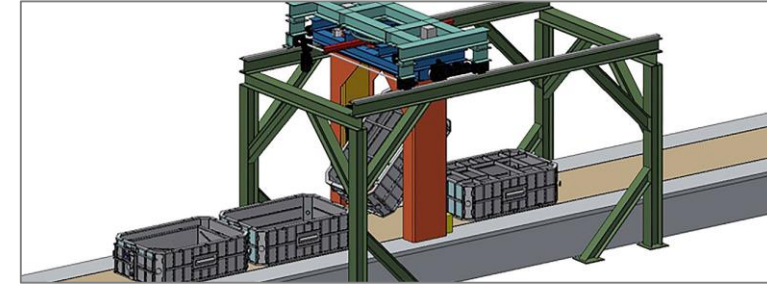
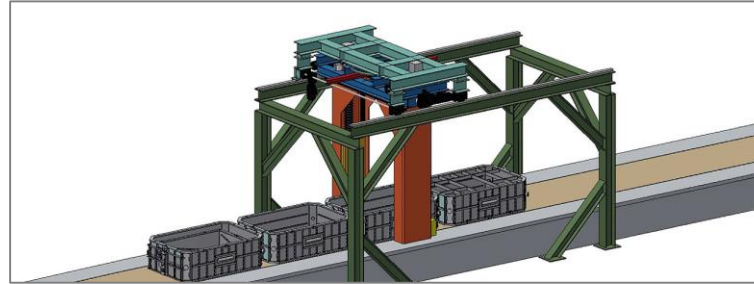
Various processing steps with transport and storage of the silicon rods as well as crushing, sorting, transport and storage of the silicon chunks are implemented.

Alztec also perfectly mastered the challenge of international coordination of the project with a wide variety of requirements such as customs clearance, work permits, cooperation with local companies and authorities, etc.

## Example

Lifting-turning-setting device for molds up to 8 tons

We bring your molds together.



### Facts & figures

Capacity: 10 molds/hour

Alztec Team:

1 EE in design

Essentially planned components:

- 1 base frame
- 1 drive axle with rack and pinion drive
- 1 rotary axis with toothed ball slewing ring
- 2 gripper infeed with trapezoidal threaded spindle
- 2 lifting drive with trapezoidal threaded spindle
- 2 swivel axes with swivel drive
- 1 safety technology

### The task

Handling

The customer needs a concept for joining molds. On an existing conveyor line, the upper mold must be turned and then placed on the lower mold.

The space conditions are very tight and the process must be carried out without personnel if possible.

### The solution

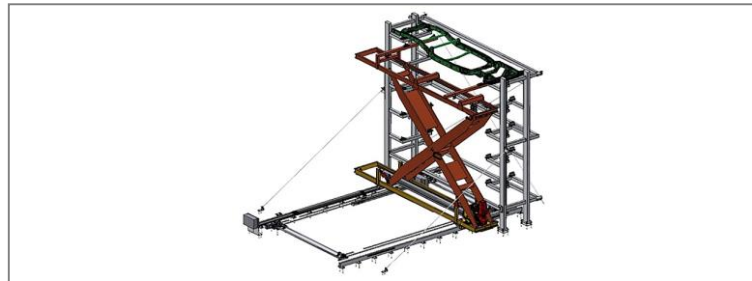
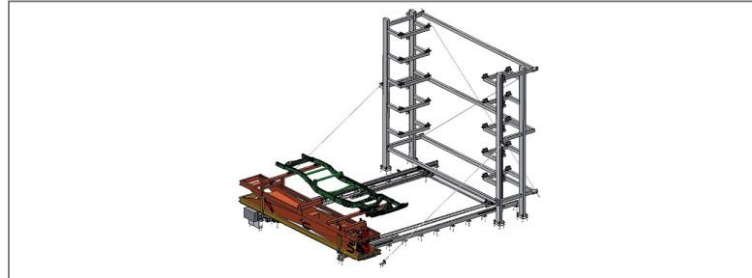
The developed concept resulted in a handling module with the following functions/work steps:

- Various sensors are used to determine the position and orientation of the upper part of the casting mold.
- With the data, the drive axle moves to the correct position and turns the gripper parallel to the mold.
- Now both gripper jaws move independently inwards and stop on resistance of the mold.
- Two synchronized lifting spindles lift the mold and rotate it 180° with two synchronized swivel drives.
- The position and orientation of the lower part of the mold is determined by sensors.
- Using the data, the drive axis moves the upper part of the mold to the correct position and rotates it parallel to the lower part of the mold.
- The two synchronized lifting spindles reduce the height of the upper part of the casting mold until it rests on the lower part of the casting mold.
- When the lifting spindle is released, the stroke is stopped and the two gripper jaws move outwards.
- Safety is ensured with surface scanners.

## Example

### Buffer system for ladder frames of off-road vehicles

Almost weightlessly your products fly into the warehouse.



## Facts & figures

Capacity: 12 ladder-frames/hour

Alztec Team:

1 EE in design

Essentially planned components:

1 drive axle with toothed belt drive

1 scissor lift with push chain

1 rack with 5 buffer places

## The task

Handling

Storage

The customer requires a concept and design for two space-saving FIFO storage units for ladder frames of off-road vehicles. The storage should be able to buffer five frames. The takeover and handover is carried out to an on-site overhead conveyor system. The protection technology (protective fence and access protection) is in the scope of the customer.

## The solution

The developed concept and its design resulted in a handling module with the following functions:

- Rail-mounted trolley with toothed belt drive for moving the ladder frames.
- Scissor lift system with a push chain for lifting and lowering the ladder frames. The supports on the lifting system are designed cantilevered so that the frames can be moved into a rack.
- By buffering the ladder frames in a rack, each frame can be accessed.
- The driving and lifting positions are determined by a laser distance measuring system.
- For safe and gentle transport and storage, the plastic holders were developed in close cooperation with the customer.

## WE ARE ALZTEC!

We love what we do!  
We have mastered the skills!  
We all give our utmost!  
We are getting better and better!  
We believe in helping each other!  
We have fun working together!  
We grow along with our challenges!  
We offer our customers more than they expect!  
We treat each other with respect and fairness!  
We act with respect and appreciation towards other people and the environment!  
We place paramount importance on workplace safety and the protection of our employees' health!



### START WITH WHY

“Why do we do what we do?”

Many companies know what they do. And how they do it. We know that, too. But have we asked, do we understand the WHY?

What so motivates us to do our best for you? Our WHY is our passion and enthusiasm to make the possible come true. For you and for your success; for your processes; for your benefit.”

Herbert Sommer, Stefan Daumoser, Markus Albisser, Reinhard Heindl  
Management

>> Simon Sinek, Start with why

# ALZTEC

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