





### 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.



### Narrow-aisle stacker crane with control room

Personnel safely to the storage location



### Facts and figures

Capacity: 240 kg payload

#### Alztec team:

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

#### Main components:

1 stacker crane with control room

### The task

#### Storage

Bringing a storage system from 1969 up to the latest state of the art with a new narrow-aisle stacker crane with control room and new safety technology.

### The solution

Alztec develops a new stacker crane that fits exactly into the narrow aisle of the warehouse. Attention is paid to optimum operation under the highest safety standards. The stacker crane is driven by a three-phase geared motor for longitudinal movement. The lifting movement takes place via a hydraulic cylinder with deflection. A safety catch brake is also integrated. The operator station is accessible from the front through a hinged door and has a sliding window for small parts and a sliding door for large parts on both sides. The operator removes the parts from the warehouse through the openings. If the machine should fail (e.g. power failure), the operator can simply lower the machine via an emergency lowering device or descend via the emergency ladder.

Fully automatic rail loading

Load heavy loads precisely and easily









### Facts and figures

250 stacks/day Payload: 20 tons

#### Alztec team:

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

Main components:

1 self-loading railcar

#### 170 m rails

- 1 safety features & equipment
- 1 plant control 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 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.

Cross-plant material flow of vehicle bodies

**Rail instead of road** 









### Facts & figures Plant 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 modules for car bodies
- 50 / 90 storage slots for car bodies
- 0/30 m conveying tracks
- 1 / 1 plant control including visualization
- 1 / 1 storage management system
- 1 / 1 factory control linkage

### The task

Conveying Storage Loading Handling

In automobile plant A, complete car bodies for SUV's are produced. In plant B, these bodies are completed with engines, driveline and exhaust systems to constitute the finished vehicle. The bodies should be loaded in the proper sequence as efficiently as possible and be delivered from plant A to B.

### The solution

Car bodies are continuously transported from the production line in Plant A to the loading system. The interaction of the 3 stacking modules and 2 storage and retrieval units ensures both the correct loading sequence for the train and the intermediate storage for loading in the warehouse.

As soon as the train enters the station and is ready, the two loading cars start to load the waiting car bodies systematically and fully automatically into the train. Thanks to the concept of this loading system, the total output can be increased by 180 vehicles per day, bringing it to over 400 vehicles.

The heart of the system in plant B is the loading wagon, which weighs approx. 13 tons and ensures that the interim storage area is always full, so that the shunting and waiting times of the arriving trains are intercepted.

Another main task in this project is the separation of the car bodies and the subsequent stacking and return of the empty load carriers. This the Alztec engineers solve with the development of stacking and unstacking modules, as well as a corresponding conveyor system linkage in between.



Tool changing wagon up to 20 tons

Simply convert the presses



### Facts & figures

Capacity: 20 tons

Alztec Team: 2 EE in design 1 EE in assembly management

Main components: 1 tool changing wagon

### The Task

Handling

It should be possible to change press tools quickly, precisely and safely.

### The solution

The tools are removed in the tool warehouse from the storage location with the help of an indoor crane and placed on the tool changing wagon. The tool changing wagon moves the tool to the corresponding press on rails by pressing a dead man's button. Positioning in front of the press takes place automatically via inductive sensors. After the tool changing wagon is locked to the floor, the roller console extends. A linear chain pushes the tool into the tool holder of the press.

Once the tool is in position, first the linear chain and then the roller console moves back to the tool changing wagon. The locking mechanism can now be opened and the tool changing wagon can be moved into the park position.

### Lifting, rotating device for wind energy gears

Heavyweights turned efficiently







### 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 units
- 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. From the torque arm to the partially assembled gearbox to the wind turbine gearbox, these parts weighing up to 32 tons have to be turned 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 ball bearing slewing ring. The lifting and turning devices are automatically moved together on a rail to accommodate the components. 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 enabling button. If the operator releases the button, the system stops.

Handling with conveying technology for dipcoating plant

Engine blocks on diving station



### Facts & figures

Capacity: 5.000 kg

#### Alztec Team:

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

#### Main components:

- 1 handling module
- 60 m conveying tracks
- 1 plant control inclusive visualization

### The task

Handling Conveying

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

### The solution

The engine blocks are transported using conventional roller conveyors and a distribution trolley. The handling developed specially for this application forms the central element of the system. While the engine block is transported to the grappler on the left-hand side by the roller conveyor, the right-hand grappler moves up to the engine block and clamps it between the holders. The handling system lifts the motor and moves it over the painting basin. After the rotating function starts, the engine block is moved into the painting basin. After a preset time, the handling unit moves up again and allows the engine block to drip over the paint tank for a programmed time. The engine block is then transferred back to the conveyor system, which transports it out for removal.

Conveying equipment for a foundry

In perfect shape









### Facts & figures

Capacity: 360 pcs./day

#### Alztec Team:

4 EE in design

1 EE in assembly management

Main components:

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

### The task

Conveying Storage

A foundry needs a conveyor system for transporting the pallets with "jackets", which takes the pallets from the filling station with the casting molds and sand via the casting station to a cooling station for the demolding station.

### The solution

Solid roller conveyors are mainly responsible for transporting the pallets with jackets. The corner transfer units are designed with chain conveyors on a pneumatic lifting unit. The distribution of pallets with jackets into the cooling station, as well as larger cross sections, is realized by distribution cars. Height differences are implemented with chain hoist lifters. The core of the system is the jacket lifter with pallet tipper and integrated cleaning function. At this station, the sand is discharged into the vibrating chute below by lifting the jacket. During the lifting process, brushes reach the inside of the jacket and clean it of any sand adhering to it. Once the jacket is up, the pallet is tilted up by 90° so that the molds on it slide into the vibration chute. A rotating brush then cleans the pallet of adhering sand.

Compaction device up to 250 kN

Using high pressure









### Facts & figures

Capacity: 25 tons

#### Alztec Team:

3 EE in design 2 EE in assembly / commissioning

2 EE in electrics / control engineering

Main components: 1 compaction device

### The task

Handling

Aluminum packs (circular segments) are to be compacted into layers in a cylindrical container with a diameter of up to 3,500 mm and a length of 7,000 mm. The aim is to be able to install several levels in this container. The production parameters must be recorded using sensors.

### The solution

A machine is being developed that compacts several circular segments with a solid aluminum plate into a single layer. The diameter of the pressing plate can be variably adapted to the container diameter by means of circular segments. The pressing force can be adjusted up to a maximum of 250 kN and is recorded via load cells.

The height of the pressing device in relation to the container can also be adjusted hydraulically. The immersion depth of the compaction device can be up to 7,000 mm. The system runs on a rail system and can also be stowed in a sea freight container if necessary. The system can be adapted to any changes in requirements (e.g. higher compaction pressure or larger compaction diameter).

Automated medicine transport

Entry into the cleanroom









### 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 plant 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 shifting systems for longitudinal transport, each with three buffer spaces, and a wall shifting system for transverse transport are installed in the gray room. The rack trolleys are moved on their own rollers by pneumatic carriers operated by toothed belts.

The trolleys from the clean room can be fed onto two lines (line 1 full trolleys, line 2 empty trolleys). Depending on the operator's requirements at the loading/unloading point, a trolley is then transported to 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 here, 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 by means of an acoustic signal.

Connecting conveyor systems

**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 EE in design50 EE in assembly / commissioning25 EE in electrics / control engineering

Main components:

- 380 m 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 plant 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 base pallets must be handled.

### The solution

An automatic truck unloading system brings the stacks of 7 on a base pallet to a frame storage unit. There, the load carriers are restacked by type 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 removed from the warehouse and transported to the module handlings via the conveyor system. 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, merged into stacks of 4 and transported to the warehouse. If required, stacks of 4 batteries are removed from storage, restacked into stacks of 7 and automatically loaded onto the truck.

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 m roller conveyors

- 12 corner conveyors
- 2 turning devices
- 2 lifting devices
- 1 handling device

### The task

Conveying

In the explosion-proof area, load carriers shall be conveyed from one production area to the next.

The solution

By using the right material pairings, chain conveyors, rotary tables, corner conveyors and lifting devices are developed which by their operation cannot generate any ignition spark.

The systems run through several rooms (fire protection zones), which are protected by fire protection gates. In the production room, the handling gantry removes the product from the load carrier and places it in the processing station. The gantry then removes the component from the station and places it back in the load carrier. The lifting unit with pneumatic manual actuation is developed and installed so that the system can also be accessed in the inner area for maintenance work and supplied with material by hand pallet truck. Alztec is responsible for the complete layout planning, mechanical design, manufacture and installation of the components. The customer is responsible for the electrics and control technology.

Heavy load conveyor system 8 tons

Load carriers precisely 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 a paint line, the Alztec customer requires conveyor technology that transports load carriers with heavy components endlessly in a rectangle.

### The solution

Robust chain conveyor technology with two strands is selected for this purpose. A centrally arranged rail guides the load carriers on the conveyor system.

To protect against painting dust, the sensor system is positioned in the middle of the chain conveyor so that it is 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 end of the painting line there are distribution trolleys which transfer the load carriers to and from the parallel return line. Alztec develops the design of the complete conveyor technology and the maintenance aisles, as well as their installation at the end customer. The general contractor is responsible for the installation and commissioning of the electrification and control technology.



Heavy load conveyor technology 14 tons

**Conveyors in all colors** 



### Facts & figures

Capacity: 14 tons

Alztec Team: 1 EE in design 1 EE in assembly / commissioning

Main components: 5 chain conveyors

### The task

Conveying

Appropriate conveyor technology is required for feeding and removing sheet metal parts into a flame cutting system.

### The solution

Thanks to the variety of special sheet metal parts, our engineering team works closely with the customer to design a seven-track chain conveyor. The customer's very interesting color scheme provides the icing on the cake for the project. After the test run in our factory, the chain conveyors are installed, electrified and put into operation by the end customer.



**Bridge roads** 



### Facts & figures

Capacity: 720 pcs./day

### Alztec Team:

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

### Main components:

- 60 m conveying tracks
- 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 more and more 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 is installed, each of which can hold two pallets. The transfer points are designed in such a way that they can be operated by forklifts and hand pallet trucks.

The control technology is designed so that it can transport the products from one side to the other and also convey the empties from dispatch back to the production.

### Heavy load conveying 16 tons

**Gentle giants** 



### Facts & figures

Capacity: 400 pcs./day

Alztec Team: 2 EE in design 3 EE in assembly / commissioning

Main components: 12 m 6-track chain conveyors 30 m roller conveyors 1 hydraulic lifting gear

### The task

Conveying

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

### The solution

The sizes and weights of the stacks of sheet metal blanks present the Alztec engineers with the challenge that the conveyor technology must be designed in such a way that the stacks can be transported without disruption under the weight and deflection. Chain conveyor technology with six strands driven on both sides is designed for longitudinal transportation. The cross transport is implemented by roller conveyors with closer divisions and multiple support rolls below the carrying rolls. The corner conveyor includes a hydraulic lifting unit that can lift and lower the chain conveyors with six synchronized hydraulic cylinders.

Alztec supplies and installs the conveyor technology on site at the end customer's premises. The electrical installation and control technology is the responsibility of the sheet metal production manufacturer.

Conveying technology for solar modules (steel design)

Stacking made easy



### Facts & figures

Capacity: 1.440 pcs./day

Alztec Team: 4 EE in design

4 EE in assembly / commissioning

Main components:

137 toothed belt conveyors

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

### The task

Conveying

The production of a solar module requires many manufacturing steps. The task is to develop a universal conveyor system that can be used to transport glass and solar panels 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 system. The individual production cells are approached via corner transfer units and rotary tables. Centering and lifting tables ensure that the glass and solar panels are positioned correctly during production. Special FILO (first in - last out) buffers are developed and installed upstream so that production figures can be kept high in the event of delays in a production cell and the system is therefore able to breathe. Alztec is "only" responsible for the construction and production of the conveyor technology, as well as its mechanical and electrical installation. A general contractor is responsible for the production cells and the complete process control.

Box conveyor technology

The right box always in the right place









### Facts & figures

Capacity: 720 pcs./day

#### Alztec Team:

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

#### Main components:

- 160 m conveying tracks
- 12 turn tables
- 4 lifters
- 4 transfer units
- 1 tilting unit
- 2 turning stations
- 1 cover handling

### The task

### Conveying

In an electroplating plant, the untreated parts are delivered by the customer in Bito-boxes. At the plant, these have to be transferred to special baskets so that they can then run through various immersion baths. After galvanic treatment, the parts have to be put back into the cleaned Bito-boxes.

### The solution

Chain conveyors are used throughout to transport the Bito-boxes and baskets. All changes of direction in the system are realized with turntables. The transfer units include a gripper for picking up the boxes or baskets. There is also a lifting station with a cross-travel unit for transferring over the hopper. There is also a turning unit that pours the parts into the hopper, which then guides the parts into the baskets or crates. Alztec designs the complete conveyor technology including turntables, lifters, tilting stations, turning stations and lid handling. Once the components have been manufactured by renowned production companies, Alztec installs the entire mechanical system at the end customer's premises. The electrics and control technology are carried out by a general contractor.

Conveying means for solar panels (aluminum design)

Handling made easy









### Facts & figures

Capacity: 1.440 pcs./day

Alztec Team:

4 EE in design 2 EE in assembly / commissioning

Main components:

- 53 timing belt conveyors
- 8 eccentric lifting gears
- 3 centering devices
- 2 rotary tables
- 4 mounting devices
- 2 tilting tables

### The task

Conveying

A conveying technology is required for the production of solar panels, which transports the semi-finished panels from one manufacturing position to the next.

### The solution

Toothed belt conveyors are developed for gentle transportation, which can transport the glass to the finished solar panel. Crossings and junctions are realized with corner transfer units or turntables, depending on the required position of the product. For the transfer of the glass or panels to the robots, set-up devices with suction technology are designed and installed at several points in the system. Quality control at the end of the production line is carried out by a worker. For this application, the solar panel is set up automatically and pushed onto a non-driven roller conveyor, where the worker can then carry out the inspection. After the inspection, the panel is automatically set down again and fed into the packaging. Alztec is suppling and installing the complete mechanical and electrical installation for the conveyor technology. The plant control system was implemented by the general contractor.

**Packaging plant** 

Everything from a single source







### Facts & figures

Capacity: 720 pcs./day

### Alztec Team:

- 2 EE in design
- 3 EE in assembly / commissioning
- 2 EE in electrics / 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 inclusive visualization

### The task

Conveying

Cartons filled with product and placed on CP pallets must be strapped, stretch-wrapped and labeled for shipping.

### The solution

Roller conveyors are used almost exclusively for transporting the cartons on pallets. These have the advantage that the pallet can be easily pushed into the correct position during strapping and stretching. The strapping machine, the stretch wrapper and the labeler are selected by our technicians and integrated into the system in such a way that the functions are perfectly guaranteed. The components have their own control systems, which communicate with the head control system and ensure correct operation.

Heavy load applications

Wireless access to the channels



### Facts & figures

Capacity: 500 stacks/day Payload: 2.5 tons

#### Alztec team:

- 4 EE in design
- 16 EE in assembly / commissioning
- 8 EE in electrical / control engineering

#### Main components:

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

### The task

Conveying Storage

Battery modules and vehicle batteries as well as basic pallets and empties are to be stored at two locations. It should be possible to load and unload products at the front and rear of both warehouses. The stacking weights range up to 2.5 tons.

### The solution

To ensure a high level of redundancy, both warehouses will be equipped with two aisles each. A long and narrow warehouse are designed as a single-deep construction. Both stacker cranes are equipped with telescopic arms. The second warehouse with a square basic shape is designed with two aisles and multiple-deep shelves. The lifting carriage on the stacker crane is equipped with a charging station so that the satellite can move wirelessly into the channels. Both types of stacker crane can transport loads of up to 2.5 tons.

Automatic 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 m conveyors
- 900 load carriers
- 48 commissioning gates
- 1 plant 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 (from unmixed containers) in a specific sequence 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 using a staple-module. Given the large number of containers, it is a challenge to grip them all securely and turn them so that the opening later faces the worker. The load carrier with the 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 in 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 trolley and returned to the warehouse via a lifter and stacker crane. There, the containers wait to be called off to the assembly line, where they are then fed, emptied and returned. In order to cover the high cycle time, a total of 8 stacker cranes are used on 3 tracks, each 150 m long.

Dynamic commissioning

Precise to the second at 424 storage locations









### 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 m shuttle high-level tracks
  - 6 shuttles
- 150 m conveying tracks
  - 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 required parts, a fully automated system is needed to ensure that the workers are always provided with the appropriate components at 424 variable storage locations so that they can then pre-pick them.

### 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 is the speed and the reliability of the rack servicing. In order to meet the high speed requirements of 4.5 m/s with a load capacity of 1 ton, the stacker crane is designed specifically for this application. To ensure the required reliability, it is equipped with redundant motors.

Automatic storage system for small load carrier containers

Sorting on a large scale



### 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 m conveying tracks

- 1 plant control including visualization
- 1 warehouse management system

### The task

Conveying Storage Handling

An automatic storage system is to be set up in an automotive plant for the pre-sequencing of a production line for gearbox assembly. The aim is fully automatic provision and collection by the tugger train.

### The solution

In addition to the usual requirements that an automatic warehouse must meet, the challenge here is to develop a stacking/destacking module that optimizes the incoming stacks in terms of storage technology before storage and sorts the separated KLT containers mixed by production into stacks ready for collection. This and the subsequent connection of an additional rack aisle and two robot cells for loading a washing machine were successfully implemented by the Alztec engineers.

Packaging plant for granular silicon

Highly compact with vacuum





### 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 systems
- 80 m bag conveyor technology
- 1 clean room lock
- 2 robot cells
- 1 box lifter / closing
- 30 m box conveying technology
- 5 labelings
- 25 m pallet conveying technology
- 1 stretch binder
- 1 plant control including visualization
- 1 material management system

### The task

Conveying Handling

A Chinese-American joint venture company is looking for a special solution for compact automated packaging of granular silicon. The silicon granules is supplied through a pipeline with a special coating and is to be packed in bags of 10kg (±10g) with a vacuum of 200 mbar. At the end of the system, fully automatically packed cartons are to be dispensed on weatherproof 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 realizes 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-packed, both bags are labeled and, after weight and metal checks, packed into cartons by a robot. The cartons are then stacked on a pallet by another robot. The filled pallet is packaged weatherproof and can be removed at the end of the line using a forklift.

Special challenges are the coating of parts in contact with the product with silicon nitride and the high negative pressure in the bag with dusty material, which is solved by Alztec's know-how.

### Processing plant for polysilicon

Parts per trillion – highest purity – unique 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 m basket conveying
- 300 etching baskets
- 1 etching plant
- 1 drying plant
- 3 bag packaging plants
- 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 plant will be used to process 4,000 tons of high-purity polysilicon for further use in the electronics industry. The customer material is brought to the system in bars of approx. 70 kg each. At the end, the crushed and cleaned polysilicon is to come out of the plant fully automatically in bags of 5 kg ( $\pm$ 50 g) each. Additional requirements include high purity < 300 pptw and precise material tracking according to SEMI criteria.

### The solution

Alztec plans and supplies this revolutionary system including a material management system. The high purity can be achieved by using special materials and patented processes. The polysilicon is crushed using noncontact high-voltage pulse crushing at 200 KV and 5 Hz, which already guarantees a high level of polysilicon purity at this stage. In the next step, the crushed material is divided into different fractions and filled into etching baskets using a specially developed wet screening system. To ensure maximum purity, particles are removed from the surface of the silicon by wet-chemical processes using an etching system linked to conveyor technology. Finally, the high-purity material is dried and packaged in PE double bags.

Automation and material flow for a polysilicon factory

Worldwide implementation









### Facts & figures

Capacity: 8,000 tons/year

#### Alztec team:

- 8 EE in design
- 16 EE in assembly / commissioning
- 8 EE in electrics / control engineering

Main components:

- 2 silicon harvesting plants
- 330 containers for silicon rods
- 1 high-bay warehouse for containers 4 crushers / 2 extraction systems
- 180 m handling sections for boxes
- 1 high-bay warehouse for boxes
- 6 packaging plants
- 110 m handling sections for bags
- 1 final packaging system
- 4 plant controls including visualization
- 1 material management system

### The task

Conveying Storage Handling

A factory for the production of high-purity polysilicon for the solar industry is being planned in the Middle East. In order to ensure the highest quality despite the lack of local specialists, this factory is mainly planned to be automated. Previous processing in other factories worldwide has been relatively manual, so that new developments and concepts are necessary 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 is 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.



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

**Bringing 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 feeders with trapezoidal threaded spindle
- 2 lifting drives with trapezoidal threaded spindle
- 2 swivel axes with swivel drive
- 1 safety technology

### The task

Handling

The customer requires a concept for joining casting molds. The upper mold must be turned on an existing conveyor line and then placed on the lower mold. Space is very limited and the process must take place without personnel if possible.

### The solution

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

- Various sensors determine the position and location of the upper part of the mold.
- Using this 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 when they meet resistance from the mold.
- Two synchronized lifting spindles lift the mold and rotate it 180° using two synchronized swivel drives.
- The position and location of the lower part of the mold is determined using sensors.
- Using this 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 lower the upper part of the mold until it rests on the lower part of the mold.
- When the lifting spindle is released, the stroke is stopped and the two gripper jaws move outwards.
- Safety is ensured by surface scanners.



### Facts & figures

Capacity: 12 ladder-fames/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 from off-road vehicles. The storage system should be able to buffer five frames. Transfer to and from a ceiling conveyor system provided by the customer is required. The protection technology (protective fence and access protection) is in the responsibility of the customer.

### The solution

The concept developed 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 benefits."

Herbert Sommer, Markus Albisser, Reinhard Heindl Management

>> Simon Sinek, Start with why

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