# MATERIAL HANDLING SYSTEMS IN THE TIRE INDUSTRY

TRANSSYSTEM
Moving industries forward

# Moving industries forward since 1991

**TRANSSYSTEM** – a Polish company specializing in the provision of technological handling systems and storage solutions for the tire industry, serving European, American and global markets.

Together with our team of highly qualified automation specialists: mechanical, electrical and control software engineers & technicians, we provide **turnkey solutions** for tire, intralogistics and automotive industries. This includes creating a **concept**, **simulation design**, **optimization** and **manufacturing** of technological systems such as **tire handling systems**, **automated intralogistics systems** and **steel structures**.

Our **customer-tailored solutions** are delivered with full **installation**, **commissioning**, staff **training**, **start-up assistance**, as well as **service support** and **spare parts delivery**, ensuring **complete customer satisfaction** for every project.

Over the years, we have gained extensive experience by completing projects in **greenfield** and **brownfield** factories in the areas of:

- **Raw Material Pallets** Handling Systems
- **Green Tire** Handling Systems
- **Cured Tire** Handling Systems
- **Final Finished Tire** Handling Systems
- **Robot Tire Palletizing** Systems
- **Warehouse Pallets** Handling and Storing Systems
- **High-Bay** Storages

Fueled by **passion**, **dedication**, and **expertise**, our team delivers **individually tailored solutions** with precise planning and flawless execution. From **engineering** through the **manufacturing** to **assembly**, everything is handled at our **HQ plant** - **full control, every step of the way**.

**We support you from day one – even before RFQ, with:**

- Expert **consultancy** in Material Handling Systems
- Concept & layout **development**
- Feasibility studies & process **analysis**
- 3D **simulation** & solution **optimization**

# SOLUTIONS YOU CAN TRUST

The **TRANSSYSTEM Team** is ready to meet your project needs, from **design** to **commissioning**

## Explore our range of key equipment and tire handling solutions:

- Conveyors: driven and non-driven roller conveyors, chain conveyors, belt conveyors
- Cross transfers: e.g.: **TS-MABS** (**T**RANS**S**YSTEM – **M**odular **A**ctivated **B**elt **S**orter); POP-UP
- Lifting tables
- Elevators
- Wrapping machines
- Palletizers and depalletizers
- AGVs
- Sorting devices
- Turntables
- Shuttles
- Automated high-bay warehouses
- Steel structures and steel infrastructure inside the production and warehouse buildings

## Why TRANSSYSTEM?

- **30+ years** of industry expertise
- **70+ projects** currently in execution
- **400+ highly skilled professionals**, including:
  - **100** experienced **Engineers**
  - **80** Certified **Welders**
  - **20** IPMA-certified **Project Managers**
- Over **200,000+ tons** of equipment delivered
- Projects successfully completed in **50+ countries worldwide**
- **Three Tire Business Units** dedicated to the tire industry
- **Tailor-made solutions** designed around customer needs
- Trusted by leading global **OEMs** and **Tier-1 suppliers**
- Reliable, field-proven **products** and **solutions**
- **Highest quality materials** & globally recognized **components**
- Comprehensive engineering **support** and **after-sales service**

We are available to answer any questions and would be glad to arrange a meeting, a site visit, or an online consultation.

**Moving your business forward. Together.**

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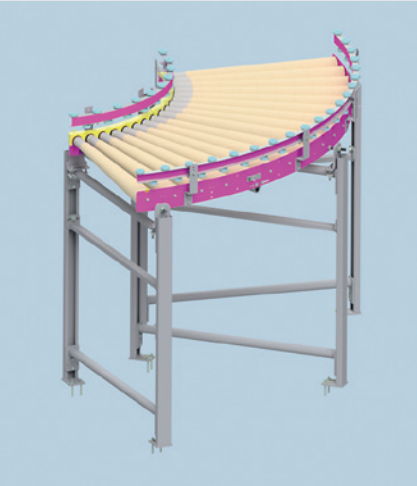
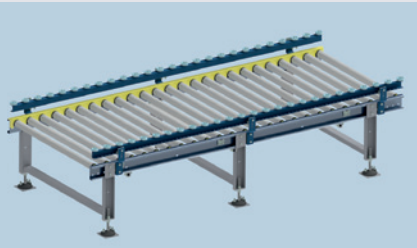
# ROLLER CONVEYORS



## Accumulating Roller Conveyor – Curve

The **Curved Roller Conveyor** is used for transferring tires with mechanical drive system. The handled products move along the conveyor thanks to the motorized conical roller, which drives the passive rollers through belts. The device consists of a steel frame, drive rollers, passive rollers, and belts. Additionally, the conveyor is equipped with a side guide composed of a steel profile and guide rollers. This solution ensures that the moved item is securely held and prevents it from falling off. To maintain safety, access to the drive belts is secured with a protective cover.



## Accumulating Roller Conveyor

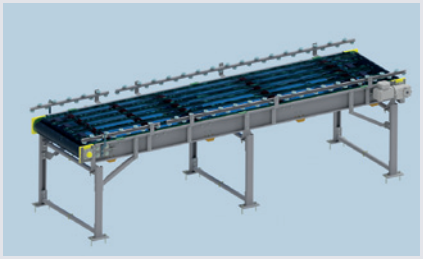
The **Roller Conveyor** is used for moving tires with mechanical drive system. The handled items move along the conveyor thanks to a powered roller, which drives the passive rollers through belts. The system includes a steel frame, drive rollers, passive rollers, and belts. Additionally, the conveyor is equipped with a side guide composed of a steel profile and guide rollers. This design ensures that the moved item is securely held and prevents it from falling off. For safety purposes, access to the drive belts is protected by a cover.

## Gravity Roller Conveyor – Straight

The **Gravity Conveyor** moves tires using only gravity force. Tires move down across the surface of the conveyor rollers under their own weight. The device consists of a steel frame and passive rollers. Additionally, the conveyor is equipped with a side guide made of a steel profile and guide rollers. This design ensures that the handled item is securely held and prevents it from falling off.

## Gravity Roller Conveyor – Curve

The **Curved Gravity Conveyor** provides a reliable, energy-free solution for smooth and controlled tire movement along curved paths. Tires move down across the surface of the conveyor conical rollers under their own weight. The device consists of a steel frame and passive rollers. Additionally, the conveyor is equipped with a side guide made of steel profile and guide rollers. This design ensures that the moved item is securely held and prevents it from falling off.

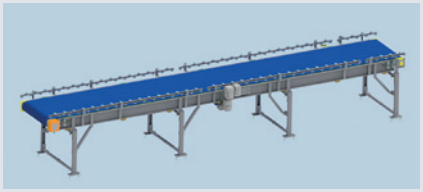


## Modular Belt Conveyors

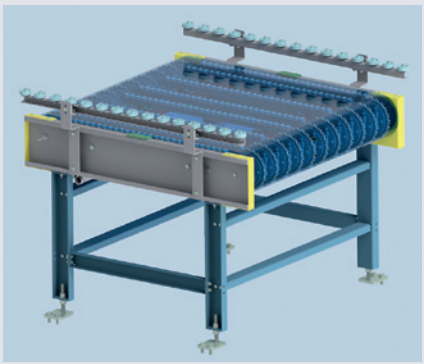
**Modular Belt Conveyors** ensure efficient handling of tires in a wide range of sizes and types. Ideal for use in Green Tires Handling Systems, Cured Tires Handling Systems and Final Finish Tires Handling System areas, this conveyor type delivers reliable performance throughout all stages of the process.

**Types produced:**

1. **Straight Modular Belt Conveyors**
2. **Inclined/Declined Modular Belt Conveyors**
3. **Curved Belt Conveyor**

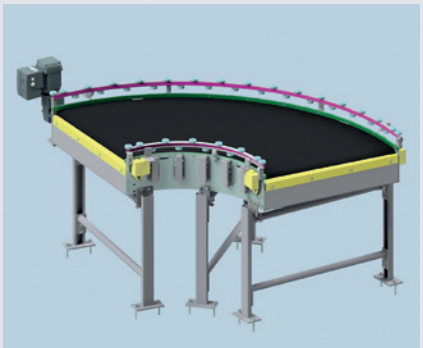


## Straight Modular Belt Conveyors



**Straight Belt Conveyors** are devices used for transfer tires in a straight direction. Depending on the conveyor length, its main components include: the drive segment, the return segment, the intermediate segment, the conveyor belt, side guides, and supports. The drive segment consists of a gear motor, drive shaft, sprockets, and a frame. The conveyor drive can be positioned at the end (exit) of the conveyor for unidirectional transfer, or in the middle of the conveyor when transfer occurs in both directions. This segment, as well as the return segment, also includes guiding and supporting components for the belt. The return segment consists of a return shaft, sprockets, and a frame made of carbon steel. For conveyors of significant length, an intermediate segment is required, which consists of a steel frame along with guiding and supporting components for the belt. A Modular Belt Conveyor is primarily used for tire handling. To prevent the product from falling off the conveyor, side guides are installed. Rollers are mounted on a steel channel, which can be configured in various arrangements depending on the product parameters. The completed conveyor is placed on steel supports.

A new solution in our company is a **Modular Belt Conveyor** driven by **an electric roller**. We use this solution for conveyors with a maximum length of L = 1500 mm. This type of conveyor, similar to a conveyor driven by a gear motor, includes a drive segment, a return segment, a frame, belt guiding components, side guides, and supports.



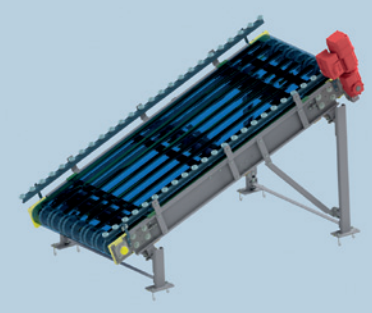
## Belt Conveyor - Curve

**Curved Belt Conveyors** are a special type of belt conveyors used for tire handling. These devices consist of a drive and take-up unit, modular belt, frame, side guides, and supports. The shaft and corresponding gears are part of both the take-up and drive units. The drive unit also includes a gearmotor, which is installed at the outlet of the conveyor, regardless of whether the movement occurs in one or both directions. The components that guide and support the belt are mounted on the steel frame of the curve. Side guides, which prevent tires from falling off the conveyor, are installed on the frame in various configurations. Belt curves can be designed for different angular ranges: 45°, 60°, 90°, and 180°, with a radius of 600 or 1000 mm.

## Inclined / Declined Belt Conveyors

**Inclined and Declined Belt Conveyors** form another group of belt conveyors designed for moving tires to between different levels. These conveyors are built using the same components as flat conveyors: drive and take-up unit, conveyor belt, side guides, and supports. In this type of equipment, a special modular belt with rubber elements is used.

Depending on the handling system requirements and tire specifications, the inclined/declined conveyor may also include a short, straight segment that ensures smooth product transfer along its surface. The maximum incline angle is 30 degrees.

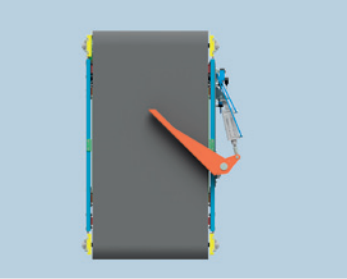


# PNEUMATIC DEVICES

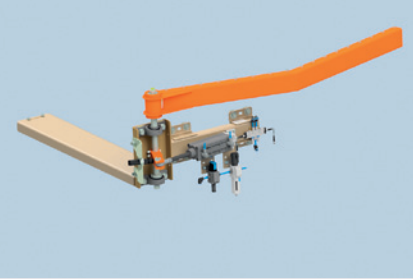
Pneumatic devices are used for positioning, stopping, slowing down, dosing, and redirecting of tires during handling. These devices are installed on Modular Belt Conveyors with transverse rollers to ensure proper tire positioning and direction change. Pneumatic devices for stopping, slowing down, and dosing tires are mounted on Gravity Roller Conveyors.

## Sorting Devices

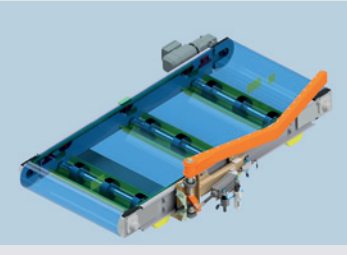
**Sorting Arm** and **Pusher** are used for changing the direction of the transferred tires.



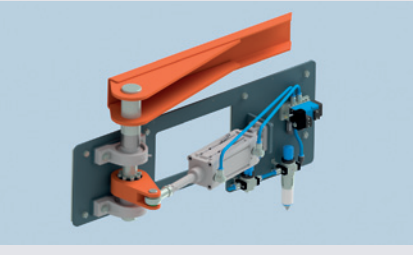
Pusher on the conveyor



Sorting Arm



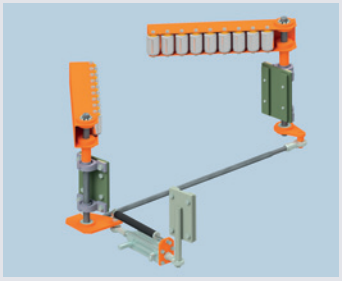
Sorting arm on the conveyor



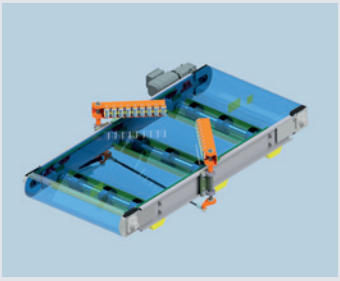
Pusher

# Centering and Aligning Devices

**Centering Arms** are used to align transferred tires with the conveyor axis.



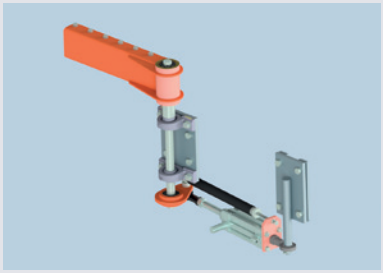
Centering Arms



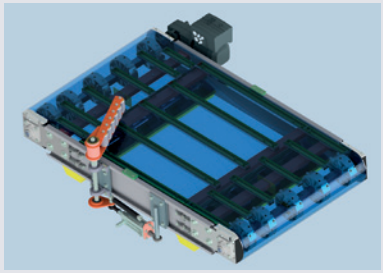
Centering Arms on the conveyor

Centering with modular belt

**Aligning Arm** is used for aligning the tires on one side of the conveyor.

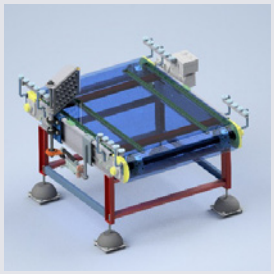


Aligning Arm



Aligning Arm on belt conveyor

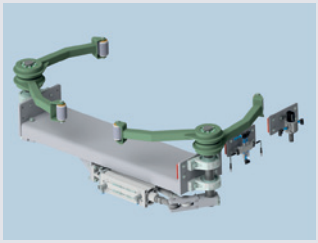
Aligning Arm with modular belt



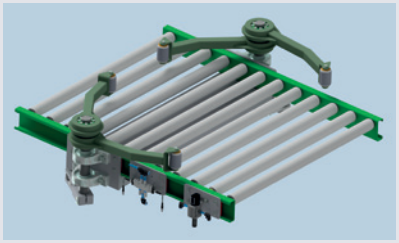
Aligning Arm with modular belt on conveyor

## Dosing Devices

The **Singulator/Blocker** is used to separate tires on conveyors.



Singulator/ Blockade

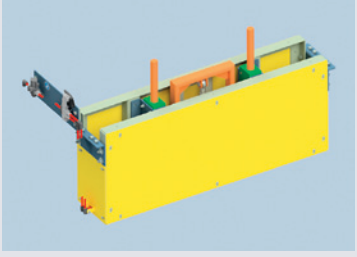


Singulator/ Blockade on the conveyor

The **Pin Stopper** and **Vertical Pin Stopper** are used for stopping tires on conveyors. The locks differ in design, but their operating principle is the same. Moving the locking element above the conveying level stopps the tire.

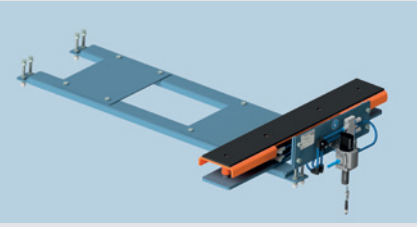
Pin Stopper

Pin Stopper on the conveyor

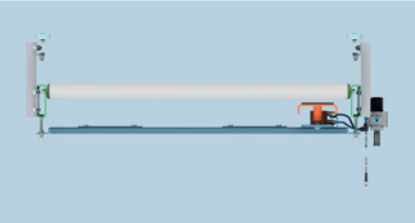


Vertical Pin Stopper

The **Breaking Field** is used to stop tires by immobilizing selected conveyor rollers.



Breaking Field

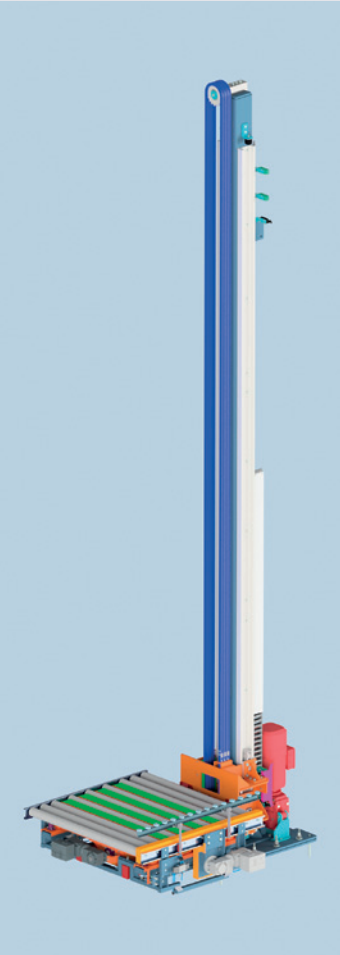


Breaking Field on the conveyor

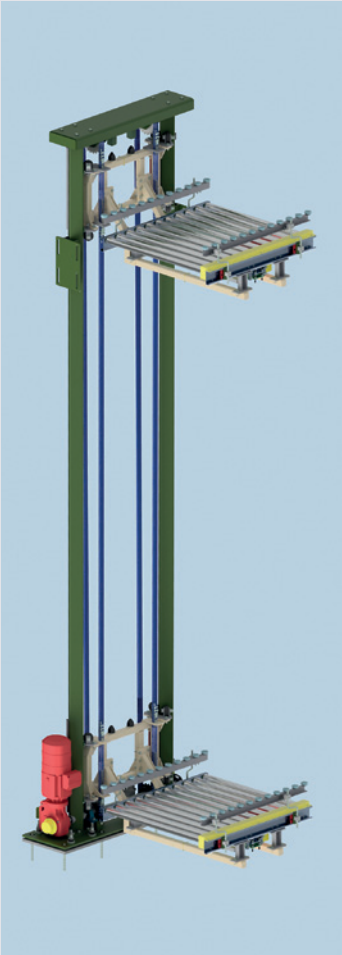
# ELEVATORS

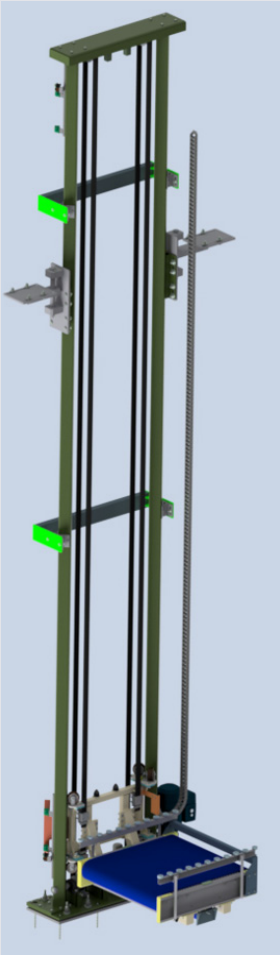
## Elevators

The **Elevator** is used for moving tires between different conveyor levels. The main structural components of the elevator are columns (for a two-column and four-column system) or a single column (for a single-column system), along with conveyor of any type (roller, belt or even POP-UP) mounted on a trolley. The trolley is driven by a gearmotor. The power from the gearmotor is transmitted with a chain or a belt.

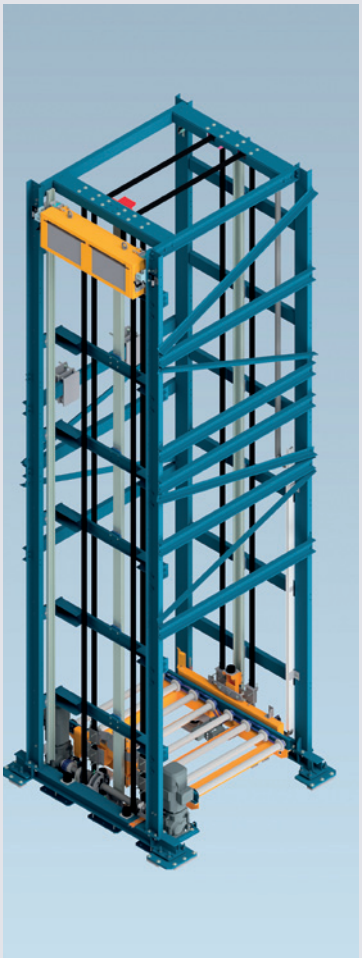


Single – post Elevator

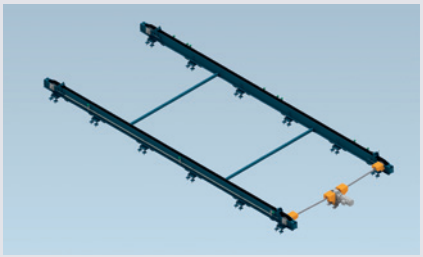




Two – post Elevator (different design versions)

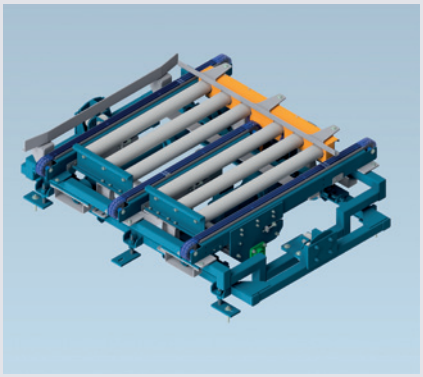


Four – post Elevator



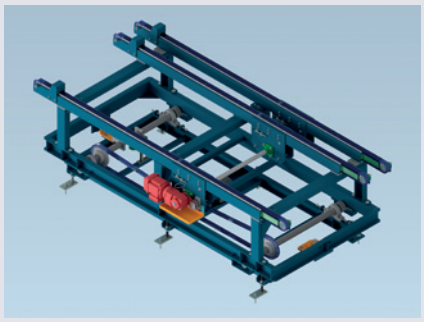
## Modular Pallet Conveyor

A modular conveyor is a device used for handling ting pallets. Its operation is based on a motor drive connected to a gearbox that ensures the appropriate force and movement speed. The motion is transmitted through shafts, chains, and modular belts. To reduce friction between components, sliding profiles are used, which helps minimize power consumption. The conveyor's structure includes a drive system, a shaft with gears, a tensioning system, sliding profiles, load-bearing profiles, and supports.



## Angular Transfer System

Chain transfer, also known as angular transfer, is a module equipped with three independent drives: for the rollers, chain, and lifting mechanisms. Its function is to change the direction of load movement by 90 degrees. In this module, the chain segment is lifted. The entire structure consists of a steel frame, chains, rollers, a shaft, and geared motors.

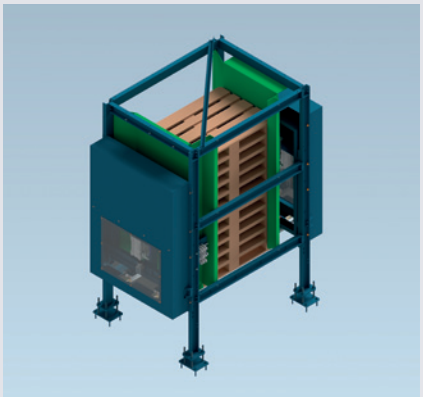


## Eccentric Table

The eccentric table is used to handling products and transfer them to a neighboring device by adjusting the height. Horizontal and vertical movements are carried out using chains powered by geared motors. The device is equipped with covers and bumpers to prevent products from falling.

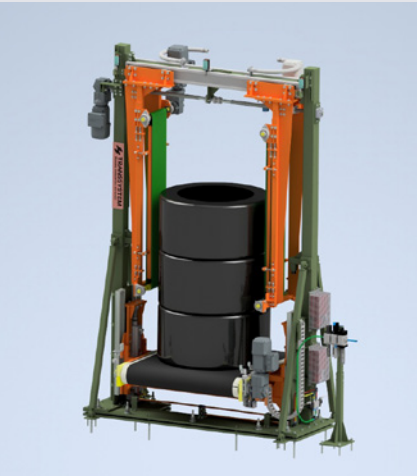
## Pallet trolley – „Shuttle"

A shuttle is a device used for the linear handling of products by movement on rails. Its structure consists of a module moving on tracks and a module containing a chain or roller conveyor that allows the handling of materials corresponding to the size of euro pallets and industrial pallets. The shuttle can be divided into longitudinal and transverse types, depending on the arrangement of the modules relative to each other. The shuttle is used as an element of a handling line, cooperating with other types of conveyors, and is used in places where the communication route must be maintained.



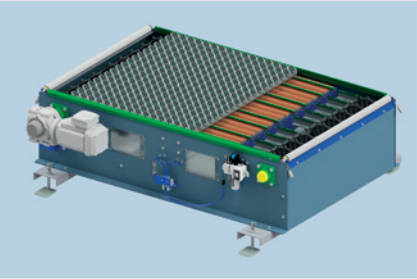
## Pallet Stacker/ Destacker

The stacker is used to automatically create stacks with a pallet, allowing them to be shared or transferred to the device. The destacker separates stacks of pallets into units that can be further used in production or logistics processes. The device works above a chain conveyor, which is used to move pallets. Movement is performed by two carriages using pneumatic actuators. Pallet holding is possible due to four actuators mounted horizontally, which can be used to set the grippers in motion. The actuators cooperate with control systems. The device is equipped with side covers and bumpers that prevent pallets from falling down.



## Tire Stacker/ Destacker

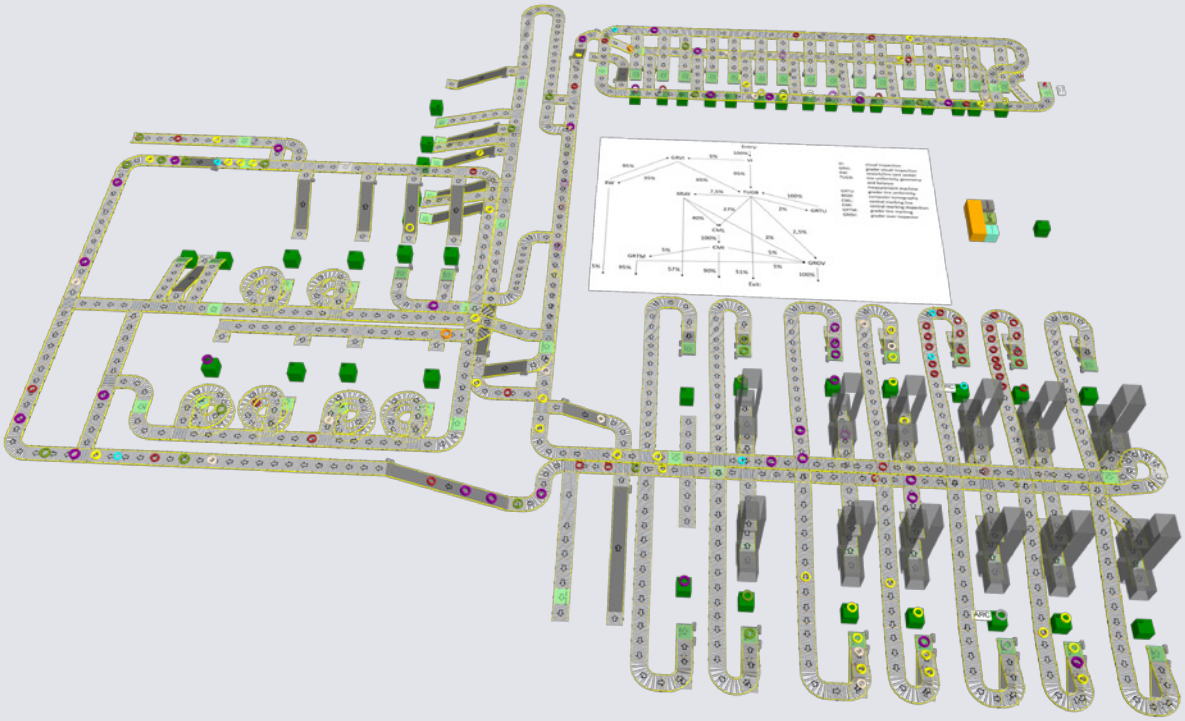
The **Tire Stacker/ Destacker** is used to separate a stack of tires into individual units. The main components of the machine are two vertical belt conveyors mounted on movable arms mowing by gear motors. The arms grip the stack of tires, and through the movement of the conveyor belt, lower the tires one by one onto the conveyor below. The belt conveyor is movable by pneumatic cylinders. The machine is equipped with sensors to monitor destacking process. Tire Destackers are used in Final Finish Handling System area.



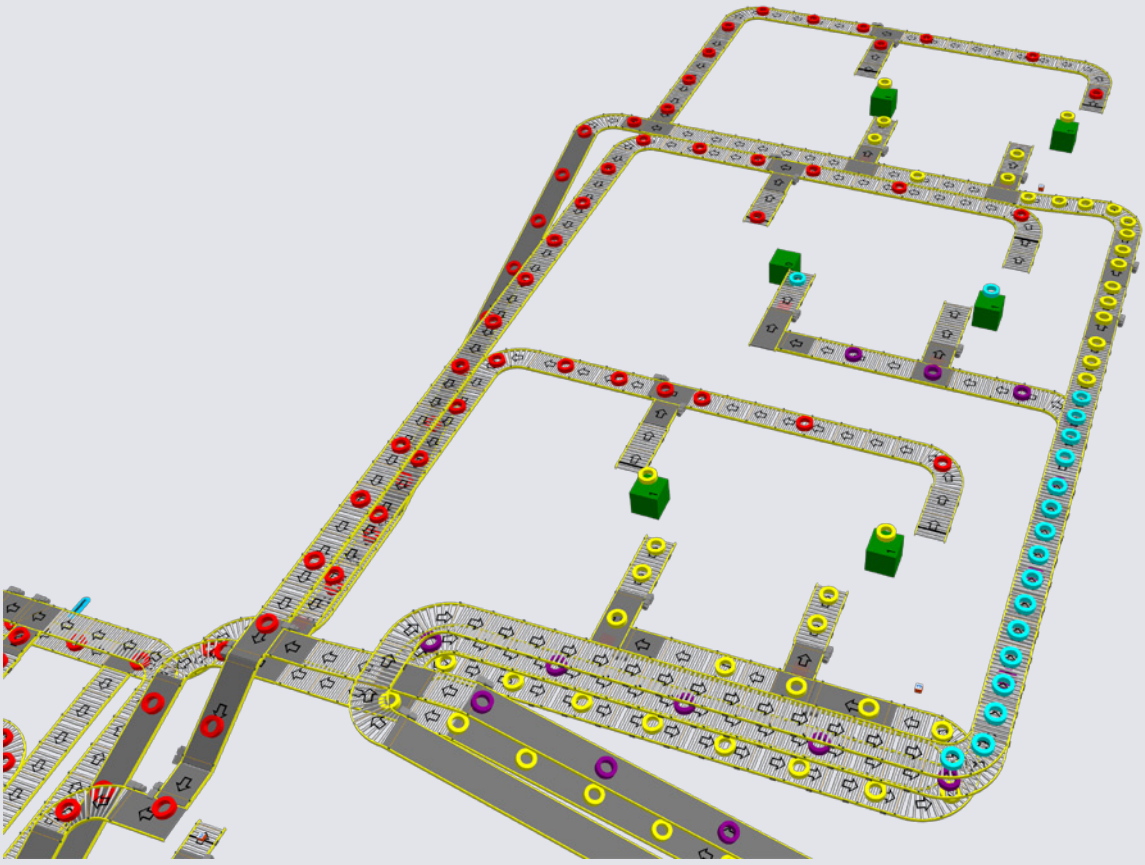
## Sorter Conveyor TS-MABS

Sorter conveyor **TS-MABS** (**T**RANS**S**YSTEM – **M**odular **A**ctivated **B**elt **S**orter) is device dedicated to transfer tires on straight and 90 degree directios (right - left). This type of conveyor can be installed in each manufacturing of the Green Tires Handling Systems, Cured Tires Handling Systems and Final Finished Tires Handling Systems.

**TS-MABS** is an electric-pneumatic conveyor, which guarantees the fast and reliable transfer of products in any direction. It is made up of the following main components: geared motor, drive and rewinding shaft, sprocket wheels, S4500 modular belt, POP-UP segments, belt support rollers and wheels including steel frame. During operation, the geared motor continuously drives the modular belt and moving the tires in a straight direction. Change of direction is possible by activating the POP-UP segments. The active POP-UP pneumatic section is responsible for the transfer of products in a 90-degree direction. The lower part of the conveyor belt is in contact with the POP-UP modules, which causes slanted rollers to move on the upper surface of the modular belt. The rollers rotated to the right or left and product has the possibility of transfer in a 90-degree direction. When the POP-UP segments are in a passive position, the tires are handled in a straight direction. The belt then slides along the POP-UP section and the slanted rollers on top of it do not rotate. The complete device is mounted on a steel frame and supports.

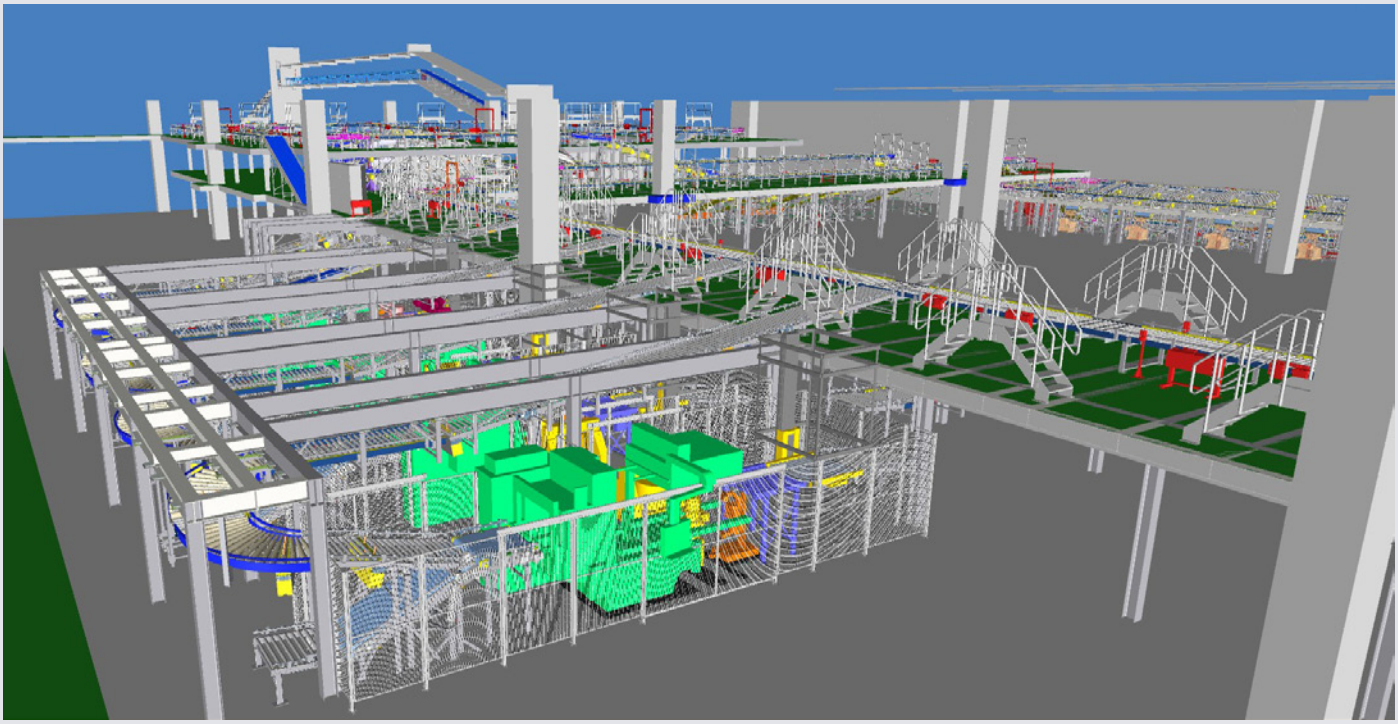


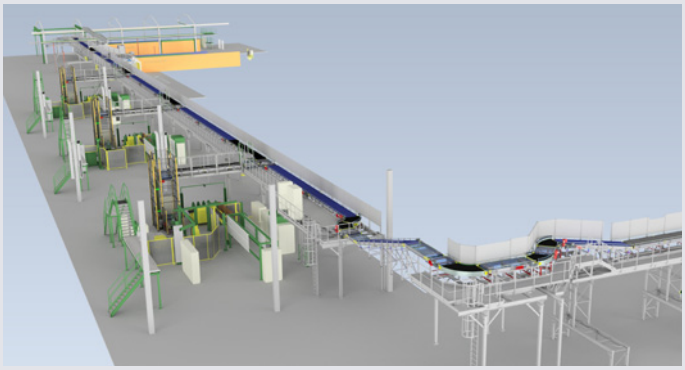
Final Finishing Tires Handling System – flow simulation with flowchart visualization

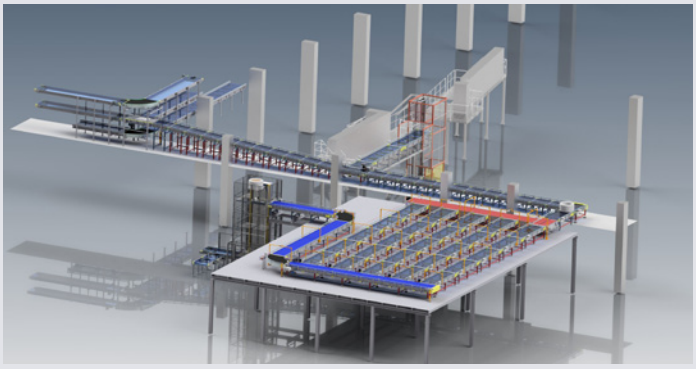


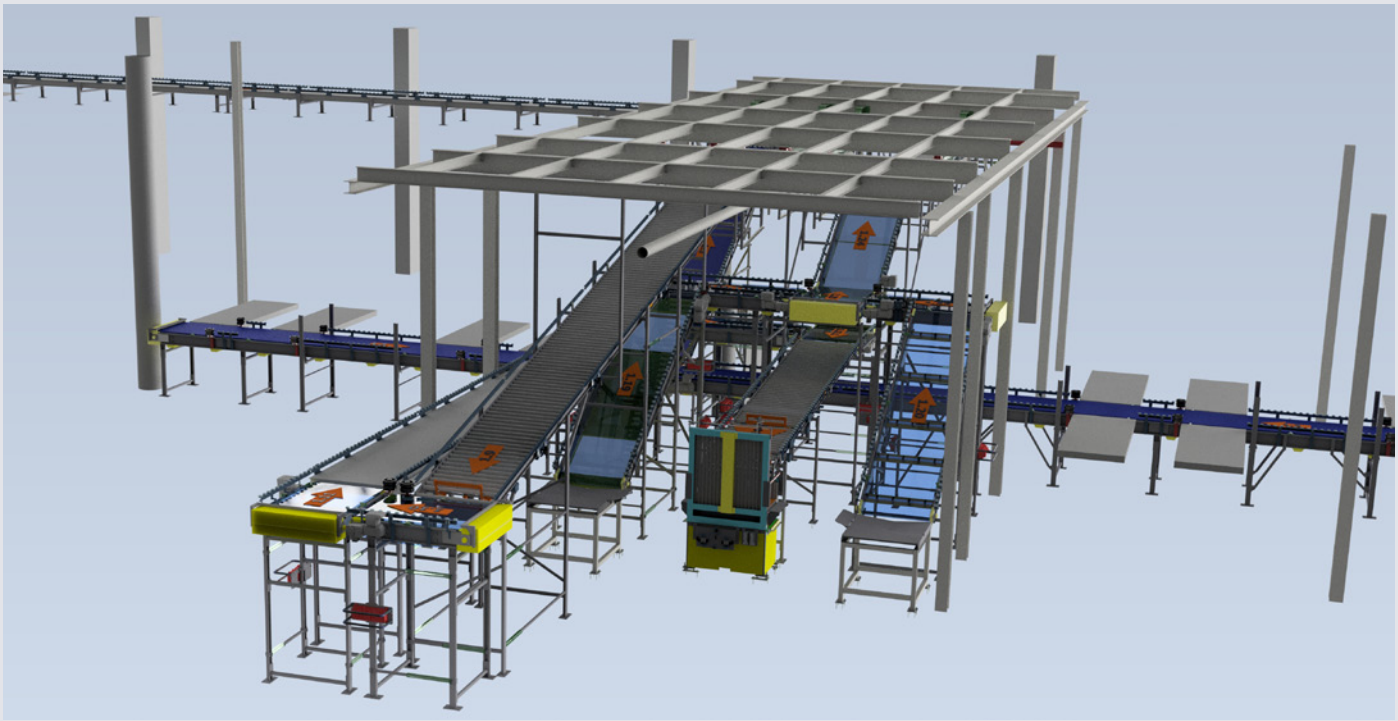
Green Tires Handling System - simulation of Spraying Area

# Turn-key handling systems with full in-house infrastructure

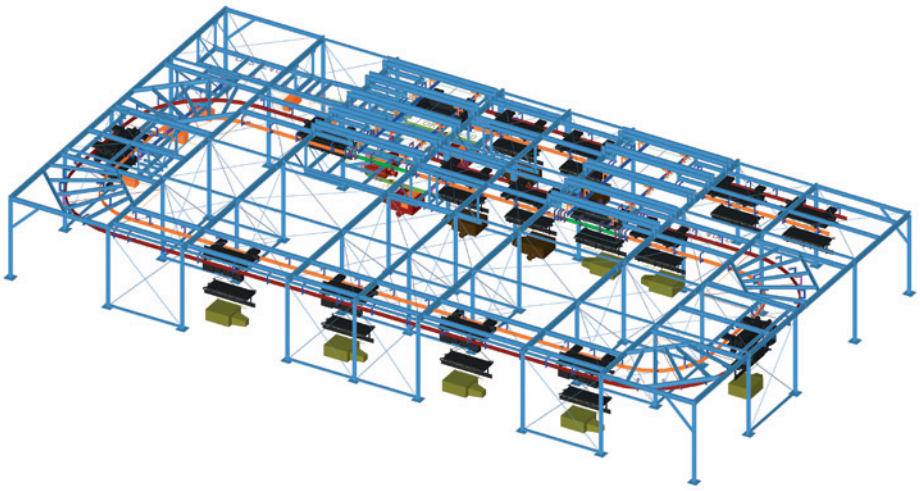






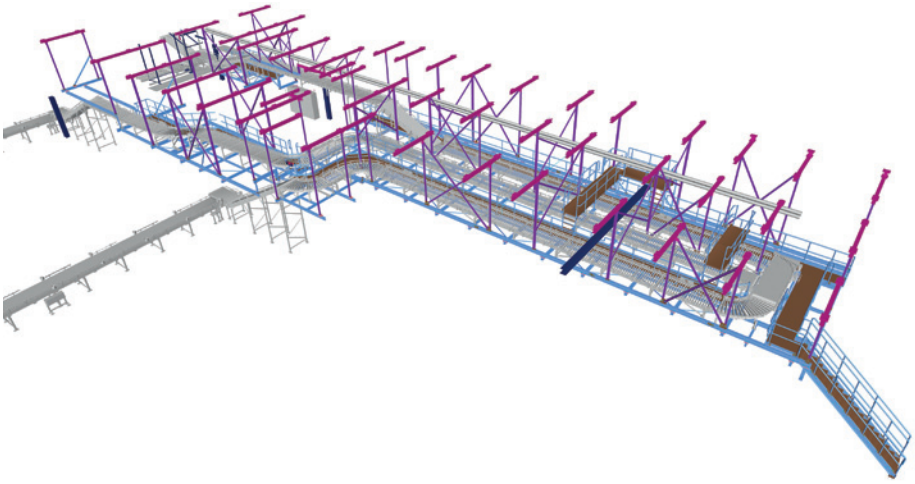


## Support structure for EHB/EMS suspended rail transport

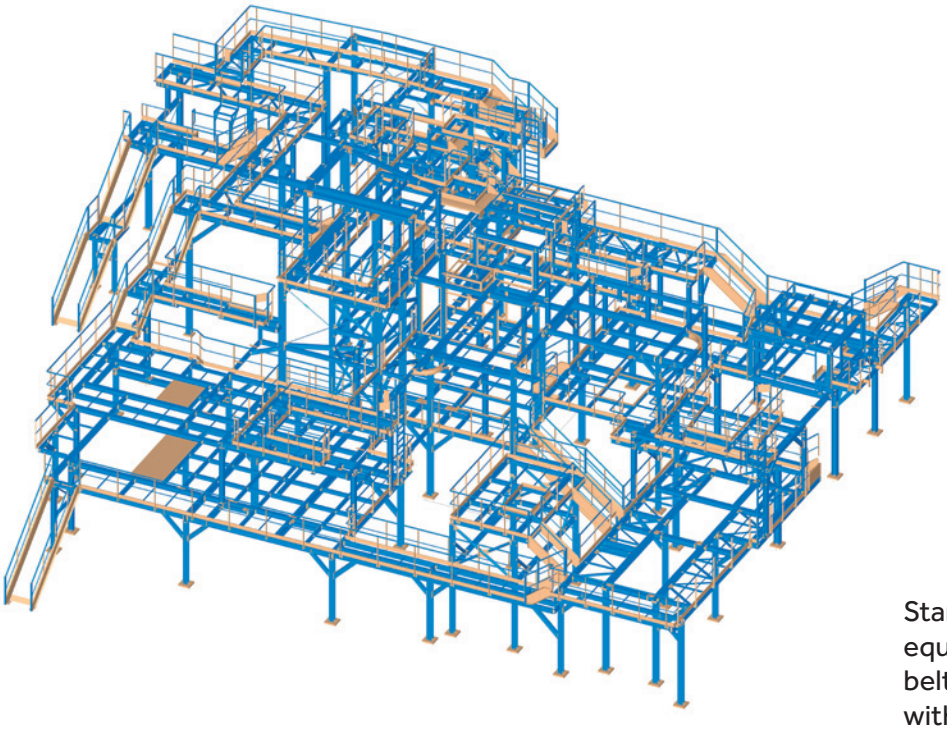


Supporting structure for material handling systems with aluminum rail, enabling installation of running rails, switches, lifts, and crossbeams.

## Support structure for tire and wheel conveyors



## Support structure for waste processing installations and devices



Standing structure for waste sorting equipment, chutes, hoist trolleys, belt conveyors and service passages with stairs and ladders.

## Welding certificates

| Lo. | Certificate | Certificate No. | Certification Body | According to the standard | Is valid to |
|---|---|---|---|---|---|
| 1. | Factory Production Control (FPC) | 2451-CPR-EN1090-2014.0586.011 | DVS ZERT | EN 1090-1:2009+A1:2011 | 09-04-2027 |
| 2. | Welding certificate – performance class EXC 4 | DVS ZERT-EN1090-2-SZ-2014.0024.011 | DVS ZERT | EN 1090-2:2008 | 09-04-2027 |
| 3. | Fully quality requirements in welding | D-ZE-16083-01-00-ISO3834-2015.0170.007 | DVS ZERT | EN ISO 3834-2:2005 | 09-04-2027 |
| 4. | Quality Management System | PL19/0888 | SGS | ISO 9001:2015 | 11-12-2027 |
| 5. | Environmental Management System | PL19/0886 | SGS | ISO 14001:2015 | 11-12-2027 |
| 6. | Occupational Health and Safety Management System | PL19/0887 | SGS | ISO 45001:2018 | 11-12-2027 |

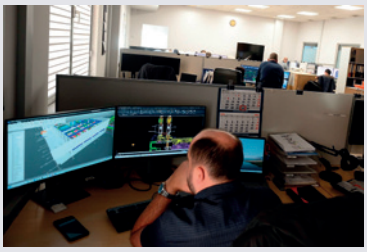
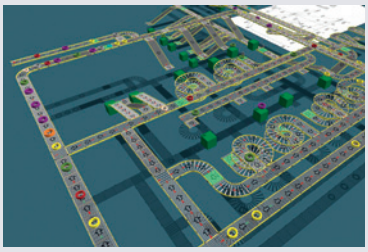
## Standards Software

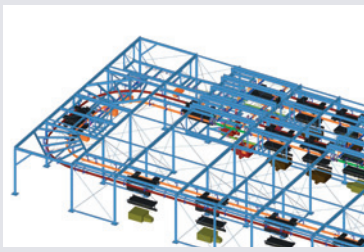
| Issue | | Standards and software used | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | ProSteel | AutoCAD | SolidWorks | Autodesk Inventor | Autodesk Navisworks | Solibri | MicroStation | Robot Structural | IDEA StatiCa | Microsoft Visio | EPLAN Electric P8 | SeeElectrical EXPERT | WSCAD ElectriX | Autocad Electrical | Emulate 3D | Siemens | Allen Bradley | Mitsubishi | Beckhoff | HMI | SCADA |
| 1. | Design concepts and layouts | x | x | x | x | x | | | | | | | | | | | | | | | | |
| 2. | Analysis of building and industrial layouts | | | | | x | x | x | | | | | | | | | | | | | | |
| 3. | Analyses of mechanical layouts | | | | | x | | | | | | | | | | | | | | | | |
| 4. | Static Calculation | | | | | | | | x | | | | | | | | | | | | | |
| 5. | Connection statics | | | | | | | | x | x | | | | | | | | | | | | |
| 6. | Workshop documentation – drawings | x | x | x | x | | | | | | | | | | | | | | | | | |
| 7. | Assembly documentation – drawings | x | x | x | x | | | | | | | | | | | | | | | | | |
| 8. | Electrical concept and layout | | | | | | | | | | x | | | | | | | | | | | |
| 9. | Electrical documentation projects | | | | | | | | | | | x | x | x | x | | | | | | | |
| 10. | Simulations and emulations | | | | | | | | | | | | | | | x | | | | | | |
| 11. | Hardware and PLC program configurations | | | | | | | | | | | | | | | | x | x | x | x | | |
| 12. | **Material Handling System** visualization projects | | | | | | | | | | | | | | | | | | | | x | x |

# End-to-end solutions in:

## Design & Engineering

- **Development** of a technological handling concept
- **Optimization** of material flow
- **Design** of complete handling system
- Carrying out **calculations** of steel structures and platforms



## Manufacturing

- Manufacturing of **steel structures** including galvanizing or painting
- Manufacturing of unusual, large-size steel **elements**
- Manufacturing and assembly of handling **equipment**




## Turn-key Implementations

- **Modification** and **upgrades** of existing brownfield plants
- **Installation** of new handling systems in greenfield plants
- **Construction** of automated high-bay warehouse
- Automation and control systems including **start-up** and **commissioning**
- **Service**, **maintenance** and **support**

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