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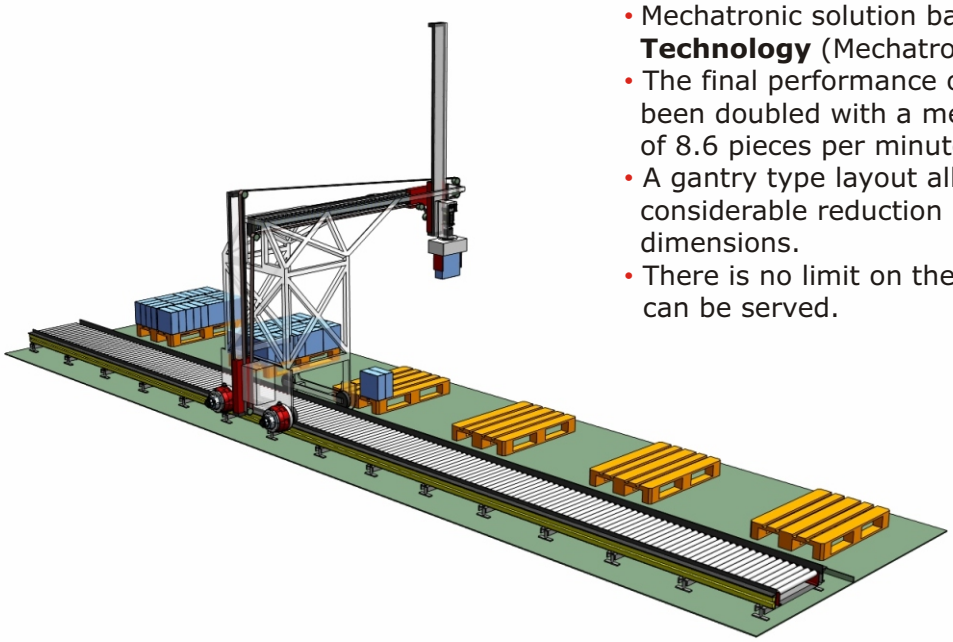
A floor-track palletizer

Designed by Mechatronic system company



Focus On

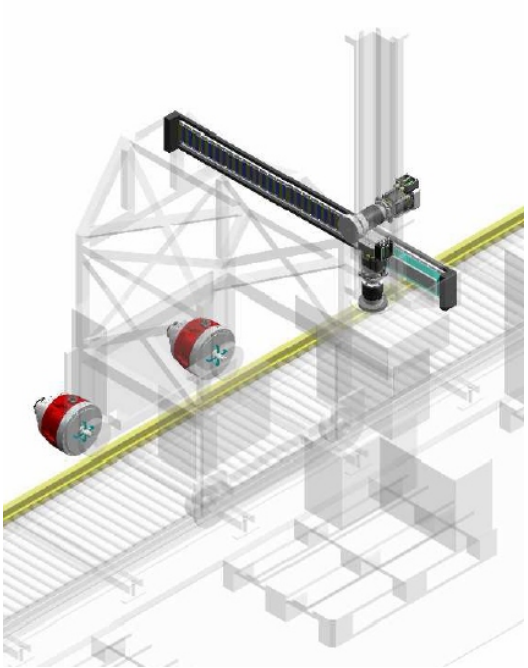
- Mechatronic solution based on **MD²** **Technology** (Mechatronic Direct Drive).
- The final performance of the palletizer has been doubled with a measured throughput of 8.6 pieces per minute
- A gantry type layout allowed for a considerable reduction in overall dimensions.
- There is no limit on the number of bays that can be served.

The need

Mechatronic System Company, a Motor Power Group member that specialises in the design and construction of mechatronic solutions, has carried through a project for a floor-track palletizer with the aim of overcoming the limitations imposed by prior technology on the performance and dimensions of the machine. The use of linear and torque direct drive servomotors, of the series SKA by Motor Power Company, allows the palletizer technological upgrading.

The solution

All the palletizer axes (X, Y, Z, J) were driven by AC motors, while the product pick-up tool was driven by a pneumatic cylinder.
Mechatronic System Company and Motor Power Company contributed to different areas of the project. The proposal of using a gantry type layout that straddles the track on which the palletizer moves allowed for a considerable reduction in overall dimensions. Power is supplied to the palletizer by means of busbars with sliding contacts. This solution made it possible to eliminate the cable chains that accompanied the track, which was also powered electrically. The use of busbars also allows the track to be lengthened without limitation while assuring good resistance to



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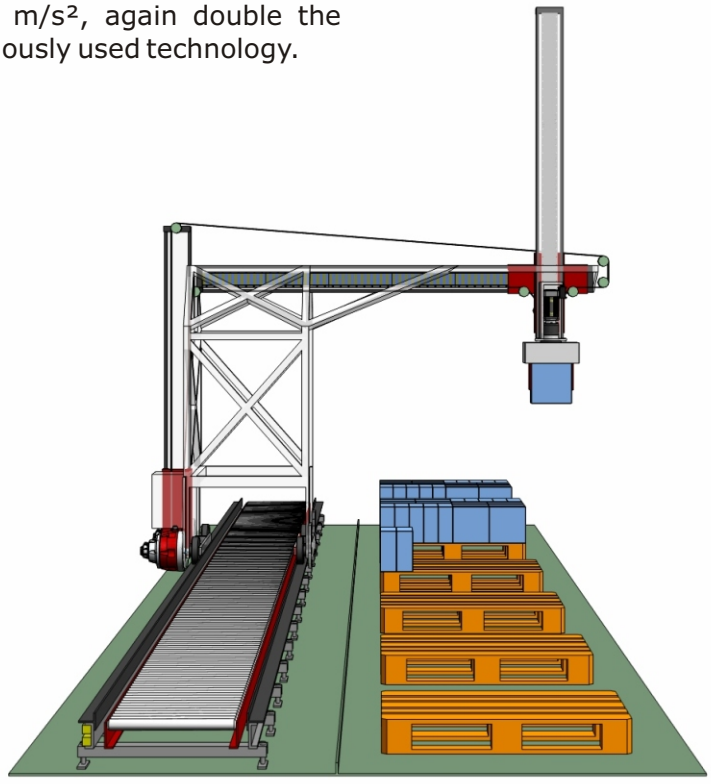
fuel, oil and mineral grease, concentrated hydrochloric acid, caustic soda and argillaceous and mineral particulate. The movement along the track (X axis) is achieved by direct drive using two torque motors from the SKA DDR series which exert traction with a thrust of 7000 N and an acceleration of 2.5 m/s², almost double the previous value. The traction wheels are located on the same side as the direction of movement of the palletizer while the two idle wheels are located on the opposite side and are equipped with feedback devices that control the position accurately and compensate for slippage of the driving wheels. Two emergency brakes assure a very short braking distance, just 75 cm at a palletizer speed of 2 m/s. The SKA DDR motors from Motor Power Company integrate all the components in a compact and shock-resistant structure. The direct drive technology allows for direct assembly on the load and eliminates the entire kinematic chain and the disadvantages relating to its use and maintenance.
The same direct drive technology is used for driving the Y axis: an Iron Core SKA DDL linear motor used in the frameless version for complete integration with the axis. It is moved with a peak force of 2970 N and an acceleration of 3 m/s², again double the values of the previously used technology.

Further technological upgrading has been applied to the Z and J axes, which are driven with Tetra brushless servomotors, again made by Motor Power Company. This solution also eliminates the pneumatic parts used in the previous design to compensate the Z axis. The advantages of this new configuration include improved axis movement control and the possibility of emergency braking using solely the safety brakes of the Tetra servomotors. The palletizer is also much more streamlined due to the elimination of all the pipes required for operation of the pneumatic devices. Using the highly compact intelligent digital drives from Elmo Motion Control mounted directly on the brushless servomotors also reduces the need for cables. The very small electronic control cabinet can be housed directly on the palletizer. The last movement, the load pick-up gripper, uses a SKA DDR series torque motor. As the motor turns, the gripper arms move closer together and a brake ensures that the load is effectively engaged. The SKA DDR motor can control the sensitivity with which the load is engaged and allows for quick and simple size changes.



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Advantages

This revolutionary and innovative project also includes software to enable the palletizer to move along optimised trajectories and not necessarily according to batch movements as is commonly the case with these machines. This software allows even working simulation for preferred trajectories to be chosen.
Following the intervention by Motor Power Company, the final performance of the palletizer has been doubled with a measured throughput of 8.6 pieces per minute. The capacity for multi-palletising operations has also been improved. Last but not least, there is no limit on the number of bays that can be served.

Direct Drive motors by Motor Power Company

Linear and torque motors featured in several modular solutions, for answering any application request and for the full integration in the machines.

SKA Direct Drive Linear - Synchronous linear permanent magnet servomotors created with "iron core" technology. Alongside the **Frameless** versions with mobile coil and magnetic track, and the **Linear Stage** versions, with temperature sensor, linear ball bearings, linear guides, bellows, encoder, cables and cable carrier, Motor Power Company also proposes the **SKA Compact** model. This has been designed as a "plug and play" solution thanks to its carrying structure enclosed in extruded aluminium.

SKA Direct Drive Rotative - "Multipoles" permanent magnet synchronous brushless motors. Even the SKA DDR series is available in the **Frameless** version formed by the rotor and stator parts alone so that it can be integrated into machines. Or in the **Power Pack** configuration with shaft, flange, bearings, feedback and connections.

All SKA motors guarantee a whole series of important advantages, typical of Direct Drive technology;

total elimination of all kinematic chain components, such as gearboxes and ball screws • overcoming of limits due to backlash, friction, inertia and consumption • increase in performance, reliability and robustness of the productive system• costs reduction • simplification the planning phase of the machines and reduction of the assembly work • excellent linearity of the movement and precision of the positioning • distributed power and intelligent control • low maintenance • energy savings.