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How Self-Propelled Modular Transporters Help Automate Factory Floors

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Today, manufacturers face increasing competition, margin pressure, compliance regulations and heightened customer expectations. As a result, they are constantly looking for ways to improve performance and profit potential by making sure facilities run efficiently and effectively. Implementing an optimal material handling solution can help and result in significant “lean” manufacturing benefits in the areas of safety, floorspace optimization, production throughput and ultimately overall business performance.

Optimize heavy machinery material handling

There are not many ideal options for manufacturing facilities that must transport loads weighing up to 100 tons. If the objective is to increase facility performance by improving

workflow automation and moving the load with precision and with minimal human intervention, ideal options seem fewer.

There is tremendous pressure to make the best decision since that decision could be the difference between earning up to eight-figures' worth of production value. Modernization, increased competition, reduced margins and the need to keep personnel safe create additional importance on decision-making.

Beyond the obvious need to think about raw cost and logistical feasibility, other considerations can be more subtle and less obvious. They include, but are not limited to, floor conditions, time to implement, opportunity costs, safety risks, return on investment, flexibility and more.

Depending on the circumstances, environment and other needs related to load movement, factors may become more or less important as the job progresses. For instance, the need for flexibility might override cost as a consideration, or the sheer weight of the load might drive the decision. These tradeoffs can be difficult to understand and articulate, much less decide between. That said, different approaches will offer different advantages and disadvantages.

Determining the best solution for materials handling typically starts by asking a series of questions, such as:

- Is the facility new or an existing infrastructure?
- If an existing facility, are there opportunities to modify and/or expand?
- Is a new process being implemented, or is the goal better space utilization?
- Are there product-flow considerations?
- Is there a need to increase production?
- What is the available budget?
- How long will this anticipated need last?
- Is this a recurring need?
- How much lead time is there to identify and implement a solution?

Options for moving loads between 20-100 tons

Particularly as it relates to [lean manufacturing](#), there may be ongoing questions that arise when faced with specific challenges. However, a common starting point can be ascertained. Depending on needs, manufacturers can explore such options as:

Air casters. Air casters lift loads on a thin, frictionless membrane of air to easily push the load in any direction. They're capable of moving extremely heavy weight, are flexible, and have a variable move path. One consideration related to air casters, however, is the flooring conditions. Smooth, nonporous surfaces will provide the best performance. Absent that, their flexibility and effectiveness diminish.

Conveyors. Conveyors are relatively efficient, can move high volumes quickly, and provide continuous movement between specific points over a fixed path. On the downside, they only work along a set path, are resource-intensive to install, and are not self-loading, which introduces safety risks.

Drag chains. Drag chains are a system of tracks in the floor from which chains or cables pull wheeled carts. They're relatively efficient for moving loads, but only work along a set path, are resource-intensive to install, not self-loading, and can be a tripping hazard.

Forklifts. Forklifts primarily move loads over variable paths and their flexibility allows units to operate in 360 degrees. Although forklifts make sense in certain instances, they require significant open floor space, have weight limitations, require a certified operator, and carry safety risk.

Overhead cranes. Overhead cranes lift from above and move loads over a set path, both horizontally and vertically. They work with loads of varying shapes and sizes and allow for flexible configurations. Although overhead cranes provide several benefits, they are typically resource-intensive to install and operate, offer limited usage area; and create relatively high safety risks to operators during operation and maintenance.

Rails. Rails are a system of tracks in the floor along which carts or cars run. They're low-cost to operate and highly efficient in moving loads consistently. However, if operational flexibility is required, they may not be optimal because they only work along a set path and consume significant floor space, which then cannot be leveraged for other processes.



Self-Propelled Modular Transporters optimize factory floor space and production throughput.

Self-propelled modular transporters (SPMTs), or transfer carts. SPMTs can carry heavy loads using powered mechanisms to load, tug, and push. They're quickly implemented, easy to use, and can be remote control-operated by one person (with a spotter).

A closer look at SPMTs

Among the options available, SPMTs are among the newer, less familiar choices and deserve further exploring. The industry is still settling on how to refer to them. Some professionals may call them “wheeled transfer carts.” “Wheeled” literally refers to the urethane wheels that ride directly on the floor as opposed to other transfer carts that are fixed on rails.

Wheel technology in transport vehicles has come a long way in the last decade. There weren’t many, if any, 100-ton or 100-plus-ton capacity wheeled vehicles 10 years ago. They come at a tremendous cost and weren’t practical. Prices have since reduced significantly while the transfer carts have also become markedly better.



Manufacturers can safely transport loads up to 100 tons without damage to floors and with minimal manpower.

For starters, electric motors and drives are much more efficient today. Readily available battery systems are more available as well, thanks largely to the hybridization and electrification of the automotive industry. Batteries are increasingly becoming more efficient and smaller with more power and storage capacity, factors that help electric parts become more viable in today’s SPMTs.

SPMTs deserve a closer look as a heavy-material-handling consideration. They spread the load over large areas on urethane wheels. They can carry 100 tons without damaging the surface because they run at low pressures, and they function on standard industrial floors. SPMTs also don’t require special footings and are essentially self-loading in that the unit drives underneath a steel skid, lifts the skid, moves it to a desired location, and sets it back

down without human involvement other than operating a remote control. It's an automated workflow process that plays right into lean manufacturing principles.

Five ways SPMTs enhance lean manufacturing

- *Flexibility.* If floorplan or process changes are, or may be, required, SPMTs easily adjust to accommodate production line reconfigurations. Since SPMTs are standalone machines there is no downtime or engineering cost required to convert the facility floor as would be required by rail cart or drag chain systems. SPMTs enhance manufacturing flexibility.
- *Maneuverability.* All four corners of these machines can be steered independently for precise movement and SPMTs can rotate within their own footprint, which enables greater flexibility in designing processes and driving efficient floorspace utilization.
- *Portability.* Unlike cranes, conveyors, and rails, SPMTs don't require permanent installation in one facility. They can be relocated and used in multiple spaces, allowing for better asset investments and higher returns on capital.
- *Safety.* Loads transported by SPMTs are inches off the floor and are self-loading, which removes challenges and risks associated with rigging operations. Operators remain a safe distance away and use remote controls to move and position loads.
- *Easy utilization and quick implementation.* SPMTs are essentially ready to run upon delivery and can operate on standard factory floors. They don't require complex factory modifications as do cranes, conveyors, or rails, nor do their operators need much training.

The ability to flex and adapt the production line to match current and future product requirements is crucial to manufacturing success. With self-propelled modular transporters, manufacturers can effectively reconfigure the line on demand without downtime or construction costs. SPMT's make it possible to quickly address material handling challenges up to 100 tons and minimize production disturbances.

About the Author:

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