Choosing the right material handling system #2: How much flexibility or maneuverability is required?

Choosing the right material handling option for any specific manufacturing or other industrial application is rarely easy. The seemingly endless options can confuse more than they clarify, and many operations end up choosing a poor solution simply because it's the one with which they're most familiar. This series is all about breaking down the decision into a sequence of straightforward questions. In the previous article, we looked at the fundamental question: how much does the load weigh? Today, we're looking at the question of required maneuverability.

Beyond what you're moving, to choose the right material handling solution you must assess where and how you're moving it.

Not all load handling options can accommodate all paths, for example. Almost any option can manage a straight-line path with ease, but what if you need to move the load between a variety of points that may be spaced apart from each other? What if the path needs to change occasionally or frequently? That's an entirely different scenario.

Is the path fixed and/or permanent?

Some material handling options (like cranes, rails, and conveyors) require permanent (and costly) installation. If you know the path the load needs to travel will never change, nothing will beat the efficiency of these options in moving large quantities quickly. But even permanent paths may have constraints. Rails and conveyors will work with straight-line paths, for example, but they won't work well with U-shaped production lines. Cranes might, but so would wheeled vehicles or air casters.

Just remember that a fixed path restricts movement. That can reduce production efficiency over time. So, if a production line needs to be reconfigured down the road, or if a particular load or machine needs to be diverted on the fly to another station or out of the way, a material handling system that's limited to that single fixed path won't be able to accommodate the change.

Is the path variable and/or likely to change?

Using a material handling system that can accommodate either variable paths or movement patterns that change grants the manufacturer or operation a lot of flexibility to grow and adapt. Air casters, wheeled vehicles including forklifts, and (to a lesser extent) cranes are strong options here. These flexible and maneuverable solutions not only allow operators to navigate variable paths but also to potentially modify those paths at will.

That flexibility, in turn, enables facilities to add or remove workstations or otherwise make special accommodations for the load being moved without disrupting their existing production processes. With air casters and wheeled vehicles, it also eliminates the need for costly and time-consuming installations that will turn into a sunk cost of the facility ever remodels or moves.

Does the facility itself impose any constraints?

Aside from the path the load must travel, the facility itself can impact which options work better. For example, forklifts require a lot of space to maneuver. Forklifts trying to move around a tightly packed workshop would risk constantly colliding with machinery and people. Any wheeled vehicle will also require a wide turning radius, so they cannot handle sharp turns.

In that case, the operation would need something like a crane or an air caster system, which can move omnidirectionally and rotate in place. Other moving systems can work within a narrow space, such air or wheel casters on the floor. Also, overhead cranes are ideal for use in areas with little or no floor space.

Indeed, don't forget the verticality of the facility. Do you need a crane or an assembly that can extend into areas that are otherwise hard-to-reach? A crane or similar assembly can reach almost any location within its envelope. Similarly, if you need to move a particularly tall load, then it's important to consider the height at which the vehicle will lift it. A forklift or wheeled casters will likely lift the load by at least 8 to 10 inches, if not several feet. Air casters would lift it only a few inches off the ground.

Ultimately, there's much more to the question of flexibility and maneuverability than we can address in a single article. For a much more detailed analysis of this question, please see our white paper "Selecting the right load handling equipment." There, we assess each material handling system individually for its suitability in working in different scenarios. We additionally evaluate six other questions that organizations need to ask to pick the right material handling system. Download the paper here.

	Travel Path	Turning Radius	Effectiveness For:			
			Linear Paths	Variable Paths	Vertical Paths	Hard-To-Reach Places
Air Casters	Limited by obstructions, bad floor condition, hose length	360 degrees, in-place	**Good**	**Excellent**	**Moderate**	**Excellent**
Conveyors	Static, defined, and inflexible	Not applicable	**Excellent**	**Poor**	**Good**	**Poor**
Cranes	Static, defined, and inflexible	Long reach radius	**Excellent**	**Excellent**	**Excellent**	**Poor**
Drag Chains	Can change direction, but chain pulls on a linear path	Very poor turning radius	**Excellent**	**Moderate**	**Poor**	**Poor**
Forklifts	Limited only by obstructions	Extra space required	**Good**	**Moderate**	**Moderate**	**Moderate**
Rails	Static, defined, and inflexible	Not applicable	**Excellent**	**Poor**	**Good**	**Poor**
Wheels	Limited only by obstructions	Extra space required	**Good**	**Good**	**Poor**	**Good**