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How Air Casters Reduce Material Handling System Damage to Plant Floors

Damage to facility flooring is a hidden but serious risk in every manufacturing and industrial environment. Many forms of floor damage occur silently, accumulate without notice, and sneak up on operators, leaders and even facility managers.

Despite being a less obvious risk to production than labor shortages or supply chain delays, floor condition is nevertheless critical to maintaining efficiency and productivity because damaged floors can lead to surprisingly high costs. Such damage can create safety hazards and slow down operations, thus incurring greater and more frequent maintenance costs while potentially endangering manufactured goods. Make no mistake: damaged flooring places workers, productivity and assets at risk.

The good news, however, is that successfully protecting flooring can be as simple as choosing a material handling system that's floor-friendly, especially in highly trafficked facilities. Air casters "rise above" alternative options in this regard because of their unique ability to float above the floor instead of rest on it—a capability that effectively eliminates impact on floors associated with other types of load movers.

The dangers of material handling on flooring

Every material handling system that touches the floor while hauling loads risks damaging the surface. Systems like steel rollers, forklifts and other wheeled vehicles can exert enormous pressures as their tires and wheels roll over floors. Such systems can cause anything from ordinary wear-and-tear to outright cracking and breakage. If the floor is dirty and covered with abrasive particulates, those systems will grind against the floor, creating a sandpaper-like effect that wears down the surface. Further, the rocking and pull away pressures such material handling systems exert can cause floors to shift, rise



Wheeled vehicles grind on a dirty creating a sandpaper-like effect that wears down the surface.

or sink, especially at potentially weak areas such as joints between two slabs. Over time, even minor roughness can turn into major gouges and small cracks can turn into yawning gaps, almost without notice. The result: floors become worn, cracked, pitted and uneven.

The floor-material handling feedback loop

Damages aren't limited to the floor. The material handling system and the condition of the facility's floors directly affect each other in a continuous feedback loop. For example, most indoor forklifts are equipped with cush-

ion tires designed for smooth, level surfaces. Even simple rough patches can wear out the tires prematurely. In extreme cases, crossing serious gaps or hitting steps in the floor could potentially cause flat tires, or transmit shock loads strong enough to damage the interior of the vehicle or its load.

Sealants and protective surface treatments can help lessen the effects of this vicious cycle, but they can't completely stop it. An epoxy surface treatment, for example, can protect against problems like stains and ordinary wear-and-tear but falls short in protecting against all damage. In fact, the treat-



ment or coating itself can be compromised by poorly chosen material handling systems. That's where air casters come in.

How air casters function

Air casters work by essentially turning even massive loads—anything from a few hundred up to hundreds of thousands of kilograms—into giant hovercraft.

Casters are donut-shaped bags of air that fit beneath the load and inflate with compressed air until filled to capacity. Once capacity is reached, excess air leaks and forms an ultrathin film no more than 10 millimeters thick (less than the thickness of a business card) between load and ground. The film of air lifts the load just enough to reduce the friction coefficient to negligible levels, enabling operators to move even extremely heavy loads with only one-tenth the amount of force required to push the same object on wheels. A single operator can move well over 2,000 kg by exerting little more than 10 kg of force, while a small team of operators can move larger equipment and machinery in minutes.

What damages floors, however, is the pressure exerted by the load on the floor surface. With air casters, load weight is evenly distributed across the entire footprint, which can reduce total floor loading to less than 25 psi, rather than concentrating floor loading at specific points of contact like wheels. For that reason, air casters work better than almost any alternative on delicate floors, including those with special surface treatments and raised floors that can support only limited floor loading.

Additional benefits of air casters

Air casters can also increase overall plant efficiency and productivity. Here's why:

1. They are among the most cost-advantageous material handling systems. That's because they require no permanent or expensive installation, no certified or specially trained operators, and the equipment requires very little maintenance. Air casters reduce capital expenses and related labor costs. Plus, air casters can convey other advantages besides flooring protection. For instance, their sheer manoeuvrability (they can move omnidirectionally and rotate in place) means they can flexibly reposition assembly lines into



Easily placed under a CNC machine, air casters then float the weight of the load, eliminating the potential for floor damage.

more efficient configurations. When considering total cost of ownership, consider that a well-implemented air caster system can actually boost overall productivity.

2. Air casters are easy to implement and install. It typically takes only about 30 minutes of training to learn to use an air caster system, certainly a low learning curve. Unlike more mechanically complex solutions, air casters can be deployed on the spot and move heavy objects within minutes.
3. Air caster safety applies not only to floors, but also to personnel and equipment. The low profile, sitting only a few inches above the floor, reduces the risk of tipping, spills or falls, and nearly frictionless moves reduce or eliminate the risk of ergonomic strain or injuries. Plus, air casters can also be manoeuvred with a degree of preci-

sion that can help prevent collisions while increasing productivity.

Make flooring a priority

It's time for manufacturers to create the environment where flooring is a priority. A short-term view of floor integrity greatly undersells the impact of floor condition on operations. It's worth investing time when choosing a material handling system to study the option that will keep floors pristine and keep production moving flawlessly. Here, air casters can pay dividends for industrial and manufacturing operations that want to lower their maintenance and facility costs over the long haul.

Paul Jakse, vice president of sales of AeroGo, Inc., Seattle, Wash.

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N° 3 - MARCH 2022

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