



Safe and Fast: Floating Heat Exchangers on Air

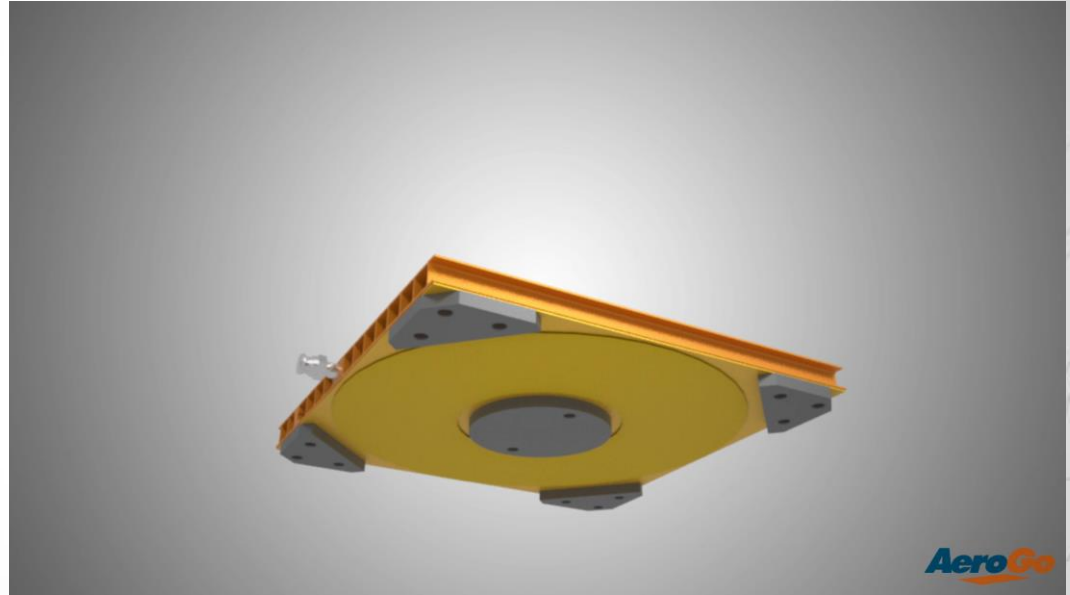
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Safe & Fast: Floating Heat Exchangers on Air

- How Air Casters Work
- Safety and Operational Benefits
- Load Considerations
- Surface Considerations
- Case Studies

How Air Casters Work

- Compressed air is captured inside a compliant bag (air caster) to lift and move objects
- Similar to how a puck moves on an air hockey table

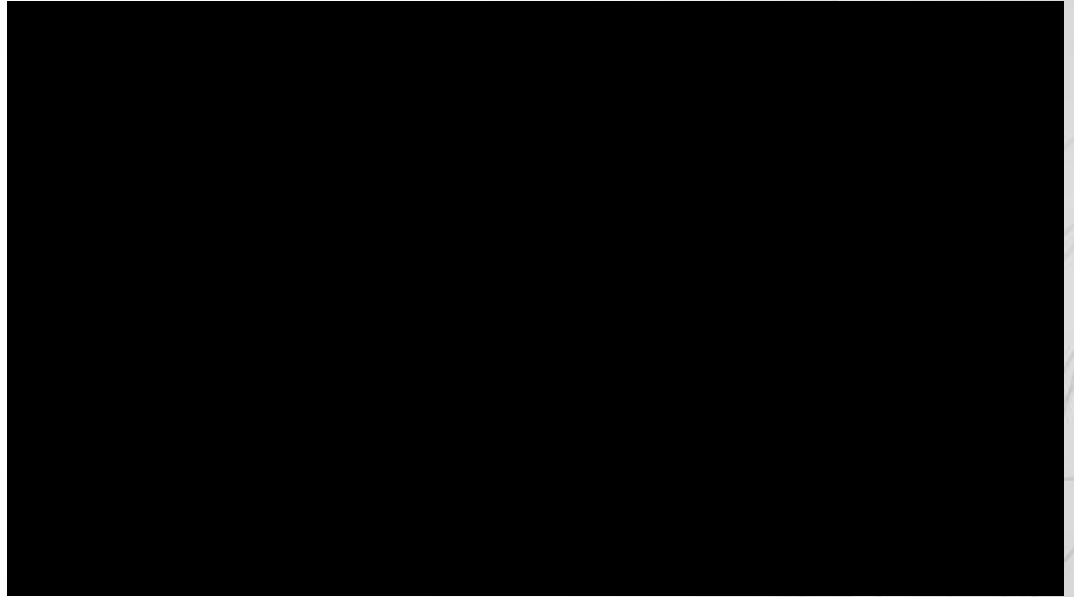


AeroGo

Benefits of Eliminating Friction

Air bearings require just **10%**
of the moving force and
5% of the steering force of
conventional wheeled systems

- 5-7 lbs. of force to move 1,000 lbs.
- 360° rotation
- Precise alignment
- Unlike wheels, movement in all directions is easy
- Safety



Why Use Fluid Film Technology

- Low surface loading
 - Typical maximum surface loading of 50 psi
 - Allows extremely heavy loads to be transported over standard floors
 - Will not damage floors or coatings
- Built-in lift feature
 - Can be used with or without other lift mechanisms
 - Greatly reduces cost and complexity

Operating Surfaces

Optimum: Smooth, flat and non-porous

<u>Good Surfaces</u>	<u>Acceptable Surfaces*</u>
Typical concrete factory floor with penetrating sealer	Asphalt
Epoxy coated	Broom finish concrete
Tile	Carpet
Vinyl	Gravel
Metal	Dirt

* Overcome by using temporary overlay

Surface Specifications

<u>Parameter</u>	<u>Allowance</u>
Acceptable Floor Slope	0.25 inch for 10-ft (6.6mm in 3.0m)
Allowable floor undulations	1/4 of total air caster lift height
Allowable overlay thickness	0.020in / 0.51mm Approx. 25 gauge sheet metal
Beveling overlays or sloping ramps	1:20 slope or ramp

Issue: Seams & Transitions

Smooth, fill or tape



As seen in: Heat Exchanger World June 2020

MOVING BOILERS

Transformers, boilers and pressure vessels: megatons moved on air



* An air caster vehicle featuring a synchronous guide wheel mechanism to rotate a 40' cylinder used to hold larger heat exchangers, boilers and chillers

Moving huge transformers, boilers, and pressure vessels, through production lines without causing slowdowns, or even shutdowns, can pose significant challenges. However, many companies do not realize that this type of equipment is easy to maneuver around using air caster technology. In this article the technology is explained, and examples of how it works and eases the movement of heavy, complicated shapes are given and endorsed. In effect a 100-ton bulky product can be moved around as if on air saving time and costs.

By John Massenberg, MGME, President and Chief Executive Officer of AeroGo, Inc., USA

Manufacturing transformers, boilers and pressure vessels presents significant challenges. The heft and unwieldiness of these behemoths can easily frustrate manufacturers trying to move them smoothly through production lines without causing slowdowns or outright shutdowns. Moving such loads is usually a production in its own right. What most manufacturers don't realize is it's possible to maneuver even 100-ton boilers through a manufacturing process safely, quickly, and with just two operators.

Technology offers an alternative

Air caster technology, around since the 1960s, has advanced to the point that air casters have been successfully used to move loads as gargantuan as a 2,700-ton ship. To control the load and adjust for size and weight, operators simply add more casters. When accompanied by powered drive systems with controls managed by one operator, users can easily maneuver a load in any and every direction, rendering the straight-line movement of the overhead crane or conveyor obsolete.

"The casters have made it a continuous flow through our manufacturing facility instead of having stop/start,"

says Jess Lamba, senior product engineer at the Carrier Chiller plant in Charlotte, N.C., which produces chillers and commercial air condition units. "They have helped to significantly lower our production costs."

What are air casters?

Air casters are bags that capture air and create lift, floating loads on a film of compressed air. They work much like a hockey puck or hovercraft, once floating and nearly frictionless, air casters require relatively little force to move even very heavy loads. Even better, by dispersing the load over a large surface area, they dramatically reduce the risk of floor damage.

Lamba says that prior to purchasing an air caster system, the Carrier plant had relied mostly on overhead like a job shop than a continuous production facility. "They tended to slow the process."

Because air casters fit within the footprint of the load, it's possible to move loads in any direction at a push, thus offering the flexibility Lamba's team wanted. On the side of the facility where the air casters are used, Carrier manufactures heat exchangers, melt compressors and water-cooled chillers. Loads are mounted on a table supported by the casters; the table can move from one workstation to another as needed, no disassembly re-

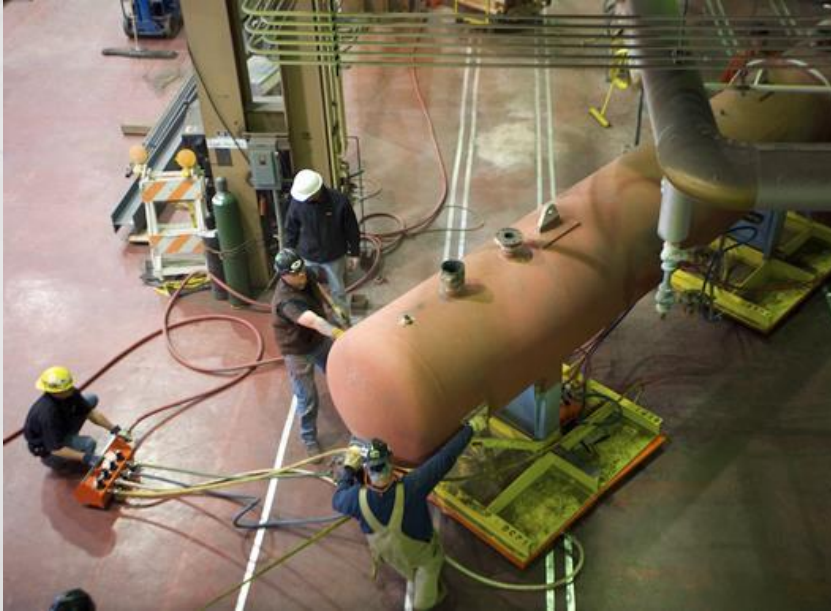


Manufacturing a heat exchanger



- Tubes up to 8' diameter
- Capacity up to 40 tons
- Rotates for welding

Replacing a Feed Water Heater



- 40+ tons
- Maneuver in tight clearances
- Move in hours instead of days
- LESS DOWNTIME

Boiler Transport



- Up to 100 tons
- Move boilers & pressure vessels through welding and manufacturing processes
- Sits on skids with v-chocks
- Power drive with guide wheel

Move a Feed Water Heater



- 100 tons
- Prep: jack load, fabricate skid, cover pipe holes
- 3 hours instead of 3 days

Multi-Floor Feed Water Heater Move



An orange AeroGo Load Module is inserted beneath the feed water heater. The control console box in the foreground regulates air into each of the individual Load Modules.



With air caster, just a few people are needed to move a 50 ton unit.



A forklift can be used where there is enough room.



Heater is in position for the crane to grab an end



- 50+ tons
- Move from 3rd floor mezzanine; swing over open shaft
- Crane 3 floors higher to turbine floor of powerhouse for pickup

Heat Exchanger: Georgia Power



AeroGo air casters are inserted under the load prior to moving.



After inflating the air casters, the 40 ton heat exchanger moves easily across the factory floor to meet the crane.



Still resting on casters, the heat exchanger is suspended over 9 stories, then successfully lowered to the floor without incident.

- Remove & replace in nine floor plant
- Low floor load
- Precise movement into exact same location as prior unit
- 1/2 day vs. two days typical

Heat Exchanger



- 6,000 lbs.
- Can also be used to move anything of similar capacity

Safe Operating Practices

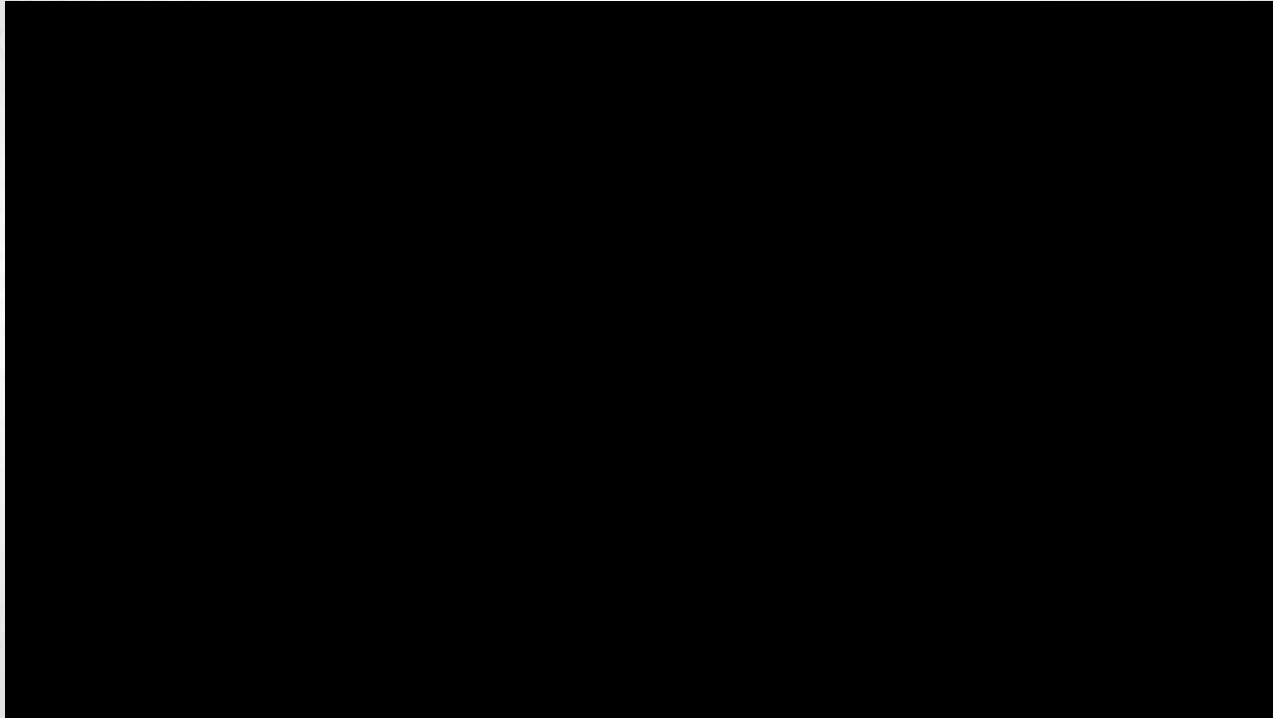


- Safety First – Have a Plan
- Maintain Control of the Load
- Maintain Visibility and Communication

Benefits of Air Casters

- **Multi-Purpose** – Variety of load types can be moved
- **Flexible** – Not limited to a fixed travel path
- **Low operating cost** – No moving parts = low maintenance
- **Protect floors** – Very low surface contact pressure
- **Less manpower** – Reduced friction makes it fast and easy
- **Easy to learn** – No certification required
- **Large capacity** – Float extremely big, heavy or awkward loads
- **Safety** – Load is low to the floor
- **Not disruptive** – Clean, quiet, smooth

So easy a child can do it





Thank You

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