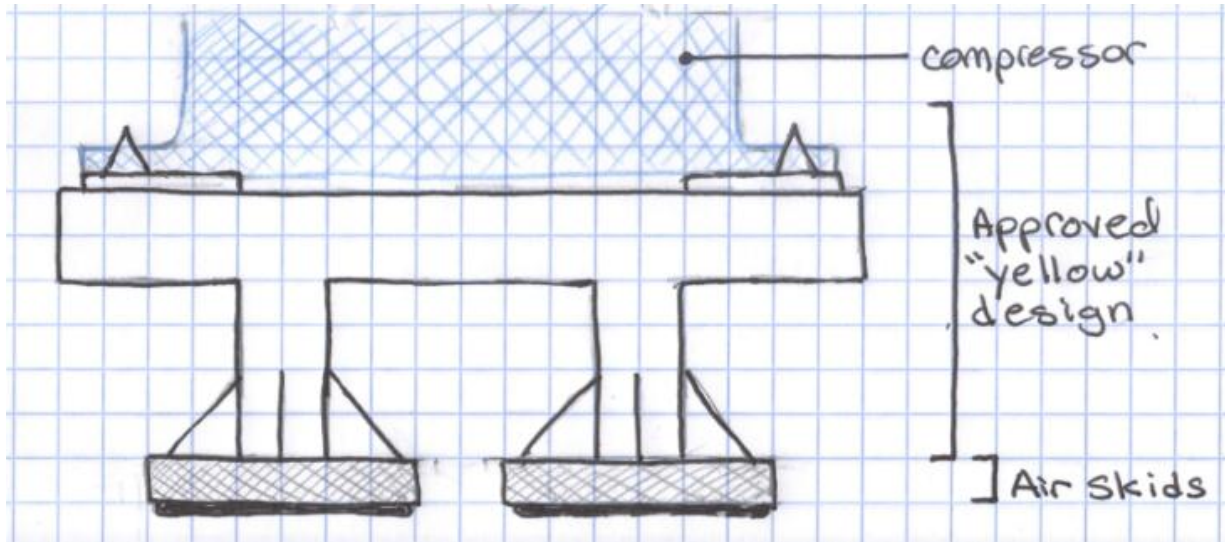


RIT P13458 Senior Design Team

<http://edge.rit.edu/edge/P13458/public/Home>

3/11/13

Air Bearing Design Option I: Updated “Yellow” System Design



Explanation: The air compressors would rest on a 4x4 box steel frame. Two frames would be required for all compressors except the Super HOS 6. A universal “flip plate” would fit into the bolt holes on the compressor frames and into holes in the top beam. Tapered pegs would allow the compressor frame to self center when lowered onto the cart. Jack stands can be placed at the ends of the main beams to level the unit during assembly. Each cart will float on two 15” air bearings. Beams would be fabricated to attach to the back of the cart to allow for tugger attachment.

Summary:

Pros

- Universal design: one system for every model using pin-plate attachment
- Easily stored: stackable, only one frame size necessary
- Modular: flexible - use 2 carts for MOS, HOS and 3 carts for HOSS

Cons

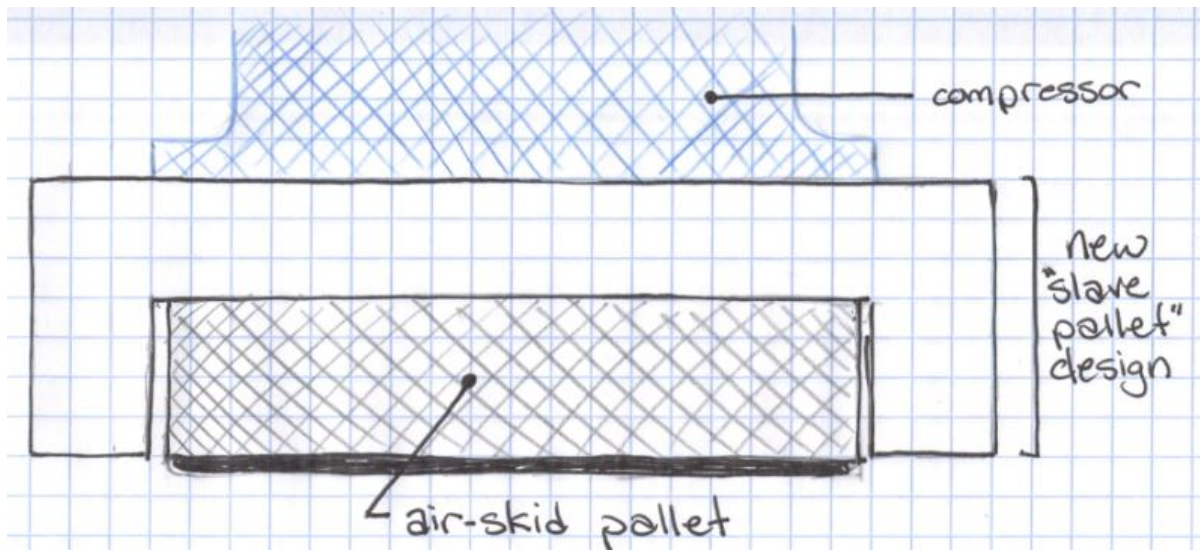
- Crane (lifting) required after cylinders are attached for rest of process: carts cannot support the weight of the frame + cylinders. Carts do not account for large CG changes
- Poor directional control: by itself, the wheeled cart would require a fixed path (locked caster, track, etc)
- Needs tugger design: tugger interface with cart has yet to be determined

- Small profile: completely underneath frame outline
- Floating attachments. The compressor frame is not rigidly attached to the frame, but rather sits on the pin-plate.
- Simple construction
- Cost effective
- Leveling built into design. The frame can be supported on the ends by jack screws, and will allow for leveling
- APPROVED: D-R agreed to the design prior to the air bearing demo

Next Steps if Pursued:

- Finalize design and dimensions with tugger attachment
- Fully detailed stress analysis
- Complete in 1-2 weeks

Air Bearing Design Option II: Slave Pallet Design



Explanation: The slave pallet design will consist of two main components: steel 'slave' pallet(s) and an air skid that acts as a powerful transport cart. The slave pallets will be in direct contact with the floor surface and loaded with the compressor frame, the air skid can then be slid into

the opening in the slave pallet and used to lift/move the compressor through the line one at a time.

Summary:

Pros

- Defragmented: the line will no longer require a different material handling solution post cylinder hang
- Testable: allows for the testing of the compressor without removal from the slave pallet
- Return: compressor can be shipped on the slave pallet which can then be returned or purchased
- Modular: flexible - use 2 MOS/HOS slave pallets for MOS, HOS and 3 HOSS slave pallets for HOSS.
- Simple: design will be a bare steel frame, no complicated interfaces will be required for air bearing integration
- Cost Effective: design will allow for a single air bearing pallet that can be removed and used to move all slave pallets on the line individually

Cons

- Supply: construction of new slave pallets will be required if not returned promptly from a previous sale
- Design: will require a completely new design, not simply a redesign
- Ergonomics: will require a much larger profile under the compressor to accommodate the air pallet
- Floor: requires a level path to travel, air bearings will lift the slave pallet approximately 1/2" off the floor, any deviation in the floor greater than this could cause the pallet to get stuck
- Paint: access to the bottom of the compressor frame would be limited, best bet would be to get the frames (at least the bottom) painted before hand
- Not Universal: will require at least 2 different sized slave pallets. A MOS/HOS and an HOSS

Next Steps if Pursued:

- Complete design and analysis
- Finalize design with dimensions
- Complete in 6 weeks