

Idea Name:

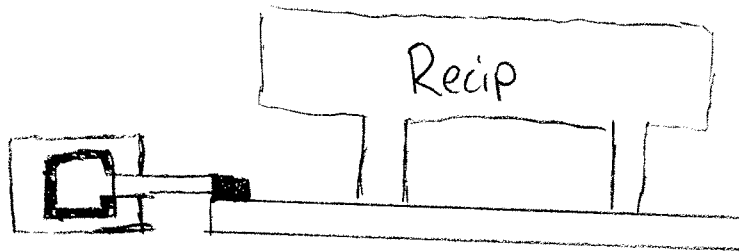
Large Inertial Shock

P12453: Reciprocating Pump and
Novel Cooling Project

Date

1/11/12

Project Sketch



Project Description:

Attach a inertia shock onto the skid, the shock will
add dead inertia and viscous damping to the system

Idea Pros:

- On Skid mounting
- detachable

Idea Cons:

- large item over hanging
off skid
- not adjustable

Idea Name:

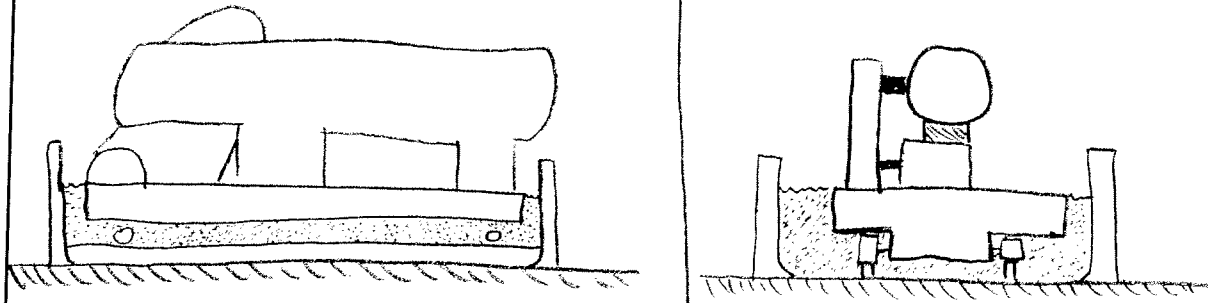
Shallow Pool of Pitch

P12453: Reciprocating Pump and Novel Cooling Project

Date

1-11-2012

Project Sketch



Project Description:

Using a very viscous fluid, the baseplate of the pump would be immersed to provide an untuned viscous damper.

Idea Pros:

- Failure

Idea Cons:

- Messy
- Complicated Installation
- Difficult to get exactly right
- Expensive

Idea Name:

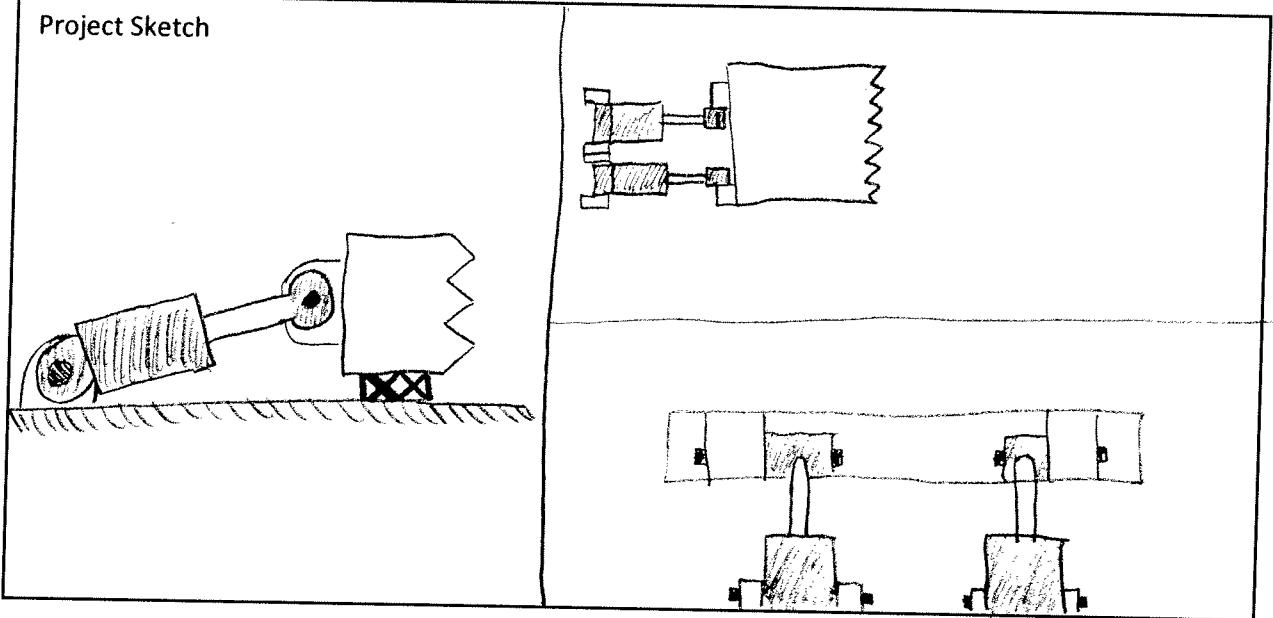
MR Fluid Dampers

P12453: Reciprocating Pump and Novel Cooling Project

Date

1-11-2012

Project Sketch



Project Description:

This design uses Lord Corp's MR dampers to control vibrations. Utilizes existing crane mounts on the skid that the pump is mounted to.

Idea Pros:

- MR dampers are variable & controllable
- Existing relations with Lord keeps costs down.
- Simple to install
- Provides possibilities for vibrate labs

Idea Cons:

- Does require mounting holes in the floor.
- Expensive if not sponsored by Lord
- Requires a controller

Idea Name:

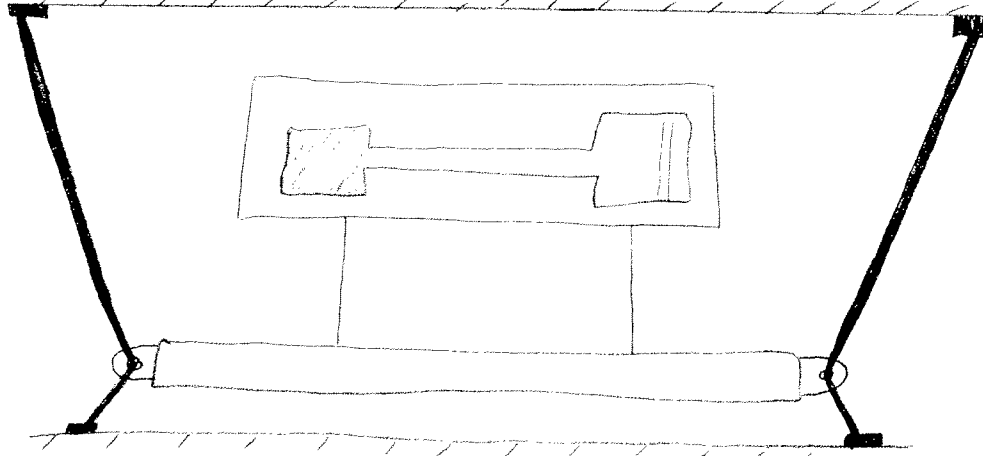
Hanging System

P12453: Reciprocating Pump and Novel Cooling Project

Date

1-11-2012

Project Sketch



Project Description:

Suspend the compressor from wires so that it is not in contact with the ground. Wires can be strategically placed to eliminate vibrations.

Idea Pros:

- Could potentially eliminate all vibrations

Idea Cons:

- Complicated
- Dangerous
- Where to mount wires to building

Idea Name:

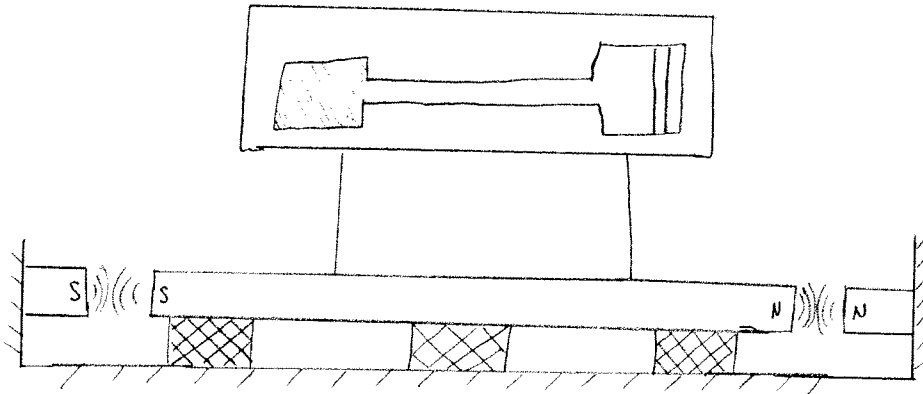
Magnets

P12453: Reciprocating Pump and Novel Cooling Project

Date

1-11-2012

Project Sketch



Project Description:

Mount electromagnets to the end(s) of the skid and also opposing ones so that their resistance to each other balances the system and eliminates the vibrations.

Idea Pros:

- Controllable (vibration amount can be adjusted)
- Easy to install

Idea Cons:

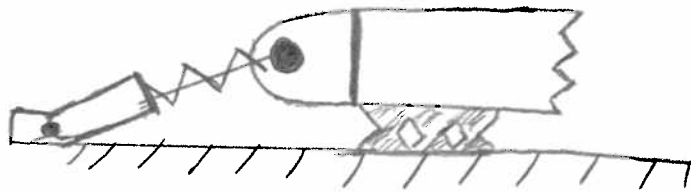
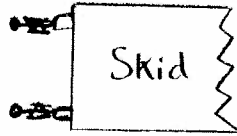
- Requires more energy than other systems
- Bad for other electronics (potentially)
- Possibly dangerous for people
- Possibly expensive

Idea Name:
Car Struts

P12453: Reciprocating Pump and
Novel Cooling Project

Date
1/11/12

Project Sketch



Project Description:

Use Car/Truck struts attached between floor and
crane mounts already attached onto skid.

Idea Pros:

- Cheap
- Variety available

Idea Cons:

- Dangerous to attach/reattach
- Non-adjustable damping
- Off skid mounting can damage floor

Idea Name:

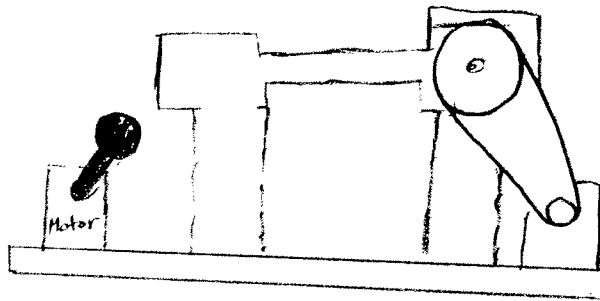
Weighted Motor

P12453: Reciprocating Pump and
Novel Cooling Project

Date

1/11/12

Project Sketch



Project Description:

Use a motor with a off-center rotating mass to cancel
out vibration

Idea Pros:

- Could eliminate all vibration if tuned correctly
- Could adjust how much vibration is eliminated
- On Skid mounting

Idea Cons:

- Control System needed
- Hard to tune
- rotating mass while running

Idea Name:

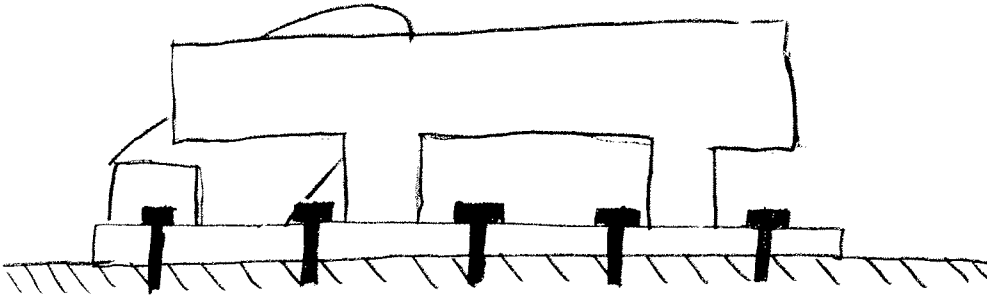
Stiff Bolts

P12453: Reciprocating Pump and
Novel Cooling Project

Date

1-11-2012

Project Sketch



Project Description:

This solution calls for bolting the skid directly to the floor.

Idea Pros:

- Simple
- Fail-safe
- Typical in industry

Idea Cons:

- Building might not be strong enough
- Rely extensively on outside contractors
- Lots of vibrations transmitted directly to the building

Idea Name:

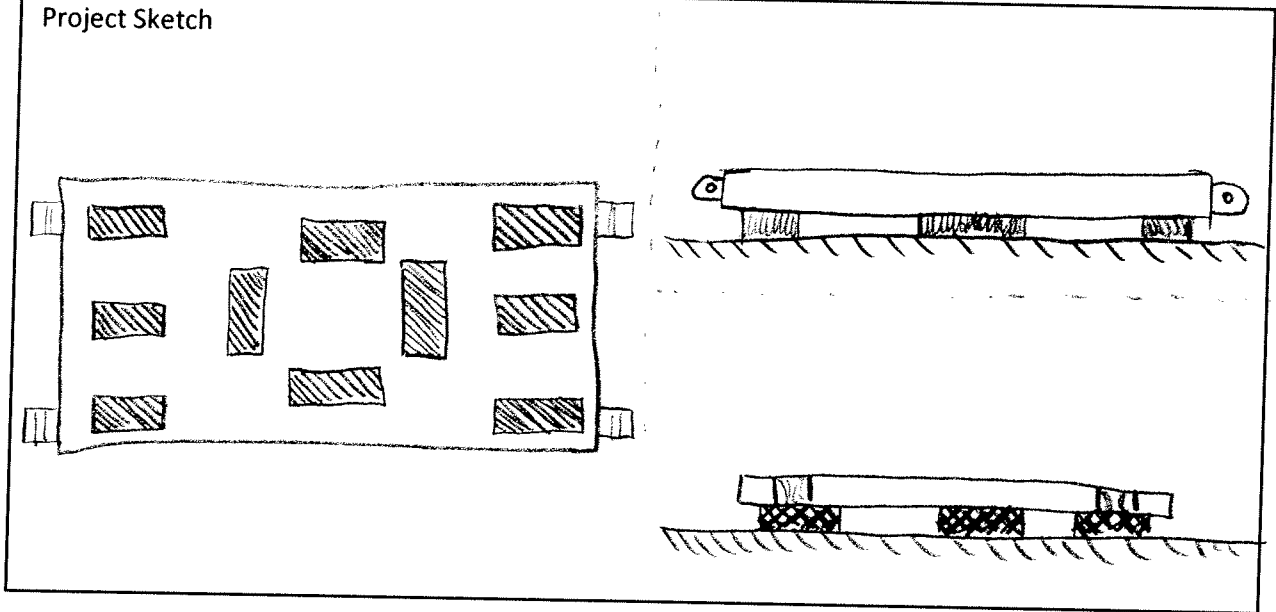
Improved Lattice Mounting

P12453: Reciprocating Pump and Novel Cooling Project

Date

1-11-2012

Project Sketch



Project Description:

This solution modifies the existing mounts to reduce vibrations. This would involve lifting the pump, replacing the mounts & the orientation of the mounts.

Idea Pros:

- Simple
- Fail safe
- Relatively cheap

Idea Cons:

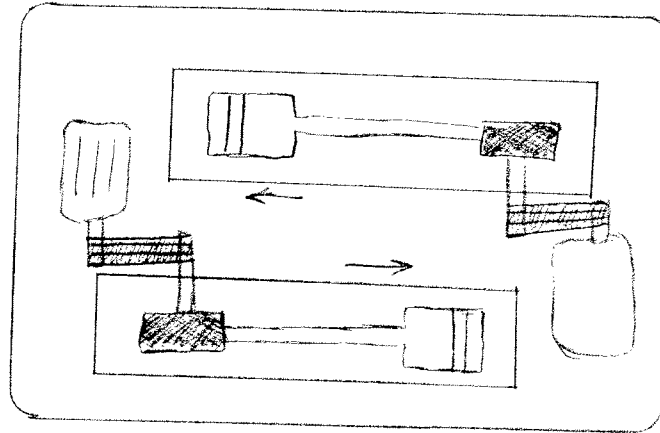
- Requires additional analysis
- Requires lifting the skid
- Would probably require new mounting holes
- More stress into the structure of the building

Idea Name: 2nd Out-of-Phase Compressor

P12453: Reciprocating Pump and Novel Cooling Project

Date
1-11-2012

Project Sketch



Project Description:

By adding another compressor, you could essentially cancel out the vibrations by offsetting the second piston 180° out-of-phase. The two pistons' motion would effectively cancel each other out.

Idea Pros:

- If perfectly out-of-phase, the vibrations could be cut down to zero.
- Simple
- Relatively fail-safe
- Typical in industry (well known and understood)

Idea Cons:

- Very, very expensive
- Very heavy (floor would need more reinforcement)
- Unless they are exactly out-of-phase, the vibrations could potentially get worse.