

Machine Moving

By

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Machine Moving

- Sources
 - **Metalworking: Sink or Swim** by **Tom Lipton**
 - Google Images
 - Vendor Web Pages
 - YouTube
 - Own experiences
- Formerly professional riggers and movers moved most heavy machinery.
- Today, especially in small shops and home shops, DIY is more common.
- Buy, build, rent or borrow moving tools?
- Hire a professional mover?

Basic Lifting Tools

- Fork Lift
- Local mover wanted \$700 to move Bridgeport Mill (2200 lb.) from driveway into garage.
- Mover estimated that 2 men and a fork lift would be needed.



Basic Lifting and Moving Tools

- New machine tools will often arrive bolted to a pallet.
- Pallet Jack
- Northern Tool
- \$259.99
- 2,500 lb. capacity



Basic Lifting Tools

- Pry Bars
- \$91.82
- 8, 12, 18, 24, 32, 36 inch sizes
- Four bar set available at Harbor Freight \$9.99



Basic Lifting Tools

- Spud Bar
- Harbor Freight “Digging Bar” 72 in., 17 lb., \$27.99



- Homemade Pry Bar

Basic Lifting Tools

- Machine Wedge
- Good for initial lift where easy grip not possible.
- Often home made by hammering a piece of pipe into a wedge shape.



Basic Lifting Tools

- Gantry Crane
- \$699 at Harbor Freight



Basic Lifting Tools

- Chain Hoist
- \$109.99 at Harbor Freight
- 5 Ton capacity



Chain Hoist and Pivoting Crane

- Gene Rowan at his shop.
- Chain Hoist
- Overhead crane pivots around vertical beam just behind hoist.



Basic Lifting Tools

- Engine Hoist
- Harbor Freight
- \$189.99
- 1500 lb. capacity



Basic Lifting Tools

- Engine Hoist used to lift Clausing horizontal mill.
- Note the use of chains to grasp the machine.
- Man in the picture is a professional machine mover.
- Mill weighs 1,000 lbs.



Basic Moving Tools

- Clausing mill loaded to a Hand Cart.
- Mill weighs 1,000 lbs.



Basic Lifting Tools

- Toe Jack
- Bottle Jack with attachment and extended foot.
- Amazon
 - Jet 2 ton toe jack
 - \$200.99



Making a Toe Jack

- From YouTube “Toe Jack Episode 1”
- Very Strong Design



Basic Lifting Tools

- Cable Winch
- Commonly called a “come along”.
- Harbor Freight
- \$11.99
- 8000 lb. capacity
- Lift or pull.



Basic Moving Tools

- Steel bars commonly used as rollers.
- Grease and liquid soap have been used by people who don't mind cleaning up messes.
- Plastic sliding pads are good for a few hundred pounds.



Basic Moving Tools

- Machine Skate
 - Northern Tool
 - \$39.99
 - 3300 lb. capacity
- Tom Lipton recommends piece of wood between skate and machine.



Making a Machine Skate

- Youtube “Easy Equipment Moving with DIY Machine Skates”
- Bottom View
- ½ inch steel plate
- ½ inch drill rod (Tig Welded)
- Ball Bearings held on with E clips.



Yet Another Machine Skate

- From Global Industrial
 - Nylon Wheels
 - \$105.95
 - Steering Arm
 - 6000 lb. capacity
- Grizzly Industrial
 - HDPE Wheels
 - \$79.95
 - Steering Arm
 - 6000 lb. capacity



Rigging Tools

- Rope
- Cable
- Chain
- Sling
- Rope and fabric slings are non-conductors
- Rope and fabric slings are less likely to damage delicate machine parts.
- Steel on steel is prone to sideways slippage. Chains and cables must be secured against sideways movement.

Rigging Tools

- Armstrong C Clamps
- Strongly recommended for use in machine moving by Tom Lipton
- Note the pointed tips... no pivoting pads.
- IronworkersTools.com
- \$129.00



Rigging Tools

- Load Leveler
- Harbor Freight
- \$26.99
- $\frac{3}{4}$ ton capacity



Rigging Tools

- Lifting Sling
- Northern Tool
- \$24.99
- 6 ft. long
- 6,400 lb. capacity



Rigging Tools

- Tow Strap
- Harbor Freight
- \$11.99
- 2 in. X 20 ft.
- 2,830 lb. capacity
- Lift or Pull



Lathe Moving with Engine Hoist

- YouTube
- Engine Hoist used to pick up and move lathe
- Weight distributed with lifting bar.
- Straps spaced on either side of center of gravity.



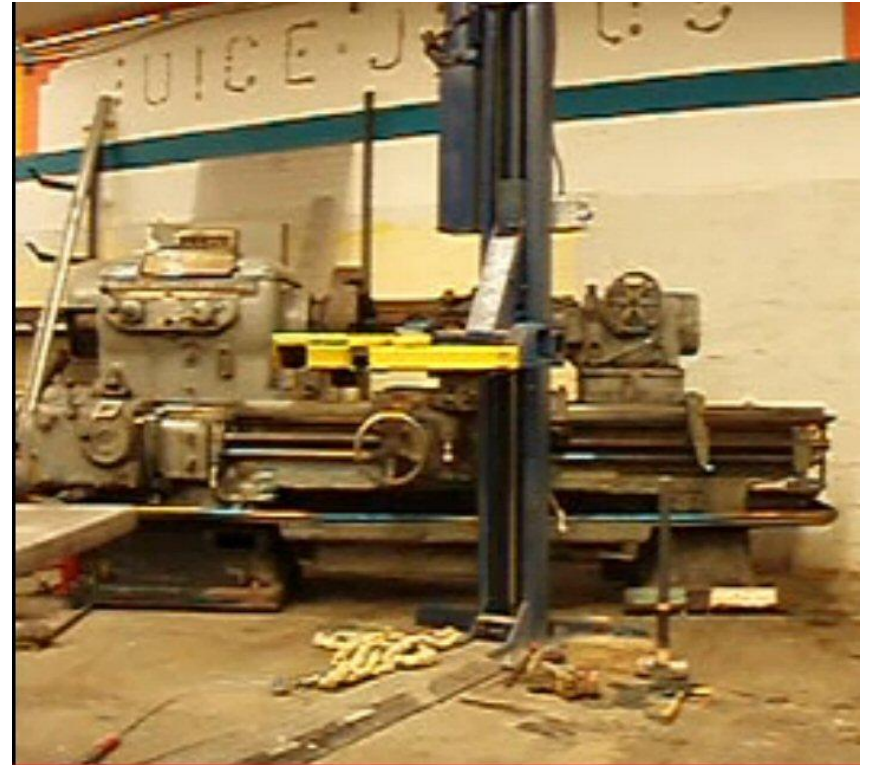
Mill Moving with Engine Hoist

- YouTube
- Engine Hoist used to pick up and move Mill.
- Lifting straps gripping high... well above center of gravity.



Lathe Moving

- YouTube
- 12,000 lb. lathe
- Note orange toe jack at far left bottom of lathe.
- After jacking, steel bar rollers placed under lathe.



Lathe Moving

- YouTube
- Large pry bar used to move lathe on rollers.



Moving a Bridgeport

- YouTube
- 2200 lbs.
- Gantry crane and chain hoist used to pick up mill for loading to a truck.



Moving a Bridgeport

- Gantry crane and chain hoist used to lift mill.



Moving a Bridgeport

- “Basement” shop is actually at street level.
- Ramp used to traverse small step (3 in.)
- Note steel bar rollers under mill.



Moving a Bridgeport

- Steel cable and “come along” used to control mill as it moves down ramp.
- Out of picture “come along” is attached to a car to anchor the mill.



Moving a Bridgeport

- Pry bar used to move mill.
- Steel rollers resting on 4x4 wood beams.
- Work table has been removed. Allows mill to fit through door. Protects gibs and dovetail surfaces.

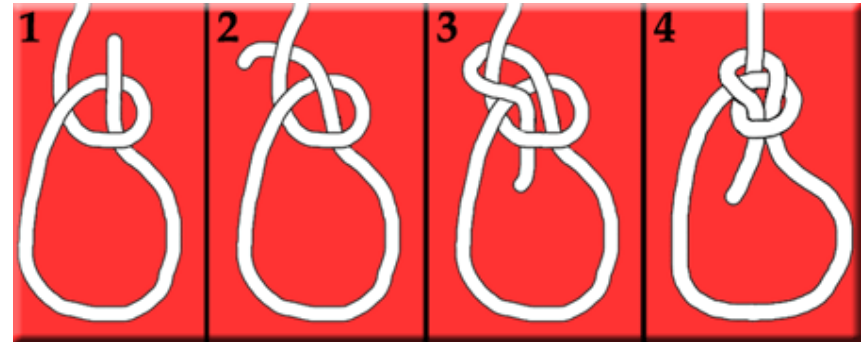


Tips and Pitfalls

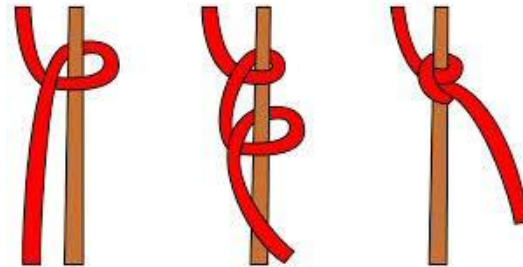
- Tom Lipton
- “The rigger must not guess, he must know.”
- Know the weight
- Know the capacity
- Retain the Load
- Control the Load

Two Important Knots

- Bowline ... to put a loop on the end of a rope.



- Half Hitch ... “trucker’s hitch” ...to make a rope taught (no slack)



Hitches

- Choker Hitch
- Basket Hitch
- Inverted Basket Hitch
- Toggle Hitch

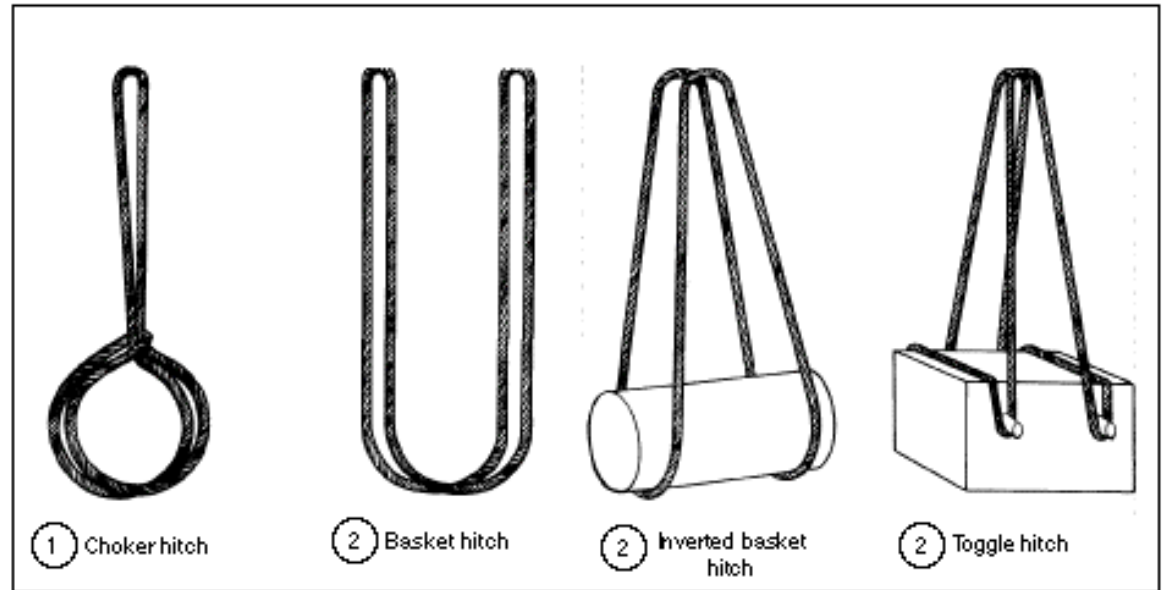


Figure 3-5. Endless slings

Eye Bolts

- Jet mill (Bridgeport Clone) at Rex Tools has built in eye bolt on top of mill for lifting.

The Importance of Wood

- Steel against steel or concrete tends to slip if there is any sideways force.
- Wood increases friction... even on oily surfaces.
- Pry bars should be used with wood blocks to avoid slippage.
- Machine skates should have wood between them and the machine. Prevents slippage and scratching.
- Wood slats or a wood pallet should be

Machine Skate Tips

- From **Tom Lipton**...
- Use three machine skates; never four.
- Three skates are easier to arrange into a stable configuration where each skate has significant weight on it..
- Four skates leave the possibility of one skate slipping out of position... especially on uneven floors.
- Align skates in the direction of desired movement.

Hauling Sheet Metal

- From Tom Lipton...
- Clamp multiple sheets of sheet metal together with C clamps.
- Clamp sheet metal to plywood or oriented strand board with C clamps.
- Tie wood backing to truck with rope.

If a Machine Slips...

- From Tom Lipton...
- Get out of the way... no heroics
- Do not attempt manual intervention... gravity is stronger than you are.
- Better yet, don't get in the way in the first place.

Safety Tip

- Mousing Hooks.
- Several loops of twine, string or rope used to prevent loop from jumping out of hook.

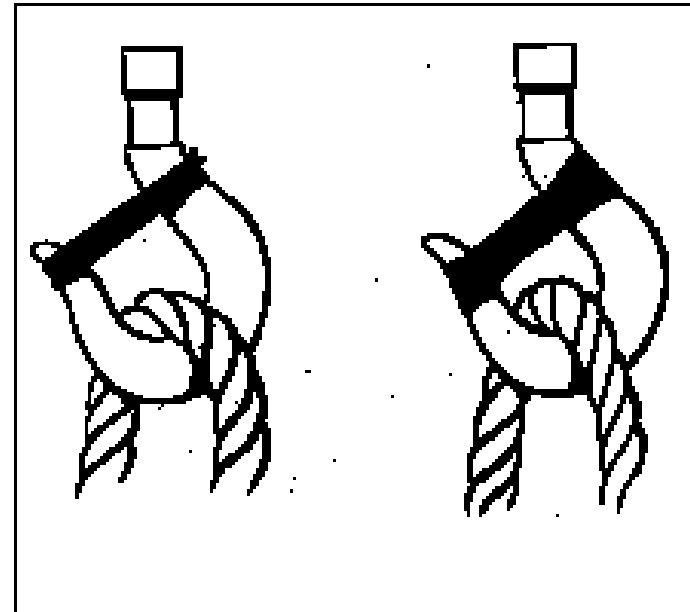


Figure 3-4. Mousing hooks

Weight?

- How can you measure the weight of a machine?

The End