



JACK & SLIDE: EVERYTHING YOU NEED TO KNOW

Background, Applications & Case Studies of Jack & Slide Equipment

1

Team Introductions:
ITI, HydraSlide, LGH & Robins & Morton

2

Introduction to the Hydra-Slide:
Applications & Project Uses

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Robins & Morton Case Study:
Sliding Condenser Units

4

Q & A:
Live Question and Answer Session

JACK & SLIDE: EVERYTHING YOU NEED TO KNOW

This panel brings together years of extensive experience in rigging, engineering, equipment, and power and industrial construction.



PAT CLARK

National Rental Support Manager,
Lifting Gear Hire (LGH)

- Manages Rental Support Group
- Trainer of LGH Products, Application and Sales Knowledge
- Featured within LGH demonstration and troubleshooting YouTube videos
- Presenter at CRC/ICHC 2013, Indianapolis
- Contributing writer to various LinkedIn groups
- Rental Representative; 1/05 – 6/12
- Safely tailored the most suitable equipment for customer applications
- Taught customer-based safe rigging and inspection training



DON MAHNKE

P. Eng., Founder / President,
Hydra-Slide Ltd.

- SVP, Mammoet Canada Eastern, 2001-2005
- Co-Founder, Engineered Transportation & Rigging Company (ETARCO), 1991-2001
- VP, Lackie Transportation Svs, 1977 - 1991
- ETARCO gained an incredible reputation and was eventually acquired. Mahnke continued working for Mammoet for several years until Mr. Mahnke left to pursue other interests.
- Taught customer-based safe rigging and inspection training



JANINE SMITH

Vice President,
Hydra-Slide Ltd.

- Janine Smith joined Hydra-Slide Ltd. in 2011 as Director of Sales & Marketing to better serve its growing client base.
- Janine was promoted to Vice President in 2015
 - Inventory and Brand Management, Logistics and Client Relations
- The best part of her job: "What I like best are the customer visits and product demos I get to do. Meeting face to face and developing relationships with future clients will never be replaced by emails. Seeing the excitement about what our equipment can do for a client's business is awesome"



FRANK GREEN

Mechanical Superintendent,
Robins & Morton

- Frank Green has been a Mechanical Superintendent for Robins & Morton for 3 years.
- Mechanical Superintendent with Southern Company for 9 years.
- Mechanical Superintendent for BE&K for 8 years.



SONNY CALDERONE

Engineering, Power & Industrial,
Robins & Morton

- Sonny Calderone has a diverse history with Robins & Morton.
- Having been with them since 2011, he has held many engineering, superintendent and managerial positions.
- Within his tenure as a Journeyman Ironworker and Rigger, he has overseen many personnel, and was charged with the inspection of critical lift plans, as a Field Safety Engineer.
- 3D Lift Plan Certified Expert

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- 300,000 lb. Heavy Duty Load Cell
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- Dynamic Testing
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Rigging Training



- Master Rigger
- Intermediate Rigging
- NCCCO Certified Rigger Level I
- NCCCO Certified Rigger Level II
- NCCCO Certified Signalperson
- Rigging Gear Inspector Level I/II
- Rigging Gear Inspector Level III
- ITI Qualified Rigger
- ITI Qualified Signalperson
- Basic Rigging & Inspection

Crane Training



- Mobile Crane Operator
- NCCCO Certified Mobile Crane Operator
- Mobile Crane Inspector
- Crane Assembly & Disassembly Director
- Boom Truck Operator
- Overhead Crane Operator
- NCCCO Certified Overhead Crane Operator
- Overhead Crane Inspector
- Pedestal Crane Operator
- Pedestal Crane Inspector

Lift Planning & Management Training



- Lift Director & Site Supervisor
- Critical Lift Planning
- Crane Assembly & Disassembly Director
- Accident Investigation
- Heavy Lift & Transport Master Class

Certification Training



- NCCCO Mobile Crane Operator Certification
- NCCCO Signalperson Certification
- NCCCO Rigger Level I Certification
- NCCCO Rigger Level II Certification
- NCCCO Overhead Crane Operator Certification

For more info visit: iti.com/training



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Hydra-Slide

- Don Mahnke, P. Eng, President & Founder
- Janine Smith, Vice President

- Skidding Systems
 - Low Profile (400 ton capacity)
 - Heavy Track (300, 500, 1,000 ton capacity)
- Safest method for moving heavy loads horizontally

- www.hydra-slide.com



HYDRA-SLIDE

HYDRAULIC SKIDDING SYSTEMS



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Cranes • Rigging • Lift Planning • Engineering

ROBINS & MORTON

power & industrial

Robins & Morton

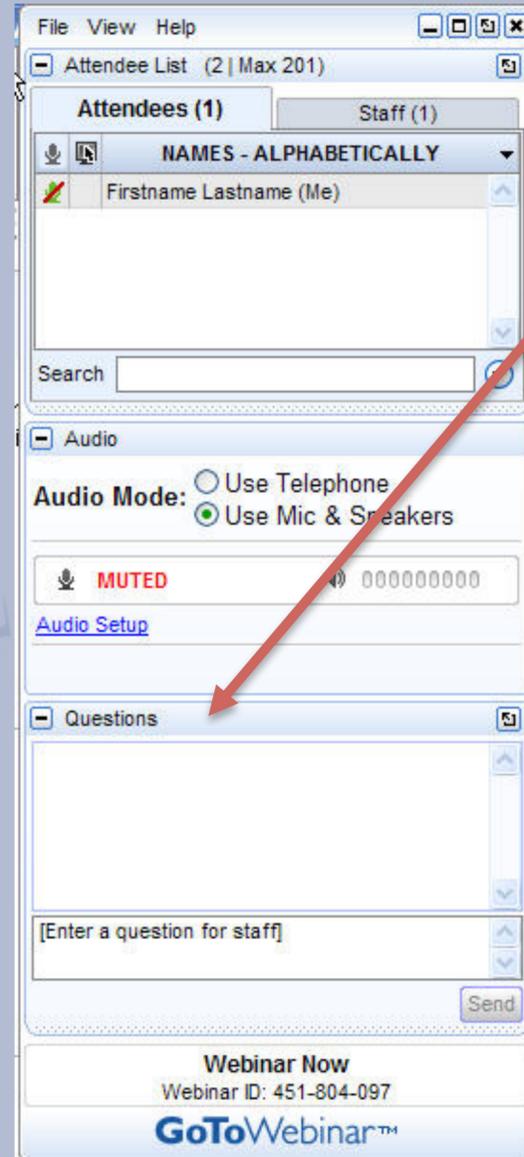
- Frank Green, Mechanical Superintendent
- Sonny Calderone, Engineer, Power & Industrial
- Founded in 2011
- Construction and Engineering Company
- Healthcare, Commercial, Government, Power & Industrial Sectors
- www.robinsmorton.com



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Questions?



Enter them in the question pane.

We will answer as many as time allows over the air at the end of the presentation!



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Cranes • Rigging • Lift Planning • Engineering



HYDRAULIC SKIDDING SYSTEMS

STRONG. SAFE. SIMPLE.



Move Heavy Loads Safely and Simply

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GENERAL DEFINITION

WHAT IS JACK AND SLIDE?



DON MAHNKE
P. Eng., Founder / President,
Hydra-Slide Ltd.



JANINE SMITH
Vice President,
Hydra-Slide Ltd.

- “Jack and Slide” or “Skidding” refers to a method of moving loads horizontally along a guided path and over a controlled friction surface
- Usually the load is first jacked up so the slide track can be placed under
- Sometimes also referred to as “Jack and Roll”



HOW BIG IS BIG?

Horizontal load movement can cover a full range of sizes and weights from a few hundred pound machine to large super heavy offshore platform structures.



World Record Load-out of 19,400 tonne
by ALE using 48 x 650 tonne skid shoes



500 tonne capacity load-
compensating skid shoes



RATIONALE FOR SKIDDING SYSTEMS

WHAT ARE THE BENEFITS?

- Ability to move loads of all sizes and weights including extremely heavy loads
- Takes very little space
- Low height; a strategic and safety advantage.
- Typically no external forces required.
- Relatively simple setup.
- Long equipment life
- Versatility

A LOOK AT PHYSICS

PHYSICS PRINCIPLES THAT APPLY

Newton's Laws of Motion:

- First law: An object will remain at rest or move at a constant velocity, unless acted upon by an external force.
- Second law: Acceleration and force are vectors; an object will accelerate in the same direction as the direction of the net force applied. ($F = ma$).
- Third law: For every action there is an equal and opposite reaction.



A LOOK AT PHYSICS

INERTIA AND MOMENTUM

Every object that has weight has Inertia

- A tendency to do nothing or to remain unchanged.
(Newton's First Law)

A moving object has Momentum

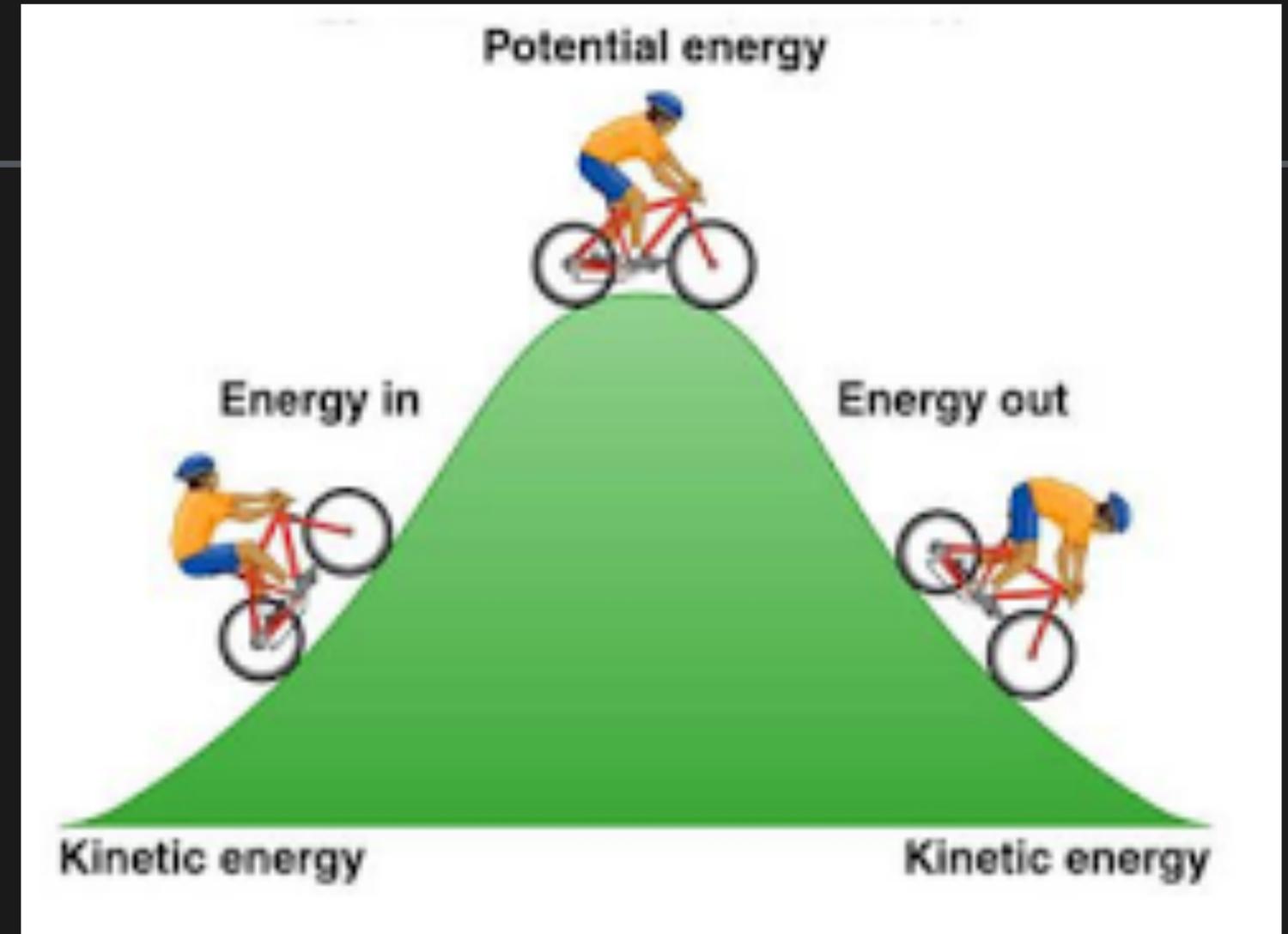
- The quantity of motion of a moving body, measured as a product of its weight times it's velocity.

Kinetic Energy is the energy that a body possesses by virtue of being in motion. Calculated as its' weight times it's velocity squared.

A LOOK AT PHYSICS

CONSERVATION OF ENERGY

- The total energy of an isolated system cannot change.
- Energy cannot be created or destroyed, but only change form.



ENGINEERING CONSIDERATIONS

COEFFICIENT OF FRICTION

Friction:

- The force resisting the relative motion of surfaces sliding against each other.

Coefficient of Friction (CoF):

- The ratio of the force of friction and the weight of the load.

Generally most skid systems operate with a 10% - 20% coefficient of friction.

What does this mean?

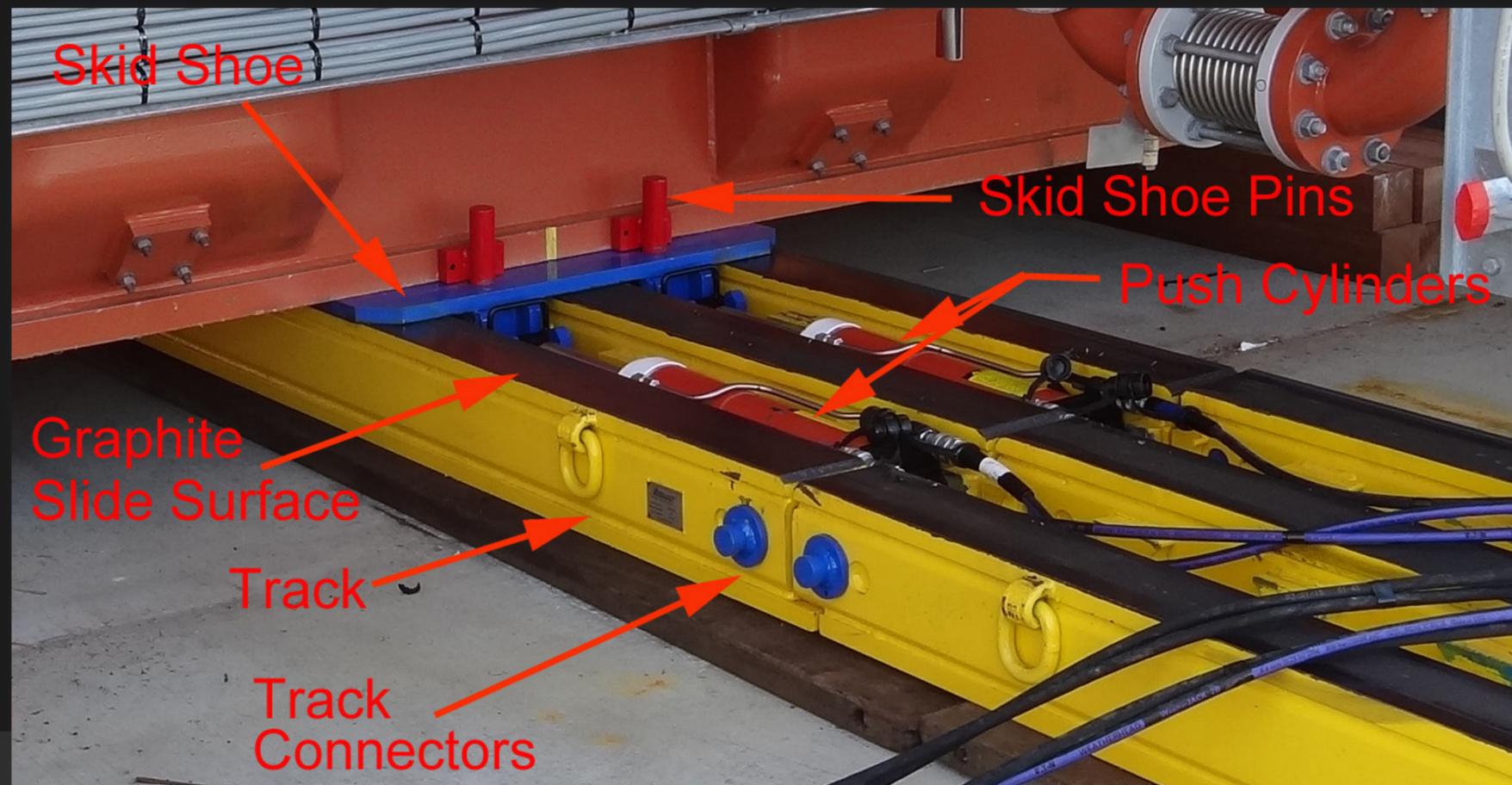
Load Weight: 250 tons

System CoF: 20%

Force Required to move the load = 50 tons

COMPONENTS DEFINITIONS

- Tracks & Connector Sets
- Skid Shoes and Skid Shoe Pins
- Pusher Cylinders and Safety Stop Blocks



- Connector Pin and Lug



- Safety Stop Blocks

ENGINEERING CONSIDERATIONS

GUIDED VS. UNGUIDED SYSTEMS



Unguided System: No restraints to stop the load from moving in unwanted directions.



Guided Systems: Maintains lateral restraints in the system.

DEFINITIONS

MODE OF FORCE



Internal Push



ENGINEERING CONSIDERATIONS WHICH DO NOT APPLY TO SKIDDING SYSTEMS?

Static and Dynamic Friction

- Due to the slow, controlled movement skid systems usually operate in the Static Friction range (10% - 20%)
- The high friction coefficient acts as a brake to prevent unwanted movement

Guided and Unguided

- Skid systems are Guided

Potential and Kinetic Energy

- Loads are generally moved at a very low height so Potential Energy is minimal
- Due to the slow controlled movement Momentum and Kinetic Energy are generally not an issue

Pulling at Angles

- Internal pushing forces are always inline

MOVING WITH ROLLERS



MOVING WITH ROLLERS



SOME HISTORY

MY FIRST SKIDDERS



About 1983

SOME HISTORY

MY FIRST SKIDDERS



About 1984

ENGINEERING CONSIDERATIONS GOOD IN TIGHT SPACES



ENGINEERING CONSIDERATIONS

PRECISE MOVEMENT



ENGINEERING CONSIDERATIONS SUITED FOR MOST TYPES OF SITE CONDITIONS



ENGINEERING CONSIDERATIONS

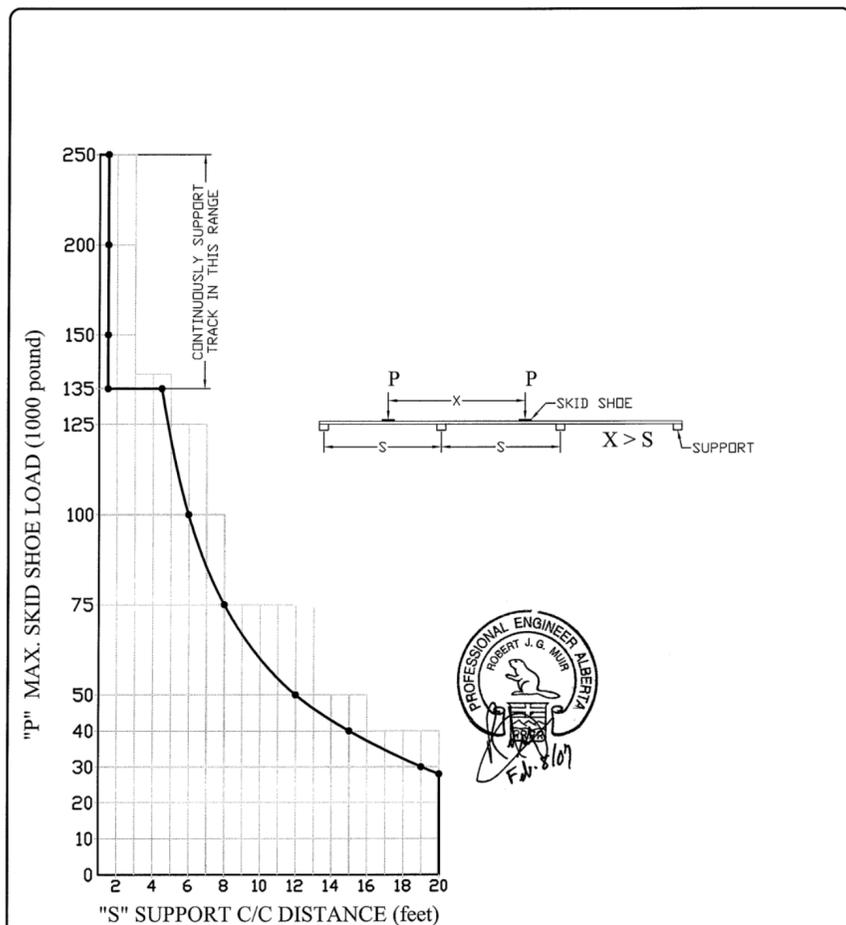
SURFACE CONDITIONS

- **Surface type:**
 - Concrete, asphalt, gravel, railcar deck, transport trailer
- Surface weight-bearing capacity
- Elevation changes
- Matting requirements
- Trenches or uneven surfaces
- What's underground?
- Obstacles in the load path or overhead?



ENGINEERING CONSIDERATIONS

TRACK CAN SPAN DISTANCES BETWEEN SUPPORTS



500 TON HYDRA SLIDE

Location				Sk. No.
Owner/Client	MuirTec Inc. PROFESSIONAL ENGINEERS 37 ALLEN STREET WEST WATERLOO, ONTARIO CANADA N2L 1C9 tel (519) 746-6368 fax (519) 746-3529			1
Project	Drawn by HH Designed by HH	Checked by RM Date NOV. 2006	Project No. M1-525 Scale 1/8"=1'-0"	Sheet



ENGINEERING CONSIDERATIONS

OPERATOR POSITION



Operator positioned for best visibility of the work or to see a signal-person at a minimum

UNCONVENTIONAL APPLICATIONS

SKID TRACK



Moving a storage tank
across a river on a
skid track

UNCONVENTIONAL APPLICATIONS

SKID TRACK



Skid track on top of lift beam for lateral movement

UNCONVENTIONAL APPLICATIONS

SKID TRACK



Skid track under lift tower
for longitudinal
movement

UNCONVENTIONAL APPLICATIONS

SKID TRACK



Loading a Steam Generator onto a free floating barge with a skid system

UNCONVENTIONAL APPLICATIONS

SKID TRACK

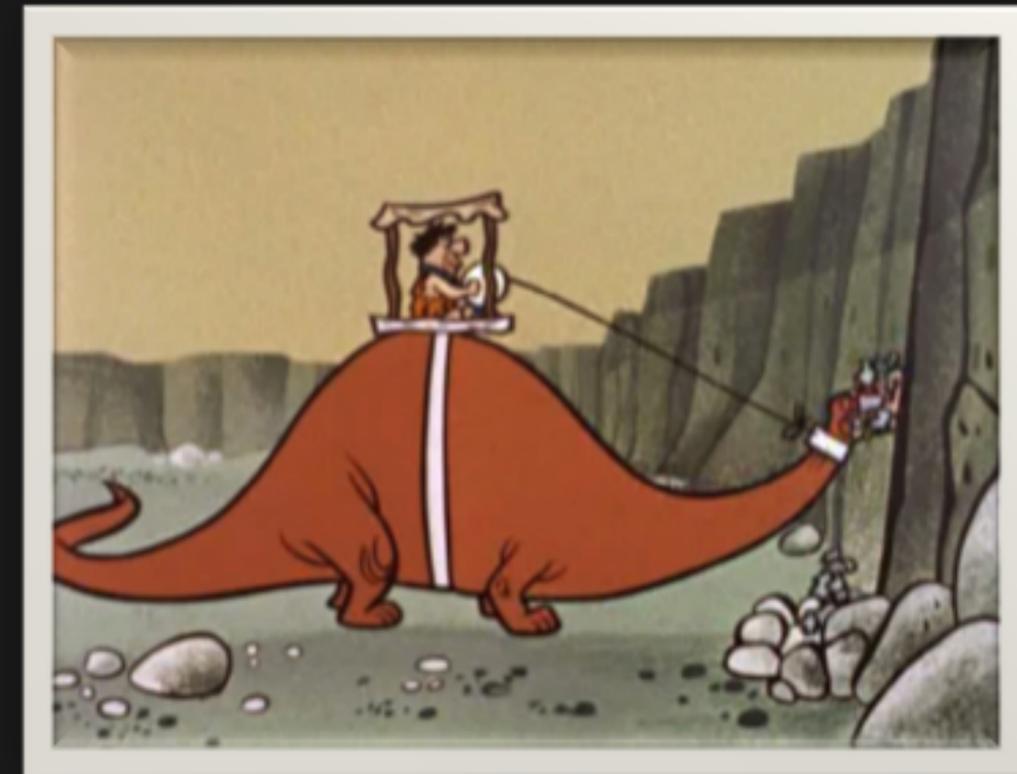


Installing a generator at height using a Skid System and Strand Jack Tower combination

CRANES

Cranes are one of the most common and useful pieces of equipment on a construction site but are not always the best choice for moving loads horizontally.

- Technical Constraints
 - Crane availability
 - Limits on crane setup space
 - Limits on pick and set area
 - Overhead clearances and obstructions
- Safety & Risk Assessment
 - Consider all the Laws of Physics
- Financial
 - Crane costs vs. benefits



CRANES

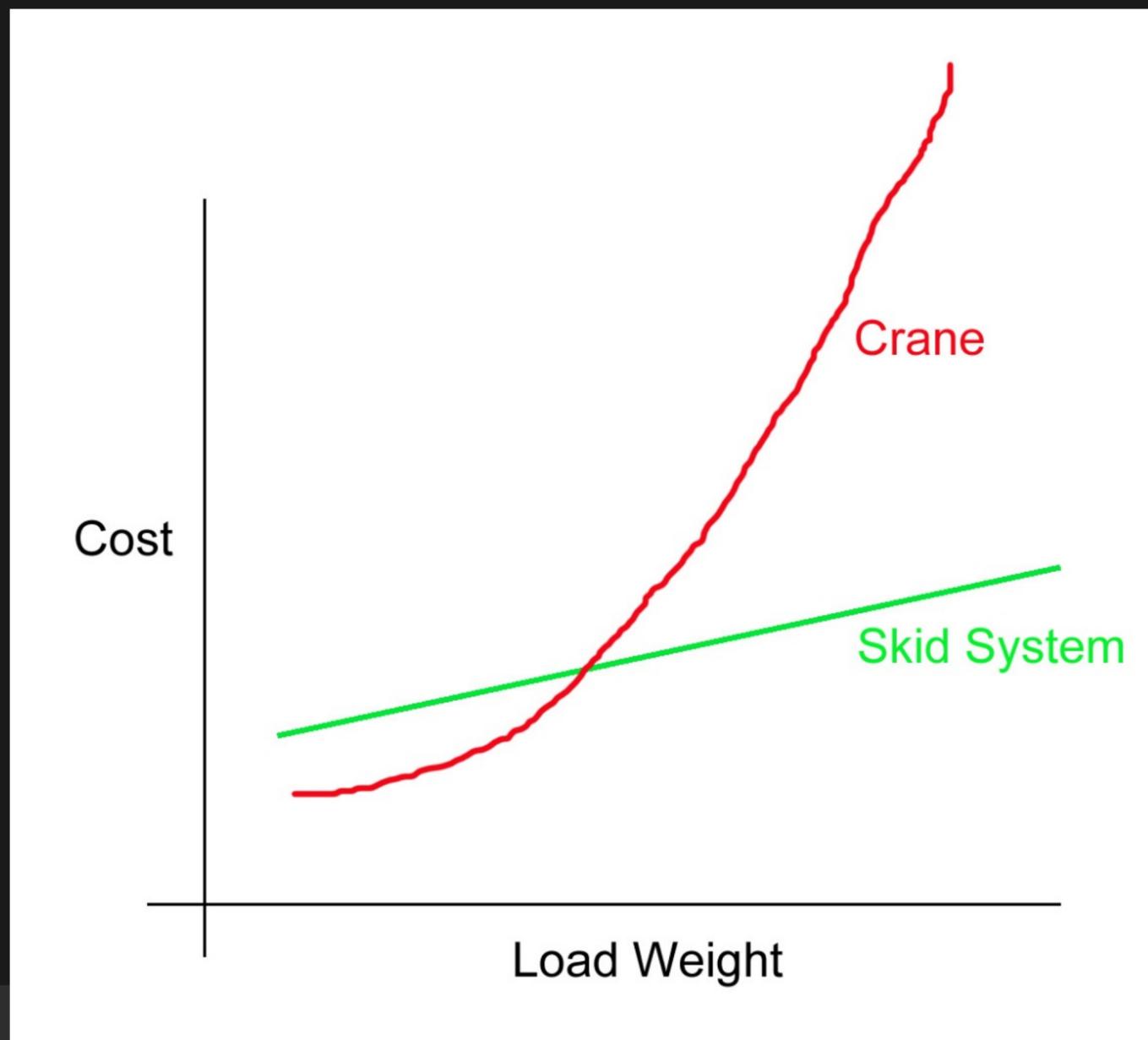


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RATIONALE FOR HORIZONTAL LOAD HANDLING COSTS — CRANE VS. SKID SYSTEM



IGNORE THE LAW OF PHYSICS?



ABIDE BY THE LAW OF PHYSICS





HYDRAULIC SKIDDING SYSTEMS

THANK YOU!

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ROBINS & MORTON

OVERVIEW



FRANK GREEN
Mechanical Superintendent,
Robins & Morton



SONNY CALDERONE
Engineering, Power & Industrial,
Robins & Morton



- History: Founded in 2011
- Robins & Morton P&I is an EPC construction firm.
- A commitment to client satisfaction, excellence in execution, and providing the best environment for our employees' growth cultivates a culture that makes Robins & Morton a trusted design and construction partner.
- People make the difference— and our people share a commitment to client service, safe behaviors, quality performance, integrity, and respect.



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ROBINS & MORTON SLID TWO 305 TON CONDENSER UNITS UNDERNEATH A STEAM TURBINE TABLETOP

- A steam turbine tabletop is a concrete foundation that houses the steam turbine and generator at a power plant.
- Used a rented HT Hydra-Slide Skidding System from LGH

SLIDING CONDENSER UNITS PROJECT

ROBINS & MORTON

power & industrial



THE CHALLENGE:

- With the size of the condenser, the only option is to slide them under the tabletop.
 - Using a crane wasn't a possibility
- The units are supposed to fit snugly – usually with only a few inches to spare.
- The physical sliding can take quite a bit of time.
 - This means more manpower and more money.

SLIDING CONDENSER UNITS **PROJECT**

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OTHER CONSIDERATIONS:

- Using a winch or a pulley type system to pull the units underneath is what Robins & Morton has done in the past.
 - This requires significantly more engineering – which means more time, money and manpower.
 - Sometimes, a hydraulic ram is used, but that takes a very long time.

SLIDING CONDENSER UNITS **PROJECT**

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VIEW 3D PERSPECTIVE

SLIDING CONDENSER UNITS **SET-UP**

Flying Tracks Into Position:

- Lightweight
- Easy Pick Points

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VIDEO CLIP



SLIDING CONDENSER UNITS **SET-UP**

Track Assembly:

- Easy to set up.

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SLIDING CONDENSER UNITS **SET-UP**

Jacking to Place Track

- Able to use the SPX designed lifting points on the condensers.

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SLIDING CONDENSER UNITS **SOLUTION**

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Hydra-Slide HT-500:

- Robins & Morton has used slide systems previously for steam turbine erections and rotor installations, among other projects.
- For this project, they recalled the capabilities of the Hydra-Slide:
 - Ability to reset itself
 - Equipped with its own hydraulics and track
 - Easy-to-use
 - Easy to set-up
 - Faster than other systems



VIDEO CLIP

SLIDING CONDENSER UNITS RESULTS

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SAVED TIME & LABOR:

- Easy to show client the benefits
- Saved time, labor, engineering hours and money
- Finished the job early and saved money in the process

USING THE HYDRA-SLIDE **WALBRIDGE**



VIDEO CLIP



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THANK YOU

We appreciate your time and attention.

Industrial Training International (ITI): www.iti.com

Hydra-Slide Ltd.: www.hydra-slide.com

Robins & Morton: www.robinsmorton.com

Lifting Gear Hire (LGH): www.lgh-usa.com