

TECHNICAL WORKSHOP

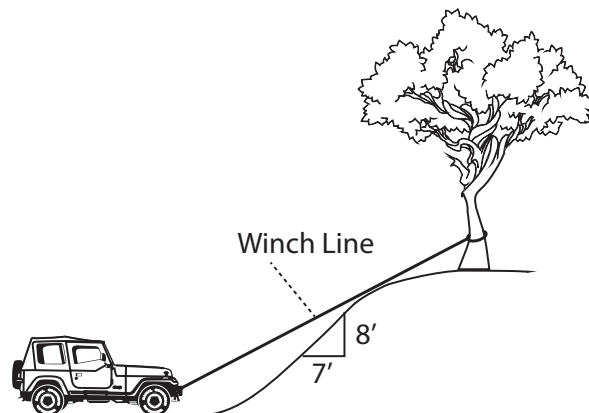
Incline Planes: 3 Points to Remember

When towing or pulling a load up an incline the effort increases with the slope. Here are three key points that the rigging crew should address to ensure a successful operation.

1. Know the load's weight and the rolling equipment's CoF (coefficient of friction). You'll notice the formulas offered from ITI's Master Rigger's Reference Card provide the means to calculate the required force if faced with a pull on a Level surface, Uphill or Downhill. Synthetic wheels such as provided with a common 3-point industrial rolling system offer a CoF of about .02, while steel rollers like those produced by Hilman, Multi-ton and Heavy Haul typically have a CoF of about .05. Discovering the CoF while on a level plane is especially helpful to refine the calculation for an uphill pull. Using a dynamometer in the winch line during a level pull can help finalize the approximate CoF for a particular set of rolling equipment.
2. Correctly accounting for the height, run and ramp length will help determine the values needed for either the Uphill or Downhill formula. These significantly influence the winch pull required and the sizing of the equipment; winch, snatch blocks, slings and shackles.
3. We have all heard about "staying out of the bight", which infers being clear of inside block angles and areas that can be in the line of fire if one experiences a sling or equipment failure. Some winches have controls immediately adjacent to the winch line, so the precaution is for non-essential personnel who aren't critical to the load pull while the equipment is under tension. In many cases, essential personnel must be next to loaded winch lines during the operation. It is a matter of minimizing the risk to the lowest level, verifying the calculations, confirming the capacity of the rigging equipment, developing and following the proper procedure and adhering to all reasonable safety restrictions where possible. Having the right equipment, well maintained and inspected is a significant key to success.

Now, let's have some fun. Try your hand at calculating the required force (tension in lbs.) by tackling the workshop at right. It is based on the adventures of Stinker and Tinker, two brothers who always seem to be getting into a rigging challenge (from Mike's Rigging Mysteries, www.iti.com/bookstore). (Truck winches are not officially covered by ASME or OSHA.)

Use the Uphill formula: $[CF \times W \times (R/L)] + [(H/L) \times W] = F$



Determine the amount of winch pull required to pull this truck out of a small canyon.

Given: The truck weighs 5,200 lbs.

Given: The run is 7' and the height is 8'.

Given: The ramp length (L) is 10.6'.

Given: The coefficient of friction is .05.

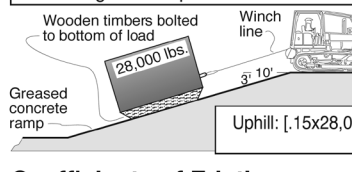
1. The required winch pull is ____ lbs.
2. The winch and its mounting is rated at 5,000 lbs. Is it overloaded? Yes ____ No ____

Hint: Refer to the MRRC-P6. (While stump-jumping, Stinker ended up sliding down into a small canyon and his truck doesn't have the horsepower to get out the same way he came in.)

Level & Incline Planes

[For Estimation Only] ⑥

| Legend | Formulas |
|--------------------------------------|---|
| W = Weight of load | Level: $CF \times W = F$ |
| CF = Coefficient of Friction | Uphill: $[CF \times W \times (R/L)] + [(H/L) \times W] = F$ |
| F = Force required to move load | Downhill: $[CF \times W \times (R/L)] - [(H/L) \times W] = F$ |
| H = Height in feet | |
| R = Run, horizontal distance in feet | |
| L = Length of ramp in ft. | |



Example

Uphill: $[.15 \times 28,000 \times (10/10.44)] + [(3/10.44) \times 28,000] = F$

$4,032 + 8,120 = F$

$12,152 \text{ lbs.} = F$

Coefficients of Friction

| | | |
|--------------------------|-----------------------------------|--------------------|
| Concrete on concrete .65 | Wood on metal .30 | Steel on steel .10 |
| Metal on concrete .60 | Cast iron on steel .25 | Load on wheels .05 |
| Wood on wood .50 | Continuous lubricated surface .15 | Load on ice .01 |
| Wood on concrete .45 | | Load on air .002 |

The workshop above was taken from Mike's Rigging Mysteries, Great Outdoors Book. All 110 workshops are available at www.mikesriggingmysteries.com. Answers to this workshop on Page 3.



After touching down in countries where the locals speak Malay, Mandarin, Tamil, Bahasa and Aussie (down-under), Bob is back home in the USA. In which of these fine American cities could you find Bob?

For those who respond with the correct answer to training@iti.com, we will be sending you a complimentary *Mobile Crane Operator Reference Card*. These are easy-to-read booklets that cover mobile cranes, overhead cranes and rigging. They make excellent training supplements for the workplace.



Hint: This city ranked 34th largest city in the U.S.

Big Plans for 2011 at the ITI Memphis Training Center

On October 25, 2010, ITI opened the doors of its new training center in Memphis, Tennessee for the inaugural training program. It was very fitting to christen the new training center with ITI's patented Master Rigger Program conducted by President Mike Parnell. After teaming up with Barnhart Crane & Rigging last summer, the new training center experienced by students is truly world class.



With a few programs under her belt, ITI Memphis has hosted 13 companies that represent 10 US states, in three months. Looking forward to 2011, ITI as scheduled 21 training programs at the new center. There are also several weeks available so ITI may host customers for "dedicated" programs (only for one customer's employees). Throughout 2011 ITI will be offering the following programs at ITI Memphis:

- Journeyman Rigger
- Master Rigger
- Rigging Gear Inspector Level I & II
- Rigging Gear Inspector Level III
- Lift Director & Site Supervisor
- Critical Lift Planning
- CIC Qualified Signaller - Basic
- Mobile Crane Inspector
- Mobile Crane Operator – ITI Qualified
- Mobile Crane Operator - Certification
- Mobile Crane Operator – Initial
- Overhead Crane Operator
- Overhead Crane Inspector
- CIC Qualified Rigger - Advanced

See the ITI Training Schedule for dates. To request a schedule, please visit iti.com/2011.

ITI Bookstore Industrial Training INTERNATIONAL

A World Leader in Crane and Rigging Resources

- Reference Cards
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- CD's & Videotapes
- Inspection Forms &
- Checklists
- Lift/Load Plans
- ASME Standards
- Posters & Decals
- Pocket Guides
- Tools & Field Equipment
- ...and much more



Mike's Rigging Mysteries

By Mike Parnell

11 booklets, 24 pages per book, 4.25" x 5.5", softbound
This series of books contains over 100 informative and educational rigging activities. Riggers and non-riggers alike will be entertained with hours of fun problem-solving activities. Included with this series of books are the Journeyman, Master Rigger and Rigging Gear Inspection Reference Cards that contain charts, tables, formulas and rigging illustrations for solving the workshops.

Item # 7000 - \$49.95 Complete Set

Item # 7010 - \$19.95 Starter Set (Includes two booklets plus Journeyman, Master Rigger and Rigging Gear Inspection Reference Cards.)



Mike's Safety Tips

By Mike Parnell

3 booklets, 26 pages, 2.75" x 4.25", softbound
These easy to read "tips" booklets work great as a set or as individuals. Each booklet contains over 25 tips per subject: rigging practices, mobile crane operations and overhead crane use. Your employees will enjoy the discussion that is generated around the "tips" subjects during monthly safety meetings. These booklets are also excellent for annual employee handouts, safety gifts and training supplements.

Item # 7050 - \$6.99 3-Booklet Set with plastic caddy

Item # 7050S - \$6.99 3-Booklet Set with plastic caddy-Spanish

Individual Booklet Prices

Item # 7051 - \$1.99 Mobile Crane Safety Tips

Item # 7052 - \$1.99 Overhead Crane Safety Tips

Item # 7053 - \$1.99 Rigging Safety Tips

Individual Booklet Prices - Spanish

Item # 7051S - \$1.99 Mobile Crane Safety Tips

Item # 7052S - \$1.99 Overhead Crane Safety Tips

Item # 7053S - \$1.99 Rigging Safety Tips

Great for Tool
Box Topics &
Safety Meetings



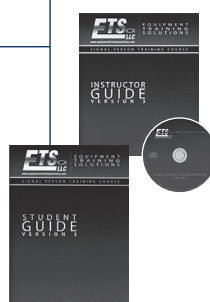
Meets OSHA's Required Regulations

(§1926.1422 Signals - hand chart signal)

Hand signal charts must be either posted on the equipment or conspicuously posted in the vicinity of the hoisting operations.

14" x 11" Decal. Designed to meet OSHA required regulations, this self-adhesive chart clearly displays the hand signals used in crane operations. Easy to read, green and black on white. Weather proof. Available in both English and Spanish.

Item # 9030 - English \$9.00 | Item # 9035 - Spanish \$9.00



Signalperson Training Program

CD and Instructor Guide

75 pages, 8.5" x 11", softbound

This state-of-the-art interactive training course covers OSHA 1926.1400 and ASME B30.5 hand signal requirements. Animations and videos illustrate the standard signals, along with an 75 question review designed to assess the students' level of knowledge.

Item # 3150 Instructor Guide (w/CD) - \$499.00

Item #3155 Student Guide - \$9.99

ITI Signalperson Testing Package

CD includes written and practical exams, evaluator guide, and certificate and qualification card templates

Item #4150 - Call for pricing starting at \$395.00



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Training that Produces Results

Ensuring Our Customers Always Rig it Right

ITI, A WORLD-CLASS LEADER

Our high energy field staff help client employees gain skills and knowledge using fun and interactive workshops. Proven techniques and quality materials make ITI the provider of choice for crane and rigging, training and consulting.

TRAINING

Hands-on crane and rigging training spearheaded by an interactive instructional design that never leaves a hand clean or a mind disengaged.
More Info >

FIELD SERVICES

Experience and expertise are what our clients appreciate the most when conducting services like audits, lift planning, and expert witness testimony.
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CERTIFICATION

A nationally-accredited certification for crane operators, riggers and signalpersons who need professional knowledge and skill level documentation.
More Info >

BOOKSTORE

The primary resource used by industry professionals and corporate trainers to educate themselves and all of their employees.
More Info >

E-LEARNING

Delivering knowledge and understanding to those who use cranes and rigging in easy-to-understand modules for beginners and veterans alike.
More Info >

Visit our website at iti.com to access all of these resources:



Subscribe to receive The Professional Rigger E-Newsletter at bottom of the ITI home page.



Download the **FREE** Crane & Rigging Info Kit in the iti.com Resources section.



Answers to Page 1 Workshop: 1. Winch pull = $[.05 \times 5,200 \times (7/10.6)] + [(8/10.6) \times 5,200] = 172 + 3,925 = 4,097$ lbs.
2. No

Crane & Equipment Training Programs

These courses are scheduled at ITI Training Centers or customized for presentation at your facility. Continuing Education Units (CEUs) are awarded for all programs. Course length may vary when conducted at your facility based on the number of participants, availability of equipment, customization, and qualification/certification requested.

Mobile Crane Operator Nationally Accredited Certification

Candidates for the mobile crane operator program may be apprentices in crane operations, current operators who have been trained by “field practices”, but not yet exposed to the formal side of crane subjects, current operators who need qualification or re-qualification, or crane maintenance personnel. This course is also excellent for supervisory personnel and lift directors who did not rise through the trades in the seat of a crane. This course is an ideal preparation course for operators who will be taking any nationally accredited crane operator exams.

Course Length: 5 Days

Mobile Crane Inspector ITI Qualification Available

This program is designed for crane maintenance mechanics and inspectors. It focuses on spotting the problems and identifying the damage that can be discovered through external evaluation. The course curriculum identifies and instructs students to crane components by the acronym “MESH” (mechanical, electrical, structural and hydraulic). It is an ideal preparation course for those who are governed by unique state or federal laws requiring “certified” inspectors.

Course Length: 5 Days

Forklift & Telehandler Operator Nationally Accredited Certification— Meets OSHA Requirements

All personnel who operator forklifts to conduct their work activities are required to be trained and qualified per OSHA. This program meets the OSHA requirements.

Course Length: 1 Day

Mobile Crane Operator Initial

This program is designed to assist a person who has little or no experience with mobile crane operation to establish good operating practices while gaining seat-time and real-life operating experience. Participants will conduct pre-operational inspections of hydraulic and lattice/conventional cranes, receive individual instruction regarding crane operating basics, and will gain seat-time while handling an empty and loaded hook.

Course Length: 10 Days

Boom Truck Operator ITI Qualification and Nationally Accredited Certification Available

Candidates for the boom truck operator program may be apprentices in crane operations, current operators who have been trained by “field practices”, but not yet exposed to the formal side of crane subjects, current operators who need re-qualification, or crane maintenance personnel. This course is also excellent for supervisory personnel and lift directors who oversee boom truck operations.

Course Length: 3 Days

Aerial Work Platform Operator ITI Qualification Available

Candidates for this course are those who operate Aerial Work Platforms to conduct their work activities. Manually Propelled, Self-Propelled and Boom Supported equipment is covered.

Course Length: 1 Day

Mobile Crane Operator Nationally Accredited Certification—Meets New OSHA Rule

This program is designed to prepare participants to take the general and crane-specific written exams in the CIC Nationally Accredited Operator Certification Series. The preparatory course and certification exams are formatted into three parts over a five-day period for qualified candidates: Test Preparation Training, Written Exams and Practical Exams. The test preparation training of this course (first 3 days) is an ideal preparation course for operators who will be taking any nationally accredited crane operator exams.

Course Length: 5 Days

Overhead Crane Inspector ITI Qualification Available

Candidates for this course include journeyman electricians and lead millwrights who are assigned to perform Frequent and Periodic Inspections on overhead lifting devices, which include bridge, gantry, monorail, fixed hoists, and jib wall mounts.

Course Length: 3 Days

Overhead Crane Operator ITI Qualification and Nationally Accredited Certification Available

Anyone who is required to operate an overhead lifting device, which include bridge, gantry, monorail, fixed hoists, and jib wall mounts, while performing their work activities or who is a crane operations trainee or crane maintenance personnel should attend this program. Certification is available.

Course Length: 1 Day

Rigging Training Programs

These courses are scheduled at ITI Training Centers or customized for presentation at your facility. Continuing Education Units (CEUs) are awarded for all programs. Course length may vary when conducted at your facility based on the number of participants, availability of equipment, customization and qualification/certification requested.

Journeyman Rigger (Comprehensive Rigging)

This course is designed for the beginner to intermediate level person whose work assignments involve some rigging activity. The participants could include millwrights, boilermakers, pipe fitters, electricians, maintenance mechanics, construction workers, carpenters, welders, machinists, and all other trades that participate in rigging activity during their work day.

Course Length: 2 Days

Master Rigger

Although anyone wanting to gain rigging knowledge and skill would benefit from this program, most master rigger students have had some exposure (2-10 years) to crane and rigging operations. Participants include lead field personnel, safety coordinators, and senior trades personnel, such as a millwright, boilermaker, pipe fitter, mechanic, rigger, machinery mover and other trades.

Course Length: 4 Days

Qualified Signalperson-Basic Rigger

Nationally Accredited Certification - Meets New OSHA Rule

The Qualified Signalperson-Basic Rigger Program prepares participants to take the Qualified Signalperson-Basic Rigger Nationally Accredited written and practical exams. All construction signalpersons or any others who are required to be qualified should attend this program. It is an excellent program for everyone who rigs under the direct oversight of seasoned rigging personnel.

Course Length: 2 Days

Lift Director & Site Supervisor

All those who are responsible to oversee lift activities should attend this program. Participants should have some exposure to mobile crane activity and load chart usage. Knowledge of overhead crane and tower crane operations is also useful. Previous training or experience with a variety of rigging tasks will help the participant quickly grasp the applications described during the course. Having served as a crane operator or rigger in the field is not a requirement for this program..

Course Length: 1 Day



Critical Lift Planning

All those who are responsible to oversee lift activities should attend this program. Participants should have some exposure to mobile crane activity and load chart usage. Knowledge of overhead crane and tower crane operations is also useful. Previous training or experience with a variety of rigging tasks will help the participant quickly grasp the applications described during the course. Having served as a crane operator or rigger in the field is not a requirement for this program.

Course Length: 2 Days



Rigging Gear Inspector Basics

Anyone who performs rigging gear inspections for an employer as an assigned task, such as a tool room check-out/in person or a supervisor who is responsible for the quality of rigging gear in a facility should attend this program. Crane maintenance personnel who inspect running and standing ropes, sheaves, drums and associated equipment during monthly and annual equipment reviews should also attend.

Course Length: 1 Day

Rigging Gear Inspector Level I & II

ITI Qualification – Meets OSHA requirement of “competent” person/inspector

Anyone who performs rigging inspection for an employer as an assigned task, such as a tool room check-out/in person or a supervisor who is responsible for the quality of rigging gear in a facility should attend this program, as well as crane maintenance personnel who inspect running and standing ropes, sheaves, drums and associated equipment during monthly and annual equipment reviews. Every company should have a few personnel qualified to perform gear inspections, meeting the OSHA requirement for “competent” person.

Course Length: 3 Days



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Improving Crane
and Rigging Activities**



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UPCOMING EVENTS

JANUARY

| | | |
|----------|---|--------------|
| 11-12 | CIC Qualified Signalperson/Basic Rigger | Woodland, WA |
| 12 | E-Learning Qualified Signalperson/Basic Rigger Hands-on | Woodland, WA |
| 13-14 | Journeyman Rigger | Woodland, WA |
| 24-27 | Master Rigger | Woodland, WA |
| 28 | CIC Qualified Rigger Exams | Woodland, WA |
| 28 | CIC Qualified Signalperson/Basic Rigger Exams | Woodland, WA |
| 1/31-2/3 | Master Rigger | Memphis, TN |

FEBRUARY

| | | |
|----------|---|--------------|
| 1-3 | Rigging Gear Inspector Level III | Woodland, WA |
| 4 | CIC Qualified Signalperson/Basic Rigger Exams | Memphis, TN |
| 4 | CIC Qualified Rigger Exams | Memphis, TN |
| 8 | Lift Director/Site Supervisor | Woodland, WA |
| 9-10 | Critical Lift Planning | Woodland, WA |
| 21-25 | Mobile Crane Inspector | Woodland, WA |
| 21-25 | CIC Mobile Crane Operator | Memphis, TN |
| 21-25 | Mobile Crane Operator | Memphis, TN |
| 2/28-3/3 | Master Rigger | Woodland, WA |

MARCH

| | | |
|----------|---|--------------|
| 4 | CIC Qualified Signalperson/Basic Rigger Exams | Woodland, WA |
| 4 | CIC Qualified Rigger Exams | Woodland, WA |
| 8-11 | Rigging Gear Inspector Level I & II | Woodland, WA |
| 14-15 | CIC Qualified Signalperson/Basic Rigger | Memphis, TN |
| 14-25 | Mobile Crane Operator - Initial | Woodland, WA |
| 16-17 | CIC Qualified Rigger - Test Prep | Memphis, TN |
| 17 | CIC Qualified Rigger - Written Exam | Memphis, TN |
| 18 | CIC Qualified Rigger - Practical Exam | Memphis, TN |
| 3/28-4/1 | CIC Mobile Crane Operator | Woodland, WA |
| 3/28-4/1 | Mobile Crane Operator | Woodland, WA |
| 3/31-4/1 | CIC Mobile Crane Operator Exams | |

APRIL

| | | |
|-------|---|--------------|
| 3-6 | AWRF Meeting | Waikiki, HI |
| 5-6 | CIC Qualified Signalperson/Basic Rigger | Woodland, WA |
| 6 | E-Learning Qualified Signalperson/Basic Rigger Hands-on | Woodland, WA |
| 7-8 | Journeyman Rigger | Woodland, WA |
| 11-12 | Journeyman Rigger | Memphis, TN |
| 11-14 | Master Rigger | Woodland, WA |
| 13 | Lift Director/Site Supervisor | Memphis, TN |
| 14-15 | Critical Lift Planning | Memphis, TN |
| 15 | CIC Qualified Signalperson/Basic Rigger Exams | Woodland, WA |
| 15 | CIC Qualified Rigger Exams | Woodland, WA |
| 25-28 | Master Rigger | Memphis, TN |
| 26 | Forklift and Telehandler Operator | Woodland, WA |
| 27 | Skid Steer Operator | Woodland, WA |
| 29 | CIC Qualified Signalperson/Basic Rigger Exam Only | Memphis, TN |
| 29 | CIC Qualified Rigger | Memphis, TN |



The Professional Rigger is a publication of Industrial Training International, Inc. It is distributed to those whose occupations require the safe and proper use of lifting and rigging equipment.

For more information contact

The Professional Rigger

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