ENHANCING BASIC RIGGING TRAINING
Using Table Top Models
YOU CAN MAKE OR BUY

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For
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CLASSROOM

LECTURE
DISCUSSION

VIDEOS

COMPUTER

HANDS ON

DEMONSTRATIONS

PASS-A-ROUNDS

SHOP FLOOR

JOB SITE

OJT

HOW ABOUT MODELS?
LET'S GET STARTED

EACH TABLE HAS STUFF TO RIG AND RIGGING GEAR TO RIG WITH (IN BAG)

[Diagram showing chairs and rigging equipment]

RIG TUBE
RIG BOX
RIG BEAM
Skip’s Interest In Adult Learning

REAL EARLY YEARS
Military Methods on Skills Training: OCS, Training Officer

EARLY YEARS
Apprenticeships and Job Skills Training in Mfg.

MS Adult Ed

MID and LATER YEARS
Rigging and Lifting Training Materials and Presentations Worldwide for Rigging Users and AWRF Members

And NOW LATER, MUCH LATER, still active
"Tell me and I forget. Teach me and I may remember. Involve me and I will learn.”  
—attributed to Benjamin Franklin

Never call for “FIRE FOR EFFECT”  
Until you know where you are,  
Or Based on class room training only.  
—attributed to Skip Ohman
Learning a bit of Academia

What you know from experience has been well-established in academic circles: physically working through a problem helps you learn what you are doing

• You learn better\(^1\)
• You learn in more detail\(^2\)
• You retain the information longer\(^3\)

1. INTRODUCE THE RIGGING SUBJECT AND MODEL
2. EXPLAIN THE RIGGING FUNDAMENTALS
3. HANDS ON WORKSHOP TO UTILIZE FUNDAMENTALS
4. GROUP DISCUSSION OF RIGGING RESULTS
5. GROUP QUIZ ON FUNDAMENTALS
**TODAY’S TOOLS**

**CONSTRUCTION MODEL RIGGING TRAINING KIT**

**POWERA BY**
TackiLearning LLC

**STUDENT WORKSHEETS**

- EXERCISE GROUP 1 – TUBULAR LOAD WITH BASIC HITCHES
- EXERCISE GROUP 2 – I-BEAM LOAD WITH BASIC HITCHES
- QUIZ 1 – BASIC HITCHES
- EXERCISE GROUP 3 – BOX LOAD WITH BRIDLE
- QUIZ 2 – BRIDLES AND SLING ANGLES
- EXERCISE GROUP 4 – THE CHALLENGE: OFF-CENTER C.O.G.

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**Practice Makes Perfect?**

Wrong – Practicing the Wrong Way makes Perfectly Wrong

Practicing the Correct Way makes Perfect

So lets review the basics before we practice
Basic Rigging Hitches

TODAY’S DEMONSTRATION

BASIC HITCHES
EXERCISE GROUP 1 – TUBULAR LOAD WITH BASIC HITCHES
EXERCISE GROUP 2 – I-BEAM LOAD WITH BASIC HITCHES
QUIZ #1 – BASIC HITCHES

AND IF WE HAVE TIME

BRIDLES AND SLING ANGLES
EXERCISE GROUP 3 – BOX LOAD WITH BRIDLE
FOLLOW UP QUIZ #2 – BRIDLES AND SLING ANGLES

PLACE YOURSELF IN SHOES OF A CUSTOMER’S RIGGER
Three Basic Hitches

SINGLE LEG VERTICAL

NATURAL CHOKER

VERTICAL BASKET
Choker Hitches

NATURAL (SINGLE-WRAP) CHOKER HITCH:
• ANGLE OF CHOKE SHOULD BE 120 DEGREES OR GREATER
Choker Hitches

REVERSING THE EYES OF DOUBLE LEG CHOKER HITCH:
• RESISITS ROLLING AND TIPPING OF LOAD, KEEP I-BEAM WEB VERTICAL
• MAY PLACE A TWIST IN THE LOAD IF NOT PlACED PROPERLY
BASKET HITCH

- Vertical basket hitch has capacity of 2 times single leg
- At 60 degrees, capacity = 1.7 times
- At 45 degrees, capacity = 1.4 times
- At 30 degrees, capacity = same as single leg
DOUBLE-WRAP CHOKER AND BASKET HITCHES PROVIDE:
• INCREASED SLING TO LOAD CONTACT
• A GRIPPING FORCE INWARD ON LOAD

THIS RESULTS IN:
• IMPROVED RESISTANCE TO SLIPPAGE
• COMPRESSION OF LOOSE BUNDLES OF LOADS
Double-Wrap Hitches

PROPER CONNECTION OF DOUBLE-WRAP HITCHES

- ENSURE SLINGS LAY SIDE BY SIDE AT BOTTOM OF LOAD TO INCREASE CONTACT AREA
- DO NOT OVERLAP SLINGS TO ELIMINATE CRUSHING OF SLING AGAINST ITSELF

MINIMUM HORIZONTAL SLING ANGLE

- 60 DEGREES FOR SINGLE-WRAP CHOKERS
- SIGNIFICANTLY MORE THAN 60 DEGREES FOR SINGLE-WRAP BASKETS
- 45 DEGREES FOR DOUBLE-WRAP CHOKERS
a. Using 2 individual slings, connect tubular load to a shackle at top. Rig it using the Student Model Kit.

Note: Indicate where slings should be connected to load to minimize bending.
Worksheet #1 Solutions

a. Using 2 individual slings, connect tubular load to a shackle at top. Rig it using the Student Model Kit.

**Note:** Indicate where slings should be connected to load to minimize bending.

The slings should be connected 3” in from end of the load to minimize bending.

The use of single-wrap chokers is acceptable since the horizontal sling angle is much greater than 60 degrees (L/H = 1.04).
b. Using 2 individual slings, used in choker hitches, connect tubular load to a shackle at top. Rig it using the Student Model Kit.

Note: Rig load as though it is a bundle of loose pipe or rebar.
b. Using 2 individual slings, used in choker hitches, connect tubular load to a shackle at top. Rig it using the Student Model Kit.

Note: Rig load as though it is a bundle of loose pipe or rebar.

The slings should be connected 3” in from end of the load to load to minimize bending.

The use of double-wrap chokers is appropriate to squeeze the loose material together and to increase grip since the horizontal sling angle is much greater than 45 degrees (L/H = 1.2).
c. Using 2 individual slings in a basket hitch, connect tubular load to a shackle at top. Rig it using the Student Model Kit.

Note: Rig tubular load to maintain control.
c. Using 2 individual slings in a basket hitch, connect tubular load to a shackle at top. Rig it using the Student Model Kit.

Note: Rig tubular load to maintain control.

The best solution is to use double-wrap baskets at an angle of 60 degrees, however, the slings are not long enough.

The slings are attached 4” from each end, providing for a sling angle significantly greater than 60 degree \( L/H = 1.04 \).

Additionally, great care must be taken to avoid any significant tipping.
a. Using one individual sling, connect I-beam load to a shackle at top. Rig it using the Student Model Kit.

Note: Rig I-beam to minimize possible slippage.
Worksheet #2 Solutions

a. Using one individual sling, connect I-beam load to a shackle at top. Rig it using the Student Model Kit.

Note: Rig I-beam to minimize possible slippage.

The sling must be connected at center of gravity which is 50% or 6” in from end of the load to minimize tipping.

The sling is a single-wrap choker for ease of connection and release, but a double-wrapped choker would improve grip. Two slings would provide much greater control.
Worksheet #2 Solutions

b. Using two individual slings, connect I-beam load to a shackle at top. Rig it using the Student Model Kit.

Note: Rig I-beam to ensure that the I-beam remains level and web vertical with minimum effort.
b. Using two individual slings, connect I-beam load to a shackle at top. Rig it using the Student Model Kit.

Note: Rig I-beam to ensure that the beam remains level and web vertical with minimum effort.

The slings should be connected 3” in from end of the load to minimize bending.

The use of single-wrap chokers is appropriate since the horizontal sling angle is greater than 60 degrees.

The slings have bights or eyes reversed on each end to ensure the web remains vertical.
Quiz # 1 Solutions

a. What are the three basic hitches?  
Answer: VERTICAL, CHOKER, BASKET

b. What technique can be used with choker and basket hitches to increase grip?  
Answer: THE USE OF DOUBLE WRAP CHOKE OR BASKET INCREASES THE GRIP AREA AND CREATES A SQUEEZING

c. When can a single leg sling be effective?  
Answer: USUALLY IN A LOAD LIKE A MOTOR OR A SHORT COMPACT LOAD WITH A CHOKER (DOUBLE WRAP)

d. What is the loss of strength when forming a choker hitch with wire rope, synthetic and chain slings?  
Answer: NORMALLY A LOSS OF 25% WITH WIRE ROPE AND 20% WITH CHAIN AND SYNTHETICS

e. What is capacity of a basket hitch, compare to single leg at vertical and at 60 degrees between legs?  
Answer: A VERTICAL BASKET HITCH IS DOUBLE THE SINGLE LEG BUT ONLY 1.7 TIMES WHEN 60 DEGREES

f. What is the angle of choke and what is minimum recommended?  
Answer: ANGLE OF CHOKE IS THE ANGLE FORMED AT HITCH BIGHT, 120 DEGREES IS USUALLY THE MIN.
**Quiz # 1 Solutions**

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<tr>
<th>Question</th>
<th>Answer</th>
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<td>g. What caution must be taken at bottom of the load when double wrapping the hitches?</td>
<td>THE SLINGS SHOULD NOT OVERLAP ON THE BOTTOM</td>
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<td>h. What is the D/d ratio and what effect does it have on a single-wrap basket?</td>
<td>THE DIAMETER OF LOAD / DIAMETER OF WIRE ROPE = D/d, WILL LOSE STRENGTH WHEN D/d LESS THAN 20.</td>
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<tr>
<td>i. What is the effect of reversing the direction of the eyes of a double-wrap choke?</td>
<td>THE LOAD WILL TEND NOT TO TIP OR ROLL OVER, HOWEVER THE LOAD MAY RECEIVE A TWIST</td>
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<td>j. What is the minimum sling angle allowed for two single-wrap chokers and baskets, and why?</td>
<td>NORMALLY 60 DEGREES</td>
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<td>k. What is the minimum sling angle allowed for two double-wrap chokers and baskets, and why?</td>
<td>NORMALLY 45 DEGREES</td>
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