Ropes Course Gear, Knots, And Terminology

acedelmar consulting

This manual was developed by Acedelmar Consulting and is used, with permission, by Northern Lakes Partners.

Revised 04/23

TABLE OF CONTENTS

INTRODUCTION

The following is meant to describe the equipment (gear) in use at Northern Lakes Partners, to discuss its proper use, and to give a brief overview on how to inspect the gear for safety. (Additional inspection details can be found in the ACCT Standards book.) Also, we will give a brief series of definitions for terms that are commonly used on the Ropes Courses.

GENERAL SAFETY REGULATIONS

These safety regulations will be enforced year-round to maintain our high standards. They are:

1. All Ropes Courses fall under the supervision of the Ropes Course Administrator. The Ropes Course Administrator must be someone at least 21-years-old and have previous training and experience on all facets of Ropes Course operation.

2. Only gear rated for the Ropes Courses (including Climbing Tower) will be used. Staff will NEVER use any of the gear from the "Real Rock" bin, the training bins (black with skull-and-crossbones), etc. under ANY circumstances!

3. Personal gear will NOT be used without approval from a Ropes Course Trainer or above. Personal gear of a Ropes Course Trainer must be approved by the Ropes Course Administrator prior to use. If personal gear is approved, a contract will be drafted stating what is allowed to be used and under what conditions.

4. Personal and/or external gear may NOT be used on or by participants. (Rationale: Camp will be unable to ascertain how outside gear may have been used.)

5. Camp gear may not be taken off-camp for use with outside groups. (Rationale: Camp would incur liability if Camp Staff used Camp gear in an unapproved fashion.)

6. Only steel carabiners and gear are allowed to be used in critical applications. Aluminum may be used for non-critical functions like retrieval lines, etc.

7. All gear on the Climbing Tower, with the exception of ATCs, Prusik Cord, p-cord, daisy chains, or webbings, shall be rated at a minimum of 5,000 pounds breaking strength. (See "Gear" manual if there are any questions.)

8. If it looks unsafe, it probably is. Always inspect the tower, the belay cables, ropes, harnesses, z-posts, carabiners, knots, etc. When in doubt, throw it out….

9. Any piece of equipment dropped from a height of over six feet is immediately retired and may not be used again, unless approved by the Ropes Course Administrator. Any questionable equipment must be removed immediately and brought to the Ropes Course Administrator for inspection before it may be used again.

BASIC SAFETY 101

While we'll be discussing how to check the gear individually, there are some very basic safety features that our Facilitators need to be aware of. These are:

NEVER use gear that you are unfamiliar with or that you removed from another bin. If it was found somewhere else, it does NOT belong where you put it!

NEVER leave damaged or questionable gear in the Ropes Course Shed. The only exception to this is the black training bins – marked with a skull-and-crossbones – which we use to teach Facilitators to look for issues with gear. If you question a piece of gear, bring it up to the Dining Hall or Main Office and hand it to either the Ropes Course Administrator or a Ropes Course Trainer.

NEVER use petroleum-based lubricants! Petroleum-based products (e.g. WD-40) can damage or destroy the integrity of synthetic tethers and ropes. These should never be used on ANY course, nor should they ever be stored in the Ropes Course Shed. (Also, keep any gear you like away from the generator!) And, speaking of chemicals...

NEVER spray chemicals on your gear! This includes bug spray, sunscreen, etc. If a participant wants to put that on, they need to remove our gear, step away, put it on, and then return.

NEVER step on your gear! (Hopefully that one is kind of obvious…)

NEVER use freshly-washed ropes. A rope that is thoroughly saturated with water is up to 70% weaker! Let it dry before using it! Oh, and…

NEVER dry gear by leaving it in direct sunlight! UV can actually break down synthetic materials. If you're walking away, take stuff down.

NEVER leave gear sitting in direct sunlight for long periods of time. See paragraph above for more information! (Obviously, if it's in use for the day it will have to be in direct sunlight!)

NEVER clean gear with harsh chemicals. (For most things, Dawn dish soap is great!)

NEVER use gear that was dropped from a height greater than six feet. Take it to the Ropes Course Administrator and they can decide what to do with it.

There is also a very important adage to keep in mind:

Take care of your gear and your gear will take care of you!

GEAR: BELAY DEVICES

The following belay devices are in use at Northern Lakes Partners:

ATC -

"ATC" is a brand-name for a commonly-used belay device. (It is also jokingly referred to as an "Air Traffic Controller".) Variations on this theme include the BFD (belay friction device), Pyramid, Sherriff, Trango, etc.

Even though this device is designed to accommodate two ropes, we will only ever use one rope per ATC. We will use ATCs (or a variation) as the basis for our programs.

Although there is some debate – mostly based on the difference in styles – it seems that the average ATC does NOT break under load! Instead, according to the Mountain Project, an ATC ***broke the rope*** at 9kN of force! (That's an equivalent of 2,023 pounds!)

Facilitator Note:
The reason we like the ATC is because it is simple to use, effective, and very difficult to set up incorrectly. Because of that, this – or a variation of it – is the primary belay device we will use in all normal, day-to-day operations.

Gri-Gri -

Gri-Gris are belay devices developed by Petzl. (As far as I know, there aren't any "knock-offs" of this belay device.)

The Gri-Gri, if set up properly and used effectively, is a very safe device. If set up improperly, people die. If used improperly, you increase the likelihood of participant injury and/or death. (I've been dropped for ten feet of free fall and then locked off because a Facilitator misused one of these.)

I tried to find the rated breaking strength of the Gri-Gri, but nothing was available. On Petzl's own site, it says: *"Lowering a climber weighing more than 80 kg [176 pounds] can be tricky, especially with new or small-diameter ropes… Above 100 kg [220 pounds], Petzl has not done testing with the GRIGRI 2 and recommends the use of more suitable products such as the RIG, I'D or another system."* (Petzl.com)

Facilitator Note:
Because of the warning from Petzl, itself, about heavier participants; the fact that it does not meet ACCT Standards as a belay device; the fact that it can be set up backwards (which means it

does NOT function as a brake); the (infrequent) issues with Gri-Gris jamming; and the potential danger from misuse; the Gri-Gri is reserved ONLY for use during Club Rock or in an emergency. (The rationale for it's use in Club Rock is it because it is commonly found at climbing gyms.)

Rescue 8

The Rescue 8 is a holdover from the past. (It's a modified Figure 8, for any of you who remember that belay device!) The addition of the wings, however, prevent the rope from flipping over and locking down on itself.

There are two main perks to a Rescue 8. First, they are easy to set up. (Pass a bight of rope through the big circle and over the tail end. Put a carabiner on the tail end and you're all set!) Second, they are very, very effective and efficient for rappel! (Never, ever try to belay off one! It will spiral your ropes!)

Depending on the particular style, Rescue 8's are rated at 50kN of force, or about 11,240 pounds. Furthermore, since you can hook the device in the trees and still use people on the ground to work it, it is ideally suited for rescues on the Ropes Courses.

Facilitator Note:
During a rescue, we do NOT "cut away" tethers unless there is no other choice. The perk to the Rescue 8 is that just a couple of people on the ground can provide enough "weight" to lift a participant in the trees so that they can be disconnected easily.

Checking Belay Devices

Overall, the inspection of belay devices – from easiest to most complex – are Rescue 8, ATC, and finally Gri-Gri. Because of the complexity of a Gri-Gri – it has a number of "moving parts" – if you are at all unsure of it, remove it from service immediately!

Rescue 8 - Look for worn spots, rough edges, or cracks in the metal.

ATC - Look for worn wire loops – if the wire is showing, the ATC should be thrown away! Also, look for rough edges where the rope goes through, deformation of the metal, cracks in the metal, or anything else that looks unusual.

Gri-Gri - Make sure the Gri-Gri opens and closes appropriately. Make sure the lever engages. Check for splits in the metal or rough edges; basically anything that looks unusual. Finally, set up the Gri-Gri and test the auto-braking system.

Cleaning Belay Devices

For any belay device, typically it just needs to be wiped off with a clean rag. If there's more, wash it with water or a mild solution of Dawn dish soap and water. Pine sap can be removed, if necessary, by using a light peanut oil (peanut butter), rubbing it carefully, and then using Dawn to remove the oil. Dry fully before use!

GEAR: CARABINERS AND RAPID LINKS

The following carabiners and rapid links are in use at Northern Lakes Partners:

Carabiner (Screw-gate) -

A carabiner is the standard name for a locking device that secures someone to the belay system. Carabiners come in various shapes (oval, parabiners, etc.), sizes and strengths, depending on the situation and the load. They also come in aluminum and steel.

A screw-gate means that the carabiners is locked by screwing down the gate. When using a screw-gate, always check to make sure that the gate IS fully closed and locked!

Carabiner (Triple-Lock) -

A triple-lock means that there are three steps involved to open the gate. This is considered safer than screw-gate carabiners as they can't accidentally work their way free from vibrations or rubbing against objects.

For all belay applications, we will be attaching the climbing rope to the participant using a triple-lock carabiner. (The screw-gate may still be used on the Facilitator end, provided it is checked often to verify that it is still locked and closed.

The steel parabiners that we use are rated at 50kN (11,240 pounds) across the long axis and 15kN (3,372 pounds) across the gate.

For our programs, we will use only steel carabiners and/or parabiners on primary belay systems. Aluminum may be used for non-critical systems like retrieval lines. Non-locking carabiners will NOT be used under any circumstances.

Facilitator Note:
When using carabiners, be sure not to cross-load them. That means that the carabiner is sideways and the force is applied to the gate, rather than the long axis. While it SHOULD hold, the carabiner is about 8,000 pounds stronger when used correctly!

Rapid Link - A Rapid Link (also, less commonly, called a "quick link") is the basis for our safety systems. The Rapid Link attaches to a primary anchor system (e.g. Through Bolt) or attaches to a pulley or spin static. (All primary belay systems MUST have a backup.)

When attaching a rapid link, remember to screw the gate down to close. (You never want to "screw up" on a course!)

A 5/8" rapid link has a breaking strength of 6,100 pounds and is the primary type of rapid link we have on the course. There are a couple of 1/2" rapid links in use to secure the Cargo Net to the ground anchors, and they have a rated breaking strength of 3,300 pounds.

Facilitator Note:
There are only TWO 1/2" rapid links, the rest are 5/8". Please do NOT take the ones off the Cargo Net as they do not meet the 5,000 pound breaking strength as required by national standards.

Checking Carabiners / Rapid Links

To check this hardware, inspect all of them for cracks, chips, pitting, rust, etc. If you don't see any visual evidence of issues, test the locking functions.

Screw-Gate - Make sure that the carabiner opens and closes effectively. Screw the barrel up and down a few times to make sure it doesn't stick, jam, or detach.

Triple-Lock - Make sure the carabiner opens and closes effectively. Make sure that the carabiner auto-locks when released. Check the opening mechanism to make sure it is working properly.

Rapid Link - Make sure the rapid link screws fully open and closed. (If this is difficult, you can use a non-petroleum lubricant like graphite to help it to move more freely.

Cleaning Carabiners / Rapid Links

For any carabiner or rapid link, typically it just needs to be wiped off with a clean rag. If there's more, wash it with water or a mild solution of Dawn dish soap and water. Pine sap can be

removed, if necessary, by using a light peanut oil (peanut butter), rubbing it carefully, and then using Dawn to remove the oil. Dry fully before use! (Always put graphite into the threads of a rapid link that's been washed and thoroughly dried, otherwise it will be very difficult to use!)

GEAR: HARNESSES AND HELMETS

The following harnesses and helmets are in use at Northern Lakes Partners:

Harness -

The primary safety point. Harnesses should be evaluated for safety based on ability to tighten the waist belt adequately, adjust leg loops (as necessary) and make sure that there the belay loop is intact.

Our primary style of harness is called a "Guide Harness". It features fully adjustable waist and leg belts, with a lock-off system. There is a central belay loop that is the connection point for our climbing rope.

Facilitator Note (Change):
Per direct order of Don Nagy of Experiential Systems in the Fall of 2021, **backup carabiners are no longer to be used!** *We are to use a single, steel, triple-lock parabiner through the belay loop ONLY! (Club Rock is allowed to do a Figure 8 tie-in.)*

Chest Harness -

Chest harnesses or full-body harnesses may be used at times for people with disabilities and/or "exotic" climbing situations. They can be used when a climber may be too small to actually have "hips", people who are larger in size, or anyone who may be "top heavy".

In the picture, you can see that, on this style, the back is fully adjustable. (Note one side is locked, the other not. This was done to show the markings.) The front loop is connected to the belay loop of the harness by a carabiner. (Lock off ALL straps!)

Facilitator Note (Change):
We are in the process of getting full-body harnesses. The first ones will be for Facilitators to use while leading the High Ropes program. After that, we will transition some of our participant harnesses to full-body, especially for the very small and the very large.

Helmet -

Also called a "brain bucket", the purpose of the helmet is to protect climbers in the event of a fall and in case something (e.g. a hand hold) falls from the top of the Tower.

All climbers will wear properly-fitted helmets that are secured appropriately. Any camper within the fence at the Tower or moving under the High Rope elements should also be wearing a helmet for safety.

Checking Harnesses / Helmets

For harnesses, look for any visible signs of fraying, damage to the belt, etc. If it's missing the tail, it also fails. Check the buckles – be sure to look UNDER the webbing – and see if there are any cracks or damage. If you find anything that looks unusual, remove the harness from service and have it inspected by the Ropes Course Administrator.

For helmets, check to make sure the straps are intact. Check to make sure that the interior of the helmet – the padding, straps, etc. – are still attached to the shell. Make sure the clips and adjustments all work. Look for rusting of the connection bolts. Finally, look for damage to the shell, itself. If you find anything that looks unusual, remove the helmet from service and have it inspected by the Ropes Course Administrator.

Cleaning Harnesses / Helmets

First, be sure to disinfect helmets after every use! Put them facing down on the racks so that the cleaner can run out of the helmets!

If the helmet needs more thorough cleaning, or you are doing a start-of-the-season cleaning, fill a sink with a solution of Dawn dish soap and warm – not hot! – water. Soak the helmet to get rid of any accumulated oils. Then, rinse it off in a sink filled with a mild disinfectant solution. After that, allow the helmets to air dry out of direct sunlight.

For harnesses, you can rinse a harness in water to remove most dirt. For stubborn dirt – or for a start-of-the-season cleaning, rinse out a sink THOROUGHLY! (You do NOT want chemicals in the sink that can transfer to the harness!) Fill the sink with a mild solution of Dawn dish soap and hand-wash the harnesses until they are clean. Then, rinse the harnesses THOROUGHLY in lukewarm water and hang them up to air dry out of direct sunlight.

Harnesses may also be put in mesh gear bags and washed on a cold, Gentle cycle in a washer without a central spindle (e.g. front-loaders). Use one tablespoon of Dawn dish soap per load and select Extra Rinse, if available. Air dry the harnesses out of direct sunlight.

GEAR: PULLEYS

The following pulleys are in use at Northern Lakes Partners:

RCU Pulley - The RCU Pulley is the standard pulley used on the High Ropes Course. It features a primary safety point for the participant and a backup bolt at the top in the event of shearing. When using a pulley as part of a dynamic belay system, care should be taken to ensure that the climbing rope does not run over the edge of the steel. (Typically this is what we mean when we refer to a "pulley".)

Note: These have a maximum working load limit of 10,000 pounds.

Spin Static - Also called a "shear reduction block". The Spin Static is a pulley (spin) with an extra bolt to prevent it from moving (static).

The spin static serves as a rope guide and provides a channel for the belay rope to travel through. It MUST be attached to a primary and secondary safety line by a minimum of one steel, Class "D" (5/8") rapid link. (Two or more may be needed for positioning.)

Note: These have a maximum working load limit of 16,000 pounds.

Zip Pulley - The Zip Pulley is used exclusively for the High Ropes Course program. Any Zip Pulley used must not only incorporate a primary safety point – the scissors on the CMI pulley at right – but also a backup safety point – the hole at the back. Two tethers, each with separate carabiners, must be used to attach the participant. The purpose of this is to create redundancy in the entire system.

Note: These have a maximum working load limit of 14,000 pounds.

Checking Pulleys

To check pulleys, look for rust, physical damage, or cracks, dents, or deformation. In addition,

check for nicks or damage to the wheels where either the rope or cable runs. (You do NOT want a pulley damaging the line it's sitting on!) Also:

RCU - Does it open and close? Is the backup bolt tight? Is the primary bolt tight? Does the wheel in the middle spin?

Spin Static - Are all the bolts tight? Does the wheel in the middle NOT spin? (Remember, this one is "static"!)

Zip Pulley - Do the scissors open and close? Are the bolts tight? Is there material in the space between the wheels? Do the wheels in the middle spin?

As with all things, if you find anything you aren't sure of, do NOT use the gear! Instead, remove it from service and bring it to the Ropes Course Administrator to check.

Cleaning Pulleys

In general, pulleys do NOT need to be cleaned! If they are dirty, wipe them off with a dry cloth. If that's not effective, use a damp – not wet! – cloth. Pine sap can be removed, if necessary, by using a light peanut oil (peanut butter), rubbing it carefully, and then using Dawn to remove the oil. Dry fully before use!

GEAR: ROPES AND TETHERS

The following ropes and tethers are in use at Northern Lakes Partners:

Climbing Ropes - Climbing Rope is the "generic" term for the style of rope used in climbing situations. There are a wide variety of names, each of which helps to clarify the type – and sometimes use – of the rope in question.

In our case we are currently using NE (company name), Apex (style), 11mm (size), dynamic (amount of stretch in a rope), STD-Dry (type of dry treatment), kernmantle ("kern" is the core which is protected by the "mantle" or woven sheath).

Facilitator Note:

Our policy is that, barring "real rock" events, we will always use 11mm, dynamic, dry, kernmantle ropes. (Smaller diameter ropes are inherently weaker, can take fewer falls, can lead to jamming situations on ATCs, and aren't recommended for Gri-Gris.)

Daisy Chain - The Daisy Chain is a tether. It's use is now generally prohibited on all Ropes Courses due to its failure to meet the minimum breaking strength recommendation of 5,000 pounds. If one is on camp, its function may include use as positioning, a gear sling, etc. but not as a primary belay system.

Facilitator Note:
Daisy Chains are rated at 4,000 pounds. Although ACCT DOES make an exception for "Personal Safety Systems" being rated at 3,375 pounds (ACCT I.3.3.1), we will enforce the 5,000 pound limit and reserve Daisy Chains for positioning, preventing premature Zipping, etc.

Lobster Claws - Lobster Claws form the primary safety gear for Facilitators. These should be used for accessing the High Ropes Course and the top of the Climbing Tower. These connect to safety cables and to the Facilitators by means of carabiners at each end.

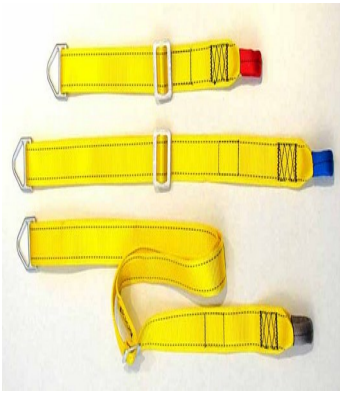
We use adjustable lanyards, which allow staff to change the length of the tethers to meet their situation.

Facilitator Note:
There ARE Lobster Claws made out of Multiline Rope that are in use around the country. These, however, fail to meet the 5,000 pound requirement and are NOT allowed at Camp!

Multiline - Multiline is a woven rope that is often used for hand ropes, swing ropes, etc. It is a synthetic fiber that is easier on participants and is reasonably tolerant of being out in the weather. Multiline is NEVER used for primary safety lines!

Prusik Cord - Prusik Cord is a smaller rope (around 9 mm), similar in construction to a climbing rope. This cord is used to transfer belays in an emergency and can be used to ballast, if necessary. Prusik Knots should be left in or retied prior to opening the Climbing Tower or High Ropes Course. (Note: There should be THREE wraps of this, not two!)

Tethers - Tethers are the primary safety gear for participants on the High Ropes Course. These connect to an RCU Pulley by means of a Rapid Link and then to the climber by means of a Triple-Lock Carabiner. All tethers should be adjusted for length prior to the start of the program to ensure that participants are not able to fall below an element. (Tethers may be adapted to form Lobster Claws, if needed.)



Facilitator Note:
Tethers come in different colors. Never put two of the same colors in sequence. (In other words, never be in a position where you have to tell a participant that they must transfer from a blue tether TO a blue tether!)

Webbing - Also called 1" Tubular Nylon Webbing. Webbing is used to "ballast" belayers during a climbing session. The general rule of climbing is that there should be ballast for any climber that weighs within 50 pounds of the Facilitator, however, unless otherwise directed, ***we will ballast for ALL climbers, regardless of weight.*** ONLY tubular webbing is allowed for our Tower program.

Facilitator Note:
Tubular nylon webbing (1") has a rated breaking strength of 4,000 pounds. Again, close but not quite! Staff may use webbing for positioning, though; provided that the person is also connected to a primary piece of equipment rated at 5,000 pounds.

Checking Ropes and Tethers

For all ropes and tethers, look for any visible signs of fraying, damage to the rope, etc. If it has metal (e.g. Lobster Claws), check the buckles – be sure to look UNDER the webbing – and see if there are any cracks or damage. If you find anything that looks unusual, remove the gear in question from service and have it inspected by the Ropes Course Administrator.

Cleaning Ropes and Tethers

According to NE Ropes under the heading "Dirt and Cleaning", "*Dirt on a rope can penetrate the cover strands, resulting in abrasion in the core as well as the cover…"* Because of this, we will keep our ropes clean and in good condition. To clean our ropes, there are a few options:

To clean both our ropes and tethers:

> First, for ropes ONLY you can use the Bokat Rope Washer found in the Ropes Course Shed. This hooks up to a hose and does a good job of removing surface dirt and mud.
>
> For both ropes and tethers, rinse the affected area in warm – not hot! – water to remove most dirt. For stubborn dirt – or for a start-of-the-season cleaning, rinse out a sink THOROUGHLY! (You do NOT want chemicals in the sink that can transfer to the ropes or tethers!) Fill the sink with a mild solution of Dawn dish soap and hand-wash the ropes and tethers until they are clean. Rinse everything THOROUGHLY in lukewarm water and then hang them up to air dry out of direct sunlight.
>
> Finally, according to NE Ropes, *"For a more thorough cleaning, soak your rope in warm water mixed with a mild detergent. Add a small amount of fabric softener to soften the rope. When possible, use a front loading washing machine; otherwise wash your rope in a mesh bag or pillowcase to avoid tangling. Rinse thoroughly and hang to dry in indirect sunlight."*

To this end, we will, as part of our start-of-the-season cleaning we will wash our climbing ropes and tethers in mesh bags, on a delicate cycle, cold water wash and rinse, with one tablespoon of Dawn dish soap.

Facilitator Note:
In the past, we would use unscented, dye-free Woolite. However, in the documentation we received from Robertson Harness, Woolite is not allowed. To avoid potentially using the wrong cleaner on the wrong gear, we will use only Dawn dish soap on the ropes and tethers.

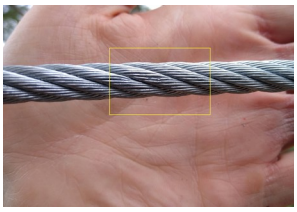
GEAR: CONSTRUCTION ELEMENTS

The following construction components are in use at Northern Lakes Partners:

Cable Clamp - Cable clamps are the old method of attaching cables to trees. (We prefer to use the fist grip clamps as they don't crimp the cable when applied.) Currently, the only use for cable clamps in our courses is to prevent Rapid Links from sliding on a cable. These are to be tightened snugly, but not fully!

Fist Grips - Fist Grips are the preferred method of attaching cable as they do not crimp cable like the old-fashioned Cable Clamps. When inspecting these annually, they need to be tightened using a torque wrench to 45 foot-pounds. Do NOT over-tighten these as they may damage the wire rope.

Galvanized Aircraft Cable - GAC or, as we refer to it, "cable" is 3/8", 7x19 cable rated at 12,000 pounds. It is used for belay cables, backups, ground anchors, etc. Staff must visually inspect the cable each and every time they use it! If you find broken strands, do NOT use the cable!



LEAP Anchor - Also referred to as an "Anchor Point", these are safety points that can be used by Primaries to set up the Ropes Course and for emergency purposes. Whenever possible, Facilitators should be clipped into these or into the top belay (GAC) cable.

Serving Sleeves - Serving Sleeves are a non-critical piece of construction gear. These are put on to the end of the cable (GAC) to prevent help keep the tails organized and to prevent participants from touching the sharp end of the cable. Serving Sleeves are crimped on to prevent movement.

Staples - Staples are, well, overgrown fencing staples. We use 8" staples and drive them to a starting depth of 4". Over time, as the tree continues to grow, the staple will become buried deeper into the tree. Staples are NOT rated for attaching safety lines to, but they CAN be used for positioning lines.

Through Bolts - Through Bolts are used to anchor cables to trees by passing through the trees. (I prefer the wrap method as it is stronger and does less damage to the tree.) Currently, these are used to secure the Vertical Playpen.

Zip Brake Block - Okay, I have to confess something: Our Zip Brake Block is installed incorrectly! (It's true!) Normally there are bungee cords attached to it to stop participants. However, we use a gravity brake system that prevents people from reaching the telephone pole. This was installed as an added safety measure because I like redundancy...even though gravity can't fail to stop participants!

Facilitator Note:
The test for ACCT Builder and Inspector used to require you to know all of this gear – and more. If you would like a sample test to check your knowledge, let me know!

Checking Construction Elements

For anything metal, look for signs of rust. Surface rust is acceptable, although the gear will be failed shortly; pitted rust fails the gear immediately. If you find a piece of equipment with pitted rust on it, close the element and/or course immediately. Other than that:

Clamps - Nothing to check since we DO NOT use these in critical applications.

Fist Grips - Check tightness. At least once a year, check torque!

Cable - Check for damage, kinks, bends, or folds. Look for damage to strands, especially broken strands. Check for indications that a tree branch may have hit the cable. (If there's a large branch BELOW a cable, it probably hit it on the way down!)

LEAP - Look for cracks, damage, or deformation of the metal. Check to make sure that the bolt is tight.

Sleeves - It doesn't matter if they're present or not. If they have come free – which can happen if a pulley hits it hard enough and/or repeatedly – inform the Ropes Course Administrator and have them replace it.

Staples - Check to make sure that they haven't come loose over time. (It's possible if part of the tree is dying / dead.)

Through - Check the tightness of the end bolt; it should be tight!

Zip Block - Nothing to check. It truly doesn't need to be there. (I usually crawl out once a year to make sure it's not rotted and the cable clamp behind it is still snug.)

Cleaning Construction Elements

Don't. (Simple enough?)

KNOTS

The following knots are used in some capacity on the various Ropes Courses at Camp:

Secondary Climbing Tower and High Ropes Facilitators need to know:

Water Knot[1]

Double-Bowline

Triple Fisherman's Knot[2]

Primary Facilitators need to know the knots above plus:

Prusik

Retrace Eight[3]

Other useful knots can include:

Overhand Knot - Used to tie the p-cord to the climbing rope if a loop is present.
Clove Hitch - Used to tie the p-cord to the climbing rope if no loop is present.

Facilitator Note:
To make things easier to remember, we are going to require a minimum of three inches of tail in the ropes for Water Knot, past the Triple-Barrel, on a Prussik, etc. This matches the requirement of three inches or more of tail on the straps of the harness. The overall length shouldn't be over a hand-span (approximately eight inches), as the "tails" may tangle around hand holds.

Know the proper placement/purpose of ALL knots before using them on a ropes course!

1This picture shows two colors to indicate how this knot is tied.
2Also called a "Backup Knot".
3Also called a "Figure Eight Follow Through".

INSPECTIONS AND TIMELINES

The following inspections will be conducted at the following times:

Ropes Course Training

This form needs to be filled out on at least an annual basis. (Typically this would be during Staff Training for the Summer Camp season.) If other Staff or Volunteers are to be added or their status upgraded, this can be done at any time, provided it's documented in writing.

Fall Protection and Self-Rescue

This is a digital document. Every Facilitator needs to read, agree to, and sign this document annually before leading high element programs like the Climbing Tower or High Ropes Course.

Pre-Use Inspections

Climb And Zip -	Before EVERY use. (This is a digital form on Google Docs.)
Climbing Tower -	Before EVERY use. (This is a digital form on Google Docs.)
High Ropes -	Before EVERY use. (This is a digital form on Google Docs.)
Low Ropes -	Before EVERY use. (This is a digital form on Google Docs.)
Vertical Playpen -	Before EVERY use. (This is a digital form on Google Docs.)

Facilitator Note:

If you don't have a way to access these forms, please document the information and provide a written copy to a Ropes Course Trainer or Administrator. This person will be responsible for entering the information into the spreadsheet.

Rope Log

The Rope Log is a physical form stored in the Ropes Course Shed. This needs to be filled out after EVERY use of the Climbing Tower or High Ropes Course. (These need to be replaced any time a new set of ropes is purchased)

Spring / Fall Inspection

A thorough inspection of all courses needs to be conducted every Spring. There is a Spring / Fall Inspection Form in Google Docs. In the Spring, all fist grip clamps need to be checked and tightened, if necessary, to 45 foot-pounds of torque. In the Fall, a random selection of fist grips need to be spot-checked to verify that they haven't loosened through use. (If a number have, check ALL fist grips!) These inspections are lengthy and may require multiple days to complete.

External Inspections

There will be conducted per the requirements of the State and/or the discretion of the Camp.

TERMINOLOGY

What follows is a general list of terms you may encounter working on Ropes Courses:

Ballast - To hold onto a webbing to help keep a Facilitator anchored to the ground.

Belay - "Belay" is the French word for safety. (Much of the techniques of modern mountaineering were pioneered by the French.) To "belay" someone means that you are securely holding onto their safety rope.

Belay Device - There are a near-infinite amount of belay devices and variations thereof. If you have climbed elsewhere (or go to another climbing center), you will find reference to Figure Eights (acceptable belay / great rappel); Gri-Gris (excellent belay / good rappel); Jaws (good belay / good rappel); Rescue Eights (acceptable belay / great rappel); Stitch Plates (good belay / good rappel); etc. However we will only use ATCs and, for special programs (e.g. Club Rock), Gri-Gris for our primary belay devices.

Bight - This can either be a loop of rope, or it can also refer to a knot tied in the end of a rope to prevent the loose end from being in the way of the climber. (Bights that are knots prevent the belay rope from being pulled back through the ATC while belaying.)

Boulder - To go around the tower as opposed to up it.

Dead - "Dead" gear is gear that is either obviously damaged (e.g. tears in the harness) or that is suspected to be damaged (e.g. a carabiner dropped from a height greater than six feet). Dead gear should be either destroyed immediately or taped with black tape to indicate that it is not safe for use on the actual course. (We hold onto some dead gear in black bins labeled with a skull-and-crossbones logo for training purposes.)

Dynamic - Dynamic can be used to describe either a rope that stretches when a load is applied or – usually on a High Ropes Course – when a climber is attached to a Facilitator who is belaying for them (regardless of rope stretch). Dynamic ropes typically will stretch on average 8% – 10% of total length to help absorb the energy created by a fall.

Emergency Brake - The Emergency Brake is a person who is assigned to stand next to the Facilitator and pass the slack handed to them through their hands to the Rope Tender. (They must make sure there is some slack between them and the Facilitator or their actions will hamper the belayer's ability to do their job.) In the event of a true emergency, the Emergency Brake will protect the climber by simply holding the rope firmly to activate the break.

Facilitator - The "official" name of a trained Ropes Course Staff. Other terms include: belayer, instructor, primary, secondary, etc.

Free - To be up in the air and disconnected. (This is a bad, bad thing!)

Knots - Knots are…knots… In the beginning, we used Figure 8's and tied directly into the harness. Then, we used 8's and clipped in; however, 8's lock down if not "broken" every couple of climbs, they have only one loop to clip through, and they lose 35% of the strength of the rope through the knot. A Double Bowline on a Bight (or Double-Knotted Bowline) loses about 40% of the strength – slightly more than that of a Figure 8 – but it provides two major advantages over the 8: it doesn't lock down on itself and it provides two loops to clip through. Water Knots are the ONLY knots used in webbings. Knots need to be "dressed" (make sure there are no unnecessary overlaps) and "set" (pulled tight) prior to use.

The knot on this page would fail my inspection, by the way. The double-bowline is fine, and you want 3-8" of tail past the triple-barrel, but the gap between the bowline and the bight is too big! NEVER have a loop big enough for a participant to accidentally put their hand through!

Lubricant - Used to make steel carabiners and rapid links move easier. We will ONLY use graphite on our courses! Petroleum-based lubricants (e.g. WD-40) can damage synthetic climbing gear and are NOT ALLOWED under any circumstances!

P-Cord - Typically this is para cord, however it can also refer to any rope – other than climbing rope – that is used to access safety gear without the need to climb. We use p-cord to setup the ropes on the Climbing Tower and to move pulleys in the High Ropes Course from the ground.

Perceived Risk - Perceived risk means that something APPEARS unsafe. It is the perceived risk that makes Ropes Courses exciting and allows participants to push boundaries. Real or actual risk is always kept to a minimum, however!

Primary - A Facilitator trained in both the basic skills and advanced rescue techniques. A Primary can facilitate the Tower by themselves provided they have some means of communication with the rest of camp in the event of an emergency. (The High Ropes Course always requires a minimum of two staff to open the program area.)

Rappel - To sit back in your harness, walk your feet up the wall, and bounce your way back down. Care needs to be given to make sure the climber remains in this position, otherwise they may end up face-first into the wall.

Retired - An object no longer in service. Ropes are usually cut into non-usable lengths. Carabiners and other steel are usually disposed of. In the event that a piece of retired equipment is to be kept (typically for training purposes), it must be marked with black tape to signify that it is "dead".

Non-locking carabiners and any carabiner or rapid link whose gate does not function properly is to be considered automatically "dead" and removed from service.

Rock - Rock indicates that something is falling from the sky. If you hear a Facilitator shout "Rock", duck your head, cover it with your hands, and move away. (Do NOT look up!)

Rope Log - A log book that contains information on all climbing ropes. At minimum it should contain the Rope ID, number of climbs and weather conditions. Rope Logs are used to determine the overall health of the climbing rope.

Rope Tender - The Rope Tender is a person who is assigned to keep the rope from simply laying on the ground at the feet of a Facilitator. This person usually takes the slack given to them and coils it into a milk crate, on a tarp, in a bin, etc. Using Ropes Tenders will help to prolong the life of the ropes.

Secondary - A Facilitator trained in basic setup, operation, and take down. Secondaries may operate the Tower – NOT the High Ropes Course! – if there is a Primary within the immediate area who can assist, if necessary.

Sheer Reduction - Every time a rope is bent sharply, it loses some portion of its overall strength. For example, a rope "biting" over a single carabiner (like when we attach a climber to the belay rope) can lose nearly 50% of its total strength due to the sharp bend. If it is passed over two carabiners, it loses approximately 20% of its total strength. The sharper the bend, the more strength lost. (This is true in knots, as well.)

Slack - The amount of excess rope that exists between the climber and the belayer. While some slack is acceptable in most applications, too much slack can cause significant injury to a participant if they fall.

Spotting - Standing in a position where you are able to assist a participant, if necessary. (Some programs use "Ninja" to describe the correct position – legs spread out, one foot behind another, two hands up in a "defensive" position and eyes focused straight ahead.)

Static - Static can be used to describe either a rope that has no/minimal stretch when a load is applied or – usually on a high ropes course – or when a person is attached to a tether anchored to a safety line rather than a person. Static ropes will stretch on average only 2% of the total length.

Transfer - To go from a dynamic tether to a static one; or to go from on static tether to another. This is used in the High Ropes Course to move from one element to another. This is also the time when, if facilitated improperly, the participant is in the greatest danger!

The End!