RESOURCE MATERIAL

PATHFINDER LEADERSHIP AWARD

PTHACT005

Pathfinder Knots and Lashings

Resource Material

January 2009

Resource Material for the Pathfinder Leadership Award.

The Resource Material, Review Booklet and Assessment tools were produced by the Seventh-day Adventist Church Youth Ministries of the South Pacific Division (SPD). We pay tribute to Pastor John Wells, the main contributor in the reshaping, rewriting and adapting of this material. He was assisted by a number of other experienced leaders and an editorial team brought the task to completion. We wish to express our deepest thanks to them all.

Contents

Orientation

Welcome to the Resource Material for PTHACT005 Pathfinder Knots and Lashings.

Purpose

This unit covers the place of Pioneering in Pathfindering. It covers the basic knots and lashings needed to teach Pathfinders Pioneering skills.

The Resource Material

The Resource Material contains the essential information to meet the competencies outlined for this unit. It should help you to:

- Gain a comprehensive understanding of Pathfinder Knots and Lashings.
- Understand knots and lashings issues as they relate to a Pathfinder club.
- Prepare for the PLA training/review/assessment program.
- Acquire knowledge that will help with your Pathfinder Ministry.

A basic Review Booklet has been developed for this unit. It contains a small number of worksheets that, once completed, provide evidence that you understand the material. The Review Booklet needs to be completed before the assessment and forms part of the requirements to gain competence in this unit.

Note: If you have any questions, please consult your District Director or your local Conference/Mission Youth Department.

What Additional Resources Do I Need?

- Access to rope and two lengths of wood.

What Do I Need to Bring for the training/Review/Assessment Program?

- Resource Material (if received beforehand).
- Review Booklet (completed, if required).
- Pencil/pen.
- Any other resources or equipment as specified by your Assessor.

How Will I Be Assessed?

At the Conference/Mission training/review/assessment program, your competency will be assessed by one or more of the following methods:

- Written/oral questioning.
- Completed Review Booklet.
- Simulation activities.
- Project/assignment.

Reassessment Process

- You will be given the opportunity for reassessment if you are not found competent.
- There will be no limit to the number of opportunities for re-assessment.

Appeal Process

If you are not satisfied with your assessment you can:

- Discuss the issue with your Assessor.
- Discuss the issue with your District Director.
- Request the mediation of another Assessor.
- Report your concern to the Conference/Mission Youth Director.

Unit Outline

The Unit Outline below summarises the requirements (Elements) of this unit. Each Element requires completion of various tasks (Performance Criteria).

PTHACT005	Pathfinder Knots and Lashings
PLA	Pathfinder Leadership Award

DESCRIPTION: This unit has been developed by the Adventist Youth Ministries of the South Pacific Division (SPD). It covers the knowledge needed to understand Pioneering and to teach skills in knots and lashings.

The Competency Based Training (CBT) method has been adopted for the delivery of this unit.

Element	Performance Criteria
1. What is Pioneering?	1.1 Determine what Pioneering is. 1.2 Explain the purpose of Pioneering in Pathfindering.
2. Source and care for Pioneering equipment.	2.1 List the strengths and weaknesses of various ropes that are used in Pioneering. 2.2 Demonstrate your ability to preserve the ends of lashing ropes. 2.3 Discuss the criteria used for selecting Pioneering timber. 2.4 Explain the methods to minimise the environmental impact of collecting Pioneering timber. 2.5 Discuss storage procedures for Pioneering equipment.
3. Practice safe Pioneering methods.	3.1 Apply acceptable methods for checking equipment used In Pioneering. 3.2 Choose safe engineering structural concepts for Pioneering. 3.3 Choose suitable knots and lashing for Pioneering structures. 3.4 Discuss specific safety issues that need to be followed in Pioneering.
4. Learn methods of teaching knots and lashing.	4.1 Learn methods of teaching Pioneering to Pathfinders. 4.2 Identify appropriate ways of teaching lashings. 4.3 Identify active learning ideas for teaching Pioneering.
5. Choose knots for the following needs.	5.1 Demonstrate knots used to join ropes together. 5.2 Demonstrate knots used to attach rope to an object. 5.3 Demonstrate knots used in rescue. 5.4 Demonstrate knots used in tying down a load.
6. Identify lashings used in Pathfindering.	6.1 Explain the purpose of Pathfinder lashings. 6.2 Demonstrate the ability to execute the Pathfinder lashings.

CHAPTER 1: Introduction

Pioneering is a term that refers to the entering of new territories and environments with the view of preparing the way for those who will follow. In the past, the term Pioneer has been used to refer to someone who was involved in exploring the bush; someone who had basic skills to be self-sufficient and use the natural resources available to survive.

Pioneering now refers to a collection of these old skills that are still relevant in today's modern society.

These skills include:

- Knots – needed to tie down loads or tie a shoelace.
- Lashings – the ability to join structures together without any nails or bolts. It also helps to understand basic, strong engineering structures.
- Estimating – being able to work out heights, widths and other dimensions/distances when there are no instruments or equipment available.
- Basic Survival Skills – understanding the basic concepts of edible wild foods, water collecting, direction finding etc.
- Basic shelters – understanding the principles of constructing shelters in a survival situation.
- Axemanship – using and caring for an axe safely.
- Knife – safety procedures for using sheaths or pocket knives and how to care for them.

In today's world of Occupational Health and Safety, and environmental awareness. We generally do not teach our Pathfinders how to use the implements mentioned in the last two bullet points.

Why "Pioneering" is Included in Pathfindering

1. Pioneering teaches practical life skills which include:
   - Being able to tie basic knots.
   - Understanding which knot is suitable and in what situation.
   - Being able to respond to an emergency where some knowledge about knots is needed.
   - Being able to practice the following skills: securely tie timber together, create useful objects, solve problems and participate in search and rescue.
   - Being able to maintain a rope in good condition: coil it, store it, and understand the different ropes in the market.
   - Being able to secure a load on a trailer or vehicle.

2. Pioneering develops the ability to solve problems:
   - It explores a variety of problem solving skills.
   - It enhances any camping or outdoor experience.

3. Pioneering develops self-confidence:
   - It provides Pathfinders with the skills to perform creative.
   - It gives Pathfinders the confidence that they can use their skills to provide practical assistance when needed in the community.

4. Pioneering develops team spirit:
    - It provides a group of individuals the ability to successfully work together and devise methods to achieve an assigned task.
    - It builds the confidence of Pathfinders in themselves and in one another.
    - It recognises that everyone has different skill levels and each one can be used to solve a problem.

5. Pioneering is fun:
    - It is hands-on activity where knowledge is best gained by doing.
    - It must be taught and practiced within a practical fun context.

CHAPTER 2: Pioneering Equipment

The rope is a basic element of Pioneering. Ropes are made from natural, synthetic or metallic materials. In Pathfindering, we use natural and synthetic ropes.

Natural Ropes

Manila: Made from the leaves of the Musa Textillis tree in the Philippine Islands.

Sisal: Made from the leaves of the Agave Sisalaua plant that is native to central America. Sisal and Manila are the strongest natural material ropes with a 10% stretch factor.

Hemp: Made from an annual herbaceous plant native to west and central Asia. Hemp is 2/3 as strong as Manila and Sisal rope.

Cotton: Made from the white, downy, fibrous substance that covers the seeds of the cotton plant.

Coir: Made from coconut husks.

Synthetic Ropes

Synthetic ropes are all man made from different types of nylon. They have unique names that reflect their different properties. The strength of the synthetic rope is at least twice that of Manila or Sisal rope.

The main types of synthetic ropes are:

- Polypropylene and polyethylene - These are nylon ropes which stay afloat are not affected by water. They are designed for marine purposes; they are tough and have good abrasion resistance. However, they have low stretch and heat resistance.

- Terylene or polyester - These ropes stay afloat and are not affected by water. They have high heat resistance, but have low stretch.

- Nylon - These have a high level of strength, do not float and are affected by wet conditions. They have good stretch and moderate heat resistance. Nylon 6 is used in rock climbing and nylon 66 is used in abseiling. Nylon is resistant to abrasions, bacteria and most organic solvents. It is sensitive to strong acids, alkalinity and long exposure to sunlight.

The most common ropes used in Pathfindering are Manila, Sisal, Polypropylene and polyethylene.

Advantages and Disadvantages of Synthetic and Natural Ropes

The following table outlines the advantages and disadvantages of synthetic and natural ropes.

	Synthetic	Natural
Advantages	• Stronger. • Light weight. • Functions well in the wet. • Generally floats. • Does not knot.	• Strong. • Good to work with. • Knots hold well because of the texture. • Ability to stretch. • Excellent lashing rope.
Disadvantages	• Slippery texture. • Knots can slip undone easily. • Have to tie extra locking knots. • Harder to work with. • Harder to use as a lashing rope. • Melts if in contact with high heat or flame.	• Difficult to work with if wet - fibre swells. • Knots can be hard to untie. • Can be affected by mildew.

How is Rope Made?

The process of ropemaking begins with the fibre which can be either natural or synthetic. In the making of synthetic rope, these fibres are used for the whole length of the rope.

These fibres are twisted into yarns. The twist is in a clockwise direction. The yarns are then twisted into strands by twisting them in an anticlockwise direction.

The strands are twisted in many different ways and combinations to make up different types of rope. Common ropes are illustrated in Figure 2.1.

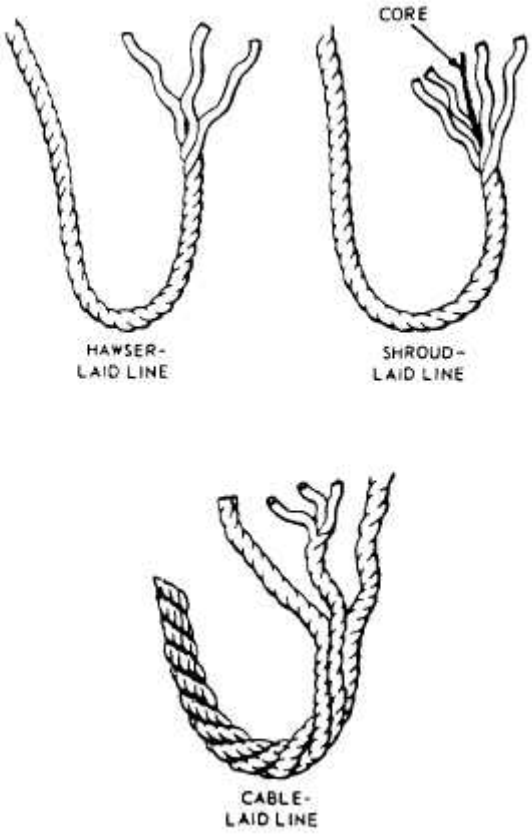

Figure 2.1: Illustration of different types of ropes.[1]

A description of each type of rope is provided below:

- Hawser-laid rope – three strands together in a clockwise direction. This is the common type of rope used for tying knots and lashings.
- Shroud-laid rope – four strands twisted together.
- Cable-laid rope – three hawser-laid ropes twisted together.

[1] All of the rope diagrams have been sourced from the internet.

Caring for Ropes – What Not To Do.

- Do not walk on the rope or let dirt, sand or grit get into the inside; it cuts the fibres and weakens the rope.
- Do not drag rope along the ground; the ground or sand acts as sandpaper to the rope; the synthetic will melt with the friction.
- Do not coil or store rope wet. Ropes require complete drying before storing away. Natural fibres will rot if left wet. Do not dry the rope in direct sunlight.
- Do not leave knots in rope. This creates kinks in the rope that weaken it. All knots lessen the strength of the rope.
- Do not allow rope to chafe (rub) over rocks or other surfaces. Protect it from wear by placing sacking, canvas or mat at the point of contact
- Do not allow the ends of the rope to unravel; splice, tie a stopper knot, use a metal or plastic stopper or melt the synthetic end so that the rope's strength is safeguarded. Securing the end of the rope is vital in caring for the rope. It keeps the rope tidy and usable.

Securing the Rope End

There are different ways of securing the end of a rope. The method used will depend on the type of rope. In Nylon based rope the ends are melted together using heat. After the end has been fused together, it helps to roll it into shape on a hard surface. One of the two methods discussed below are used to secure the end of a natural fibre rope.

1. Backsplice (Figure 2.2).
   Step 1: A knot is formed on the end of the rope. Step 2: A Turk's Head is formed in the end of the rope by dividing the three strands. Step 3: Then the three strands are tucked under the strands in the rope by tucking each strand under a separate formed strand. The disadvantage about this form of securing the end is that increases the circumference of the rope.

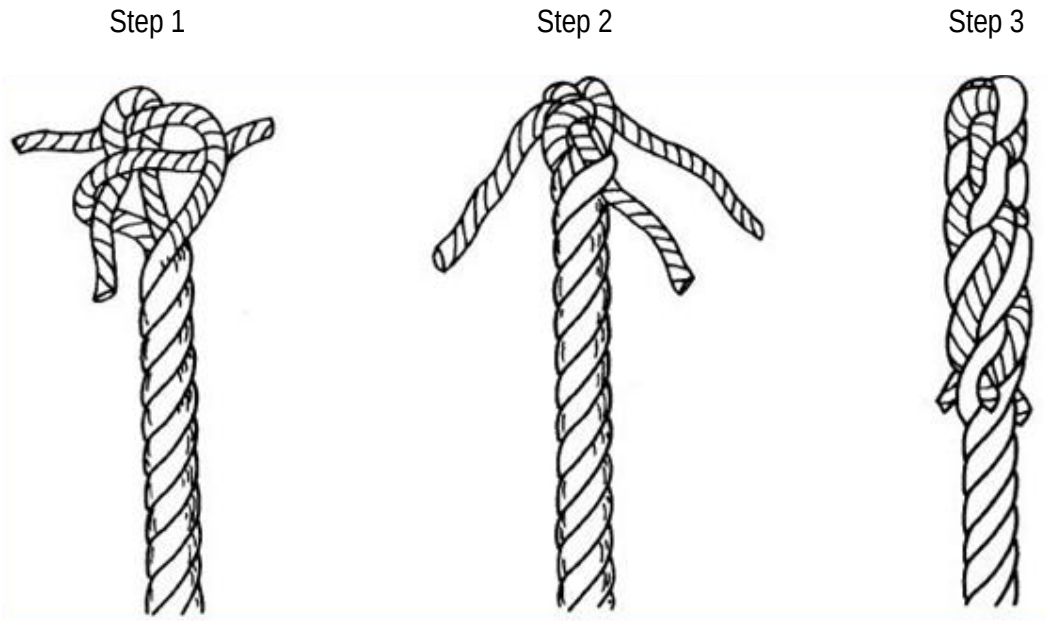

Figure 2.2: Illustration of the steps in tying a Backsplice.

2. American Plain Whipping (Figure 2.3).
   This method uses twine to secure the end of the rope. Whipping is a better way of securing the end of a rope because it does not increase the size of the rope and is therefore able to go through the eyes of Tarpaulins or a tackle block.

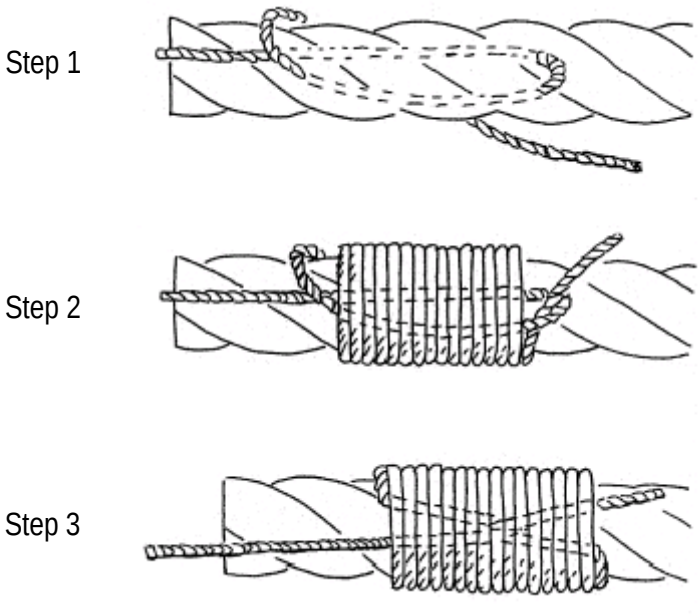

Figure 2.3: American Plain Whipping.

Storage of Rope

The rope should always be stored in a cool, dry and shaded area. The rope should be coiled and secured by a stopper after usage.

The rope should be stored either by hanging or by placing in a secured box. They need to be stored in order of length and size; that will assist with the prompt location of the appropriate rope.

Rope for Pathfinder Clubs

A rope is measured by its diameter which is expressed in millimetres (mm). It is bought by the length. A length of a good lashing rope is 3 metres.

The following table provides an indication of how many lengths of each diameter rope a Pathfinder Club can have.

Size of Rope	No. of Lengths
6mm rope (3m length)	at least 2 lengths for each member in the club
8mm rope (3m length)	at least 1 length for each Pathfinder
8mm (6m length)	at least 4 lengths per unit (min. of 10 per club)
9mm (9m length)	at least 2 lengths per unit (min. of 10 per club)
14mm (30m length)	at least 2 lengths per club
18mm (30m length)	at least 1 length per club

Different lengths of rope can be identified by colour coding. Dip each of the lengths into different coloured paint and the club will quickly learn to recognize the code. Colour coding makes it easier to store ropes of similar size together either by hanging them on the wall or putting them into the correct container.

Pioneering Timber, Spars or Poles

These are the essential elements for making interesting objects. Timber poles should be straight, round and thick enough to give rigidity and strength.

Poles can be bought from a timber yard, but these may often be too thick for Pioneering projects. Ensure that you have the right sizes. Do not use broom handles as they are unsafe for Pioneering. The best poles are taken from the bush. This can pose a problem because of access and the environmental impact of cutting down trees or saplings.

Guidelines for obtaining suitable poles:

a) Decide how many lengths are needed by the club.
b) Cut only what is necessary. If the saplings can be cut from a wide area it will lessen the negative environmental impact.
c) Strip the bark off if it is loose.
d) Choose only straight lengths.
e) Avoid cutting down a mature tree, only to use the appropriate branches at the top.
f) Plan to keep and store the cut timber for as long as it is useful.
g) Avoid waste.
h) Be a good steward and care for the timber.

Create a storage location for the different lengths so that the timber will last many years. The storage area should be:

a) Protected from weather.
b) Easily accessible when needed.
c) Organised in racks according to the length of the timber.
d) Secure from people who want to use it for fire wood etc.

Locations for obtaining the timber include:

a) Location of an area that is being cleared for housing development, farming or other reasons. Approach the developer and obtain permission to collect what you need.
b) Private property where the owner gives permission to collect the timber.
c) Council Land. Contact the local council and share the needs of your club and ask if they are able to help. Inquire if they may have a location that needs clearing.

For each unit, a Pathfinder Club would need:

a) 4 x 2 metre lengths.
b) 8 x 1.5 metre lengths.
c) 16 x 1 metre lengths.

These figures may be adapted depending on the projects that you plan for the club. This quantity should be enough to make a tower.

Care of Timber

a) Should be stored in a secure location.
b) Should be stored in a cool, dry area that protects the timber.
c) Should be stored so that it can be easily used and returned.
d) It is a good idea to paint the ends of each of the lengths so that you can identify them quickly e.g. red for a 1 metre length, blue for a 1.5 metre length.
e) Should be stored so that similar lengths are together.
f) Store off the ground and away from locations where moisture and white ants could damage it.
g) Use the timber only for Pioneering purposes.
h) Check the sturdiness of timber by dropping one end onto a hard surface (e.g. concrete) and listening for a solid sound.

Other Equipment

1. Pulley Blocks

   Pulley blocks are very useful if Pioneering projects involve moving parts. It is good to have a set in order to introduce Pathfinders to the concept of pullies and the different ratios that can be obtained using a pulley. The parts of a pulley block are shown in Figure 2.4.

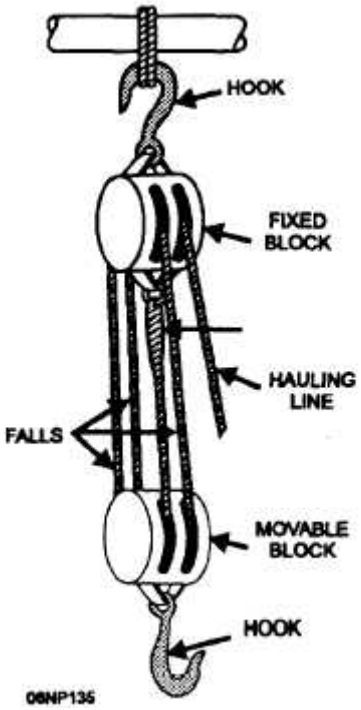

Figure 2.4: Parts of a pulley block.

2. Bow Saw

   The Bow Saw (Figure 2.5) is used for cutting or trimming timber. The saw should be kept sharp. The blade needs to be covered when it is not in use. It should only be used by responsible people.

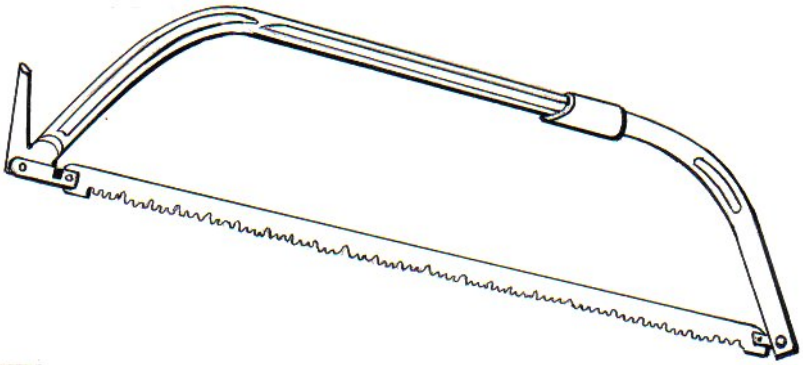

Figure 2.5: Bow Saw.

3. Knife

The knife (Figure 2.6) is used for cutting ropes, splicing of ropes etc. It needs to be kept sharp.

Figure 2.6: Knife.

4. Axe

The axe is used for cutting timber. It should be kept sharp. The blade needs to be covered in a pouch. It should only be used by staff. This can be a small hand axe or a full sized axe. Full size axes come in different weights. If you purchase one, ensure that you are comfortable with it first.

The parts of an axe are shown in Figure 2.7.

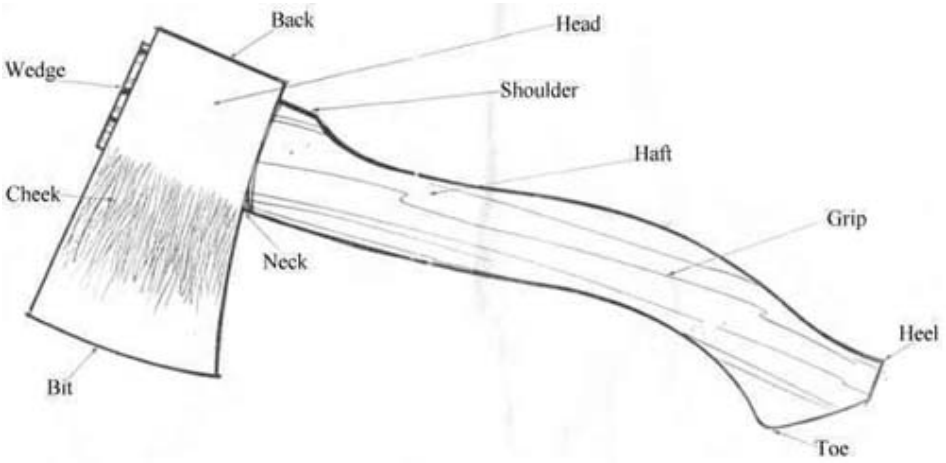

Figure 2.7: Parts of an Axe.

Axes, saws and knives should only be used by staff or under strict supervision of staff. Figure 2.8 shows the action of using an axe.

Figure 2.8: Using an Axe.

Points to watch for are:

a) Always keep the blade of the knife away from yourself.
b) Keep knives and axes sharp.
c) Position body clear of the swing of the axe.

5. Sharpening Stone
The sharpening stone (Figure 2.9) is very important for keeping the axe and knife blade sharp.

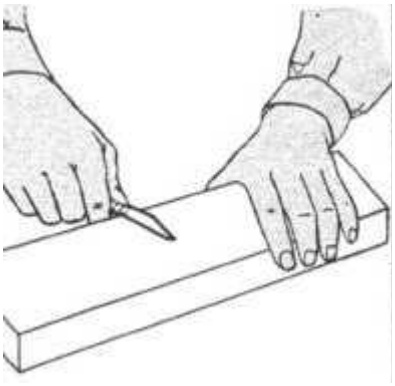

Figure 2.9: Sharpening Stone.

6. Tape Measure
The tape measure (Figure 2.10) is needed to ensure that all measurements are correct.

Figure 2.10: Tape Measure.

CHAPTER 3: Occupational Health & Safety Guidelines for Pioneering

Pioneering must be supervised at all times by a staff member. The project must be properly planned for before commencing so that:

- Any specific OH&S issues can be identified.
- Staff can ensure that all of the equipment is available.

Leaders should sight and pre-check all ropes before the project. Longer ropes must be twisted so that the condition of the core can be checked out. If the condition is in doubt, remove it from the Pioneering equipment. Check that all ropes are secured at both ends.

Pre-check poles before usage. Long poles can be checked by dropping an end on hard ground and listening to its sound. Check visually for signs of white ants or rotting. Make sure that the poles will not bend under reasonable strain. The butt of a metre pole should be around 60 mm in diameter.1.8 metres above the ground is the maximum height for any Pioneering project. When a project is at a height where a potential fall could result in an injury, develop a backup safety line to be attached to the participant and ensure adequate supervision.

Check all knots and lashings before the project is used by anybody. Limit the weight involved so that it is less than 50% of the manufacturer's minimum breaking force.[2] (The minimum breaking force in the table is NOT the maximum safe working load. It only tells us what the weight force was when the rope broke in the test situation.)

Size of Rope	Sisal with Manila (kN)	Polypropylene (kN)	Polyetylene (kN)	Nylon (kN)
6 mm	2.6	4.5	3.9	7.4
8 mm	4.7	8.5	6.8	13.2
10 mm	6.2	12.8	10.7	20.4
12 mm	9.3	18.3	15.1	29.4
14 mm	12.6	25.1	20.4	40.2
16 mm	17.7	29.9	27.4	52.0
18 mm	21.2	39.8	33.9	65.7

(Note: 1kN ~ 100kg)

[2] Figures are based on Kinnears Break Chart

The safe working load is also affected by:

a) weather conditions.
b) age of the rope.
c) knots used in the rope.
d) the way that lashings are done.
e) the edges that the rope is passing over.
f) the strain that is being put on the rope by the project.
g) the condition of the rope.

Use the correct knots and lashings for the specific weight bearing needs of the project. The lashing frapping must be done as tight as possible for square and diagonal lashing. Use appropriate engineering structural principles in Pioneering.

These are:

1. The strongest shape in Pioneering is the triangle (Figure 3.1). The two side poles are lashed to the base first using a square lashing. The two side poles are then pulled together and a Diagonal Lashing is used to bring the two sides together. It is important to make sure that the shape is correct for a standing triangle.

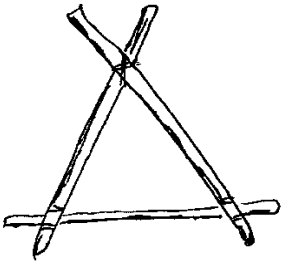

Figure 3.1: Triangle

2. Square shapes or trestles must be strengthened with diagonal braces to keep them square (Figure 3.2). Lash all of the poles that make up the square first. When the square is completed, lash the two diagonal poles by attaching the lower lashings before the upper lashings. When the upper lashings is done, make sure that the structure is square. All of the lashings are Square Lashings. The top of the trestle is always smaller than the bottom.

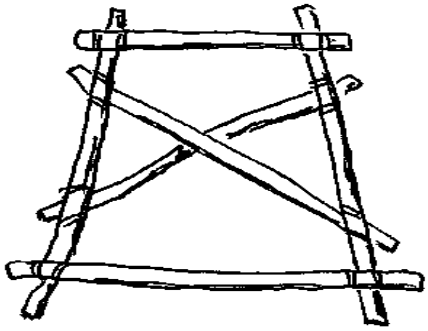

Figure 3.2: Braced Square or Trestle.

3. A trestle or triangle frame that stands by itself must be secured with ropes and pegs in the ground.

4. A rope that is used as a means of moving someone over a section of ground between two trestles must be set up so that the tension is not lost in the stretch of the rope. The rope should be securely fastened by being attached to a tree or with pegs being backed up in the ground by solid anchorages. It also needs to be tensioned so that there is limited stretch. Refer to Figure 3.3 for methods of anchorage.

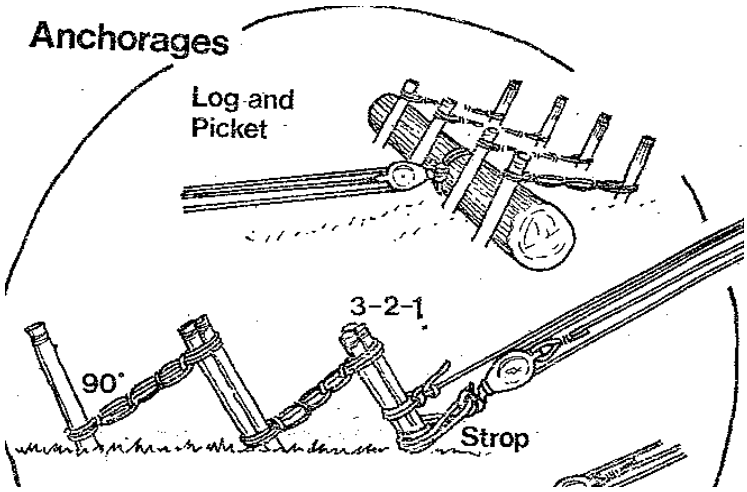

Figure 3.3: Methods of Anchorage.

CHAPTER 4: Knots and Lashings Teaching Methods

Knots, lashings, problem solving and the creation of fantastic projects are all the result of acquiring basic skills. In Pathfinder Pioneering, time needs to be spent in teaching the basic skills so that adventuring is safe. Pioneering can help in an individual's development of their life skills. Pioneering requires people working together, helping each other, encouraging each other and finding ways of overcoming the different problems set out in creative pursuits.

Pioneering is more than technical tasks; it has to do with Pathfinder involvement. An excellent scout and Pioneering author, John Thurman (see bibliography) said, "As a leader in Scouting [or Pathfindering] you must remember constantly to be interested in the human being you are training more than you should be interested in the subject matter."[3]

Basic outline of teaching knots and lashing:

1. Introduce the knot and talk about what it does, what it is used for and any interesting stories that go with it e.g. Sheet bend – used by sailors to tie the corner of the sail (sheet). When teaching knots, it makes it easier if all participants use the same terminology. The basic rope terminology is:

   Standing Part: The main part of the rope between the two ends.

   Standing End: The end of the rope that is made fast to an object.

   Running End: The opposite end to the standing end.

   Bight: A loop formed in the standing part.

   Overhand Loop: The Running End crossed over the Standing Part to form a loop.

   Underhand Loop: The Running End crossed under the Standing Part to form a loop.

   These terms are illustrated in Figure 4.1.

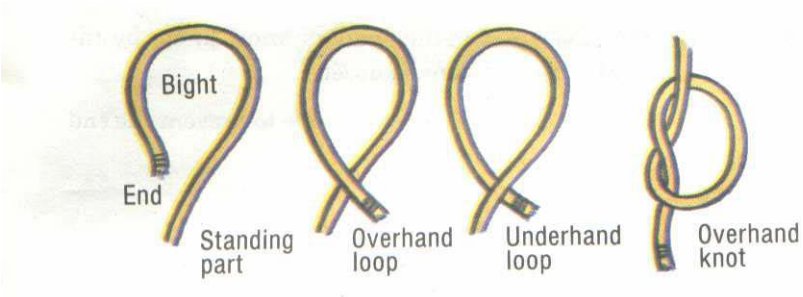

Figure 4.1: Parts of a rope.

2. Demonstrate the knot. Talk about what you are doing. Break it down into simple steps. Make up a story.

[3] Thurman, John Progressive Pioneering p xii

3. Get the Pathfinders to tie the knot. Affirm those who do it correctly. Help those who did not get it right and then affirm them too. Have fun.

4. Have the Pathfinders do it again until it becomes familiar. Ask those who have succeeded to help those who are still trying to work out how it all fits together.

5. Do something with the knot (or group of knots).

6. Tie the knot behind your back.

7. Tie the knot as part of a relay team.

8. Tie the knot to be rewarded with something special.

9. Review the knot. This is done either later in the program or at the next meeting. Set up a problem where a knot can be used to solve it. An example is the game 'Get the equipment over'. The unit is split in half with a 3 – 4 metre crocodile infested 'river' between. The teams have to transfer everything from one side of the 'river' to the other side. They can only use the equipment and implements they are given:
    a) 12 different objects that have to be transferred over to the other side.
    b) 1 plastic bucket with a handle.
    c) 4 lashing ropes (6 or 8 mm).

10. Have 2 ropes and the 12 objects on one side. The rest of the gear is on the other side. Blow the whistle and see what happens. Debrief the experience afterwards.

11. Encourage Pathfinders to use the different knots they learn in everyday life.

CHAPTER 5: Pathfinder Knots

Experts tell us that there are only four true knots in the world. The *Ashley Book of Knots* lists over a thousand different ways of tying a knot. Fortunately, Pathfinders are only taught a basic group of knots that have a practical application in life.

The main knots that Pathfinders are required to know have been included in this section.

The Overhand Knot

The Overhand Knot (Figure 5.1) is used as a stopper knot on the rope end, to prevent the end from fraying or to stop the rope from slipping through a sleeve.

Figure 5.1 The Overhand Knot.

The Granny Knot

The Granny Knot (Figure 5.2) is tied by holding one end of the rope in the left hand and one end in the right hand. Place the left rope over the right making an overhand knot and then place the left rope over the right again forming the knot. If one end of the Granny Knot is pulled, the knot will capsize into Two Half Hitches, which makes a better knot than the Square Knot. It is used to join two equal ropes. It is a stronger knot than the Square Knot.

Figure 5.2: The Granny Knot.

Two Half Hitches

Two Half Hitches (Figure 5.3) is a quick way to tie a knot to a post is to first form a loose Granny Knot, leaving a long end. As the running end is pulled it take up the slack and the Granny Knot will capsize into Two Half Hitches.

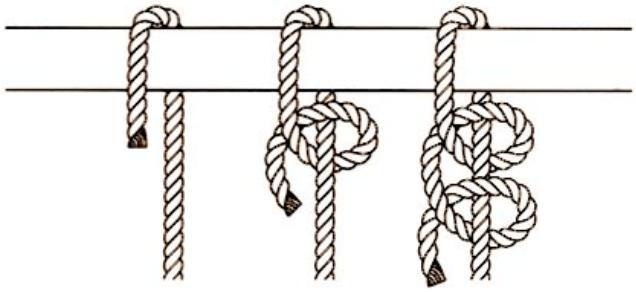

Figure 5.3: Two Half Hitches.

The Square or Reef Knot

A Square Knot or Reef Knot (Figure 5.4) is tied by holding the two ends of the rope in the left and right hands. Place the left rope over the right and then the right rope over the left. It is one of the most common knots. It is used in first aid and to join two equal ropes.

Figure 5.4: The Square or Reef Knot.

The Slip Knot

The Slip Knot (Figure 5.5) slips but when tied properly, becomes tighter the more one is pulled. Make an overhand knot with a long end. Use the long end to form a bight and feed it back into the overhand knot. Make sure that you leave enough through the overhand so that it does not slide out the wrong way. It is used for tightening around an object.

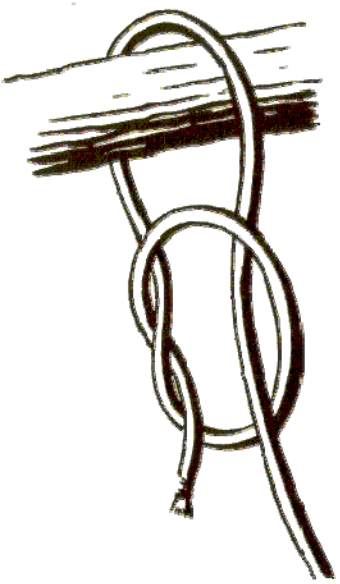

Figure 5.5: The Slip Knot.

The Double Bow

The Double Bow (Figure 5.6) is the one tied every time a person ties their shoelace. It should follow the square knot principle and not the granny.

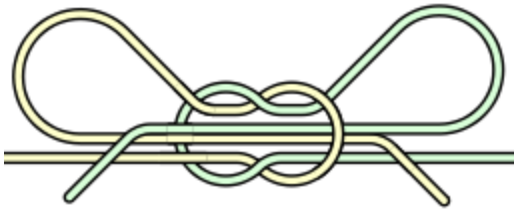

Figure 5.6: The Double Bow.

The Figure Eight Knot

The Figure Eight Knot (Figure 5.7) has a single rim part, which passes completely around the neck and it has another single part at the top that nips the end. It is used at the end of a rope as a stopper knot. It is also used in rope sports (abseiling, rock climbing, etc).

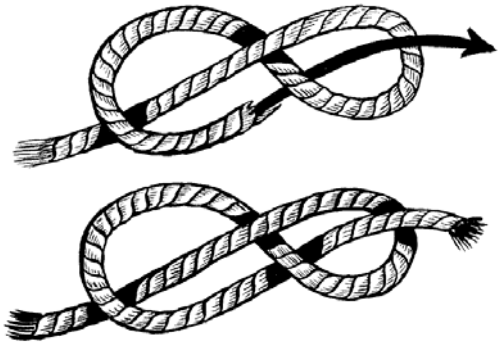

Figure 5.7: Figure Eight Knot.

The Figure Eight on the Bite

The Figure Eight on the Bite knot (Figure 5.8) forms a non slip bight that is used in rock climbing, abseiling etc. It can be used to tie a rope around an animal's neck so that the animal does not choke. It is an easy knot to tie. When finished it should lie flat with no rope crossing over in the bights. Place a bight in the end of the rope and tie a figure of eight knot.

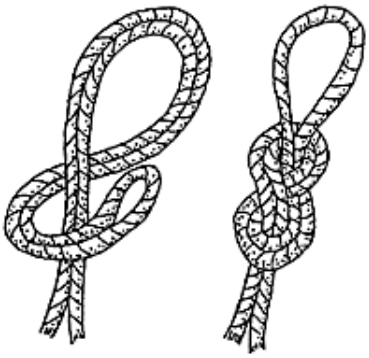

Figure 5.8: Figure Eight on the Bite.

The Clove Hitch

The Clove Hitch (Figure 5.9) is used for securing a rope to a spar. This hitch, if pulled taut, will not slip up or down on a smooth surface. It is used to start and finish most of the lashings.

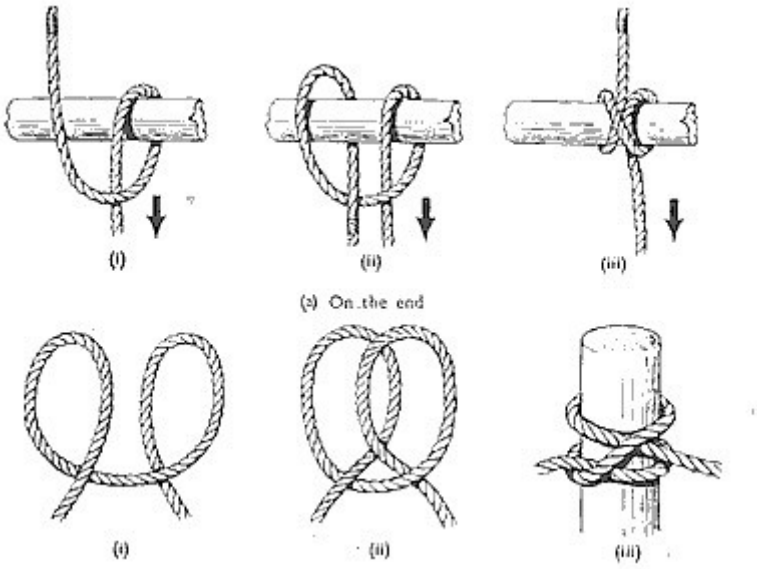

Figure 5.9: The Clove Hitch.

The Sheet Bend

The Sheet Bend (Figure 5.10) is a method of joining two ropes of different sizes is stronger than the commonly used Square Knot. It can also be used for tying ropes of the same size or two ends of a single rope. Take a bight near the end of one rope and hold it in position with the left thumb and fingers. The right hand grips the other rope end and throws a Half Hitch around the bight. Then, instead of tucking the loose end under the standing part of the rope, the right hand pushes it through the bight held by the left. Pull the ropes tight and the Sheet Bend is completed.

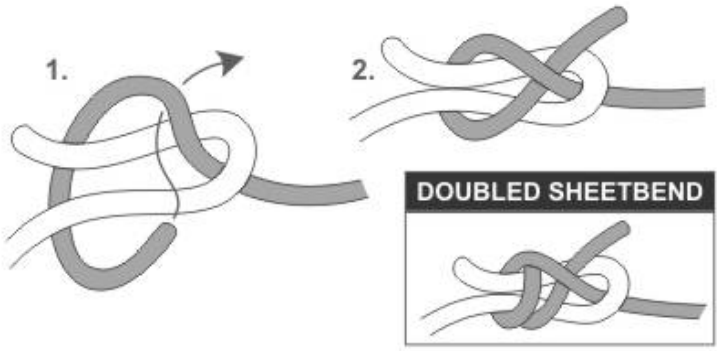

Figure 5.10: The Sheet Bend.

The Sheepshank

The Sheepshank (Figure 5.11) is the most famous and useful of rope "shorteners," is also a "strengthener," as it supplies triple strands at any portion of a single rope. Take a bight near the centre of a rope and take another bight in the opposite direction, one running upward, the other downward. For simplicity, assume that the upward bight is at the left, and the standing part of the rope is at the right. Twist the standing part to form an underhand loop and slip it over the upward bight, pulling the loop tight so that it is practically locked in place. Now do the same with the downward bight, but in reverse fashion. To simplify this, turn the rope upside down so that you will be performing exactly the same operation as before. The result is simplicity itself – two opposite bights in the centre of the rope, each gripped by a Half Hitch. The harder you pull on the rope ends, the firmer it becomes. If there is any danger of a slip, insert two toggles or bars through the loops that project from the circling Half Hitches.

Figure 5.11: The Sheepshank.

The Fisherman's Knot

The Fisherman's Knot (Figure 5.12) is known under a variety of names, such as the "Waterman's Knot" and the "Englishman's Knot," this knot definitely seems of English origin, so the name English Knot or Englishman's Knot is an appropriate one. This knot is an easy one to tie. Lay the ends of two ropes "A" and "B" – so that they overlap, each pointing opposite to the other. Tie the end of rope A around the standing part of rope B, using a simple Overhand Knot. Then tie the end of rope B around the standing part of rope A in identical fashion. Draw the standing parts in opposite directions and as the ends come together, the knots will jam into one, forming a strong join.

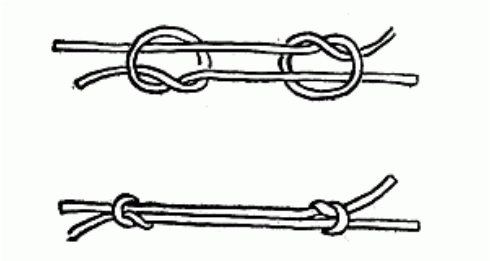

Figure 5.12: The Fisherman's Knot.

The Timber Hitch

Timber Hitch (Figure 5.13) is so called because it can be used for rolling logs or hoisting lumber, the Timber Hitch is useful as a temporary hitch that will hold while needed and loosen easily. It is simply a Half Hitch with this added twist: After drawing the end down through the loop, bring it over and under the side of the loop again, so that it jams more firmly. It thus becomes a double Overhand Knot, and further turns can be taken to triple or quadruple it, if so desired.

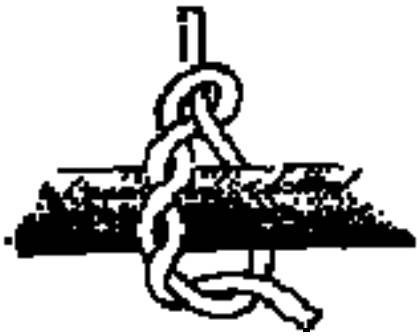

Figure 5.13: The Timber Hitch.

Timber Hitch with Half Hitch

The Timber Hitch with Half Hitch (Figure 5.14) is used for hauling long objects, such as beams, in an upright fashion. First, form a simple Half Hitch above the centre of the object, by making an overhand loop and drawing the end well down, while the standing part goes straight up. Allow enough bight

below the Half Hitch to form a Timber Hitch around the lower portion of the object, tightening the free end with the customary double twist. Hoist the object with the standing part of the rope.

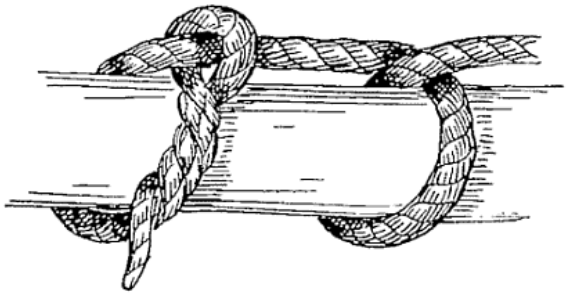

Figure 5.14: Timber Hitch with Half Hitch.

The Bowline

The Bowline (Figure 5.15) is an excellent knot for creating a non-slip loop that can be used on a person, animal or to secure a boat. It is not an easy knot to tie. It used to be used extensively in rope sports but the format of the BOWLINE places more stress on the rope than the Figure of Eight that is now used.

Figure 5.15: The Bowline.

The Truckies Hitch

The Truckies Hitch (Figure 5.16), which is also known as the Hay Hitch, is used to secure a load on a trailer or car. It is also used in Pathfinder Pioneering when you don't have a tackle to take up the strain on a rope. It resembles one end of a Sheepshank.

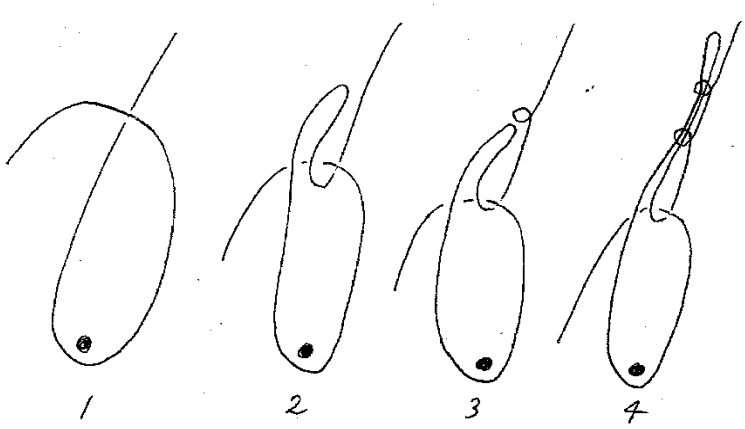

Figure 5.16: The Truckies Hitch.[4]

The stages in tying the Truckies Hitch are:

1. Pull the rope down around the point where you are going too secure it to. It may be a fixture on the trailer, a tree or anchor point. Bring the end of the rope across the standing rope.

2. Below where the rope crosses, form a bight

3. Twist the standing rope above where you are crossing the rope over to form an underhand loop. Put the end of the bight through the loop that has been formed.

4. Form a second loop above the first by twisting the standing rope to form an underhand loop above the first one. Pull the end of the bight that has gone through the first loop through this one as well. This is so the first loop does not come undone under pressure. Pull down on the load or the apparatus and tie off with either a Clove Hitch or One and a Half Turns and Two Half Hitches.

[4] The Truckies Hitch was hand drawn by J. Wells.

CHAPTER 6: Pathfinder Lashings

These knots are useful for creating different fun apparatus at a Pathfinder Fair, campout or just to solve a problem during the Pathfinder program. The following six lashings have been developed in England and are the safest ways of securing timber poles so that they won't come apart. Pacific Islanders and people from the Asian regions of the world use natural rope such as vines so they have a different type of lashing that is quick and easy, but tend to be less secure. These are known as Japanese and 'Filipino' lashings.

The Square Lashing

The Square Lashing (Figure 6.1) is the standard lashing that is used most of the time. It is used to bring two crossing timber poles together and to prevent one sliding along the other. Begin with a clove hitch and end with two half hitches. The Clove Hitch is always tied under the pole/spar that has the load bearing on it. The end of the rope is then twisted around the rope as it is wrapped around the spar as illustrated in the diagram above. Make four wrapping turns and two frapping turns between the poles. Keep the rope as tight as possible. Lay the rope as shown in the picture.

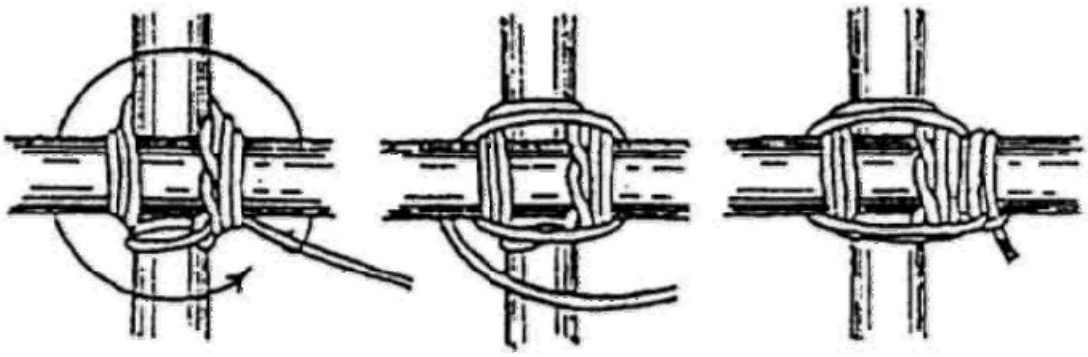

Figure 6.1: Square Lashing.

The Diagonal Lashing

The Diagonal Lashing (Figure 6.2) is used to hold two poles/spars together that tend to spring apart. The lashing starts with a timber hitch and ends with two half hitches. The rope is wound around three times as shown in the diagram. Three one way and three the other to form a St Andrews cross. Frap around twice. Keep tension on the rope.

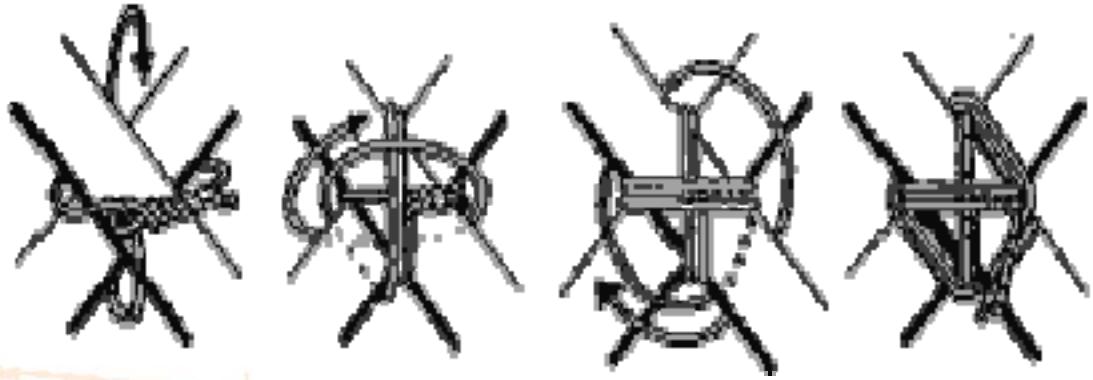

Figure 6.2: Diagonal Lashing.

The Round Lashing

The Round Lashing (Figure 6.3) is used to join two poles so that they can be made longer. Start the lashing with a clove hitch on one pole. Turn the rope around both poles until almost out of rope. Finish off with two half hitches around both. Tighten the whole lashing by knocking small wooden pegs down between the timber poles under the rope.

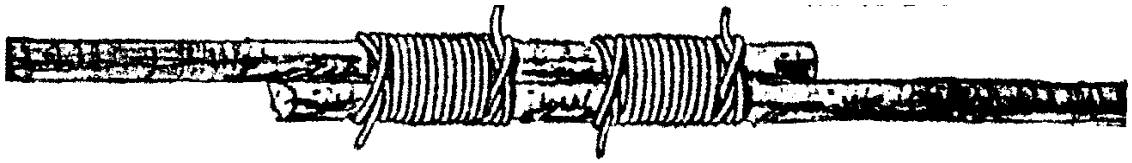

Figure 6.3: The Round Lashing.

The Sheer Lashing

The Sheer Lashing (Figure 6.4) is used when the load is going to be between two timber poles such as for a rope bridge. Place the timber poles beside each other and begin by tying a clove hitch around one of the timbers. Keep a space between the two poles by putting in small spacers (wood) so that there is room to do the frapping between the two poles. Wrap the rope around the two poles then complete the frapping with enough rope to finish off with two half hitches.

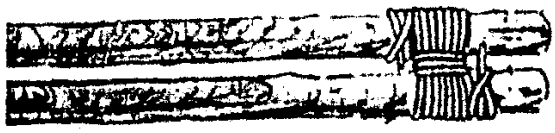

Figure 6.4: The Sheer Lashing.

The Tripod Lashing

The Tripod Lashing (Figure 6.5) is used so the poles can be split to form a tripod. This can be used in making a basin stand. It is the same as Sheer Lashing except there are three spears involved.

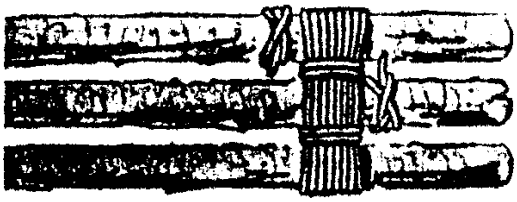

Figure 6.5: The Tripod Lashing.

The Continuous Lashing

The Continuous Lashing (Figure 6.6) is used to secure a tabletop or the lookout platform on a tower. Lay the table poles in place. Step 1: Centre the rope and tie with a clove hitch. Step 2: Take the two lengths of the rope and pass them over the table poles and cross the ropes under the support pole as demonstrated in the diagram. Step 3: Push the next pole up into place. Put the two ropes over and cross under and continue the process until you have the table top or platform you are constructing. Finish off with a square knot.

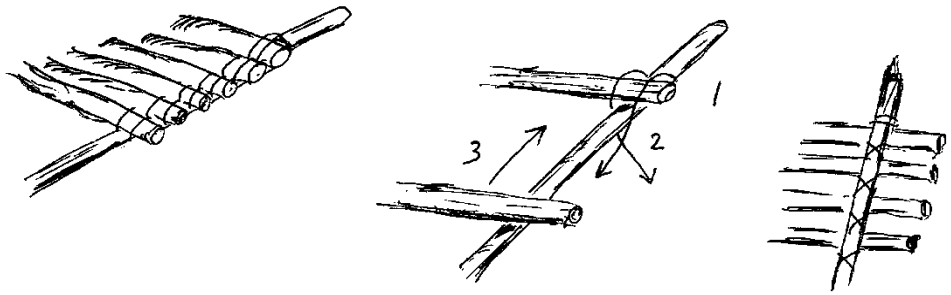

Figure 6.6: The Continuous Lashing.

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