



Basic building construction works Level I Learning Guide-61

Unit of Competence: Erect and Dismantle

Scaffolding and formwork

Module Title: Erecting and Dismantling

Scaffolding and Formwork

**LG Code: EIS BBCW2 M15 LO2-LG-02 Learning
Guide - 61**

TTLM Code: EIS BBCW2 M15 TTLM 0919 v1

**LO 2: Whip, tie, splice and inspect
ropes.**



Instruction Sheet	Learning Guide # 2
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This learning guide is developed to provide you the necessary information regarding the following content coverage and topics:

- Inspecting damage fiber rope and whippy cord.
- Whipping rope ends accordance with project specification.
- Whipping rope ends accordance with project specification.
- Applying bends hitches and inspect with project specification.

This guide will also assist you to attain the learning outcome stated in the cover page.

Specifically, upon completion of this Learning Guide, you will be able to:

- Inspect damage fiber rope and whippy cord.
- Whippy rope ends accordance with project specification.
- Splice designates rope ends with regulation and specification.
- Apply bends hitches and inspect with project specification.

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below 3 & 5.
3. Read the information written in the information “Sheet 1, Sheet 2, Sheet 3, Sheet 4 and Sheet 5”.
4. Accomplish the “Self-check 1, Self-check t 2, Self-check 3 and Self-check 4 in page 4, 7, 11, and 14.

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Introduction

Fiber rope is a group of yarns, plies, fibers or strands that are twisted or braided String (structure) made of multiple strands twisted together or thin rope Cord ,together into a cord:-larger and stronger form. Ropes have tensile strength. It is Personal equipment for protection against falls. Rope access systems are fundamental principles for working at height.

All rope access work must be planned and carried out in accordance with the International Rope Access Trade Association (IRATA).

The team leader shall prepare an access permit before beginning rope access work.

The access document shall include, but not be limited to, the following safety objectives:

- list the rope access methods to be used for the proposed work,
- List the members of the work team by name and identify their duties. (Note: the Rope Access
- Supervisor shall assess the individual team member's suitability for the work to be performed.)
- list the rope access equipment to be used for the work to be performed,
- list the hazards associated with the work to be performed,
- list appropriate personal protective equipment (PPE) to be used,
- list provisions for providing security to the anchor,
- List the rescue service and the means to summon the rescue service.

Before adopting rope access techniques for a particular job, the asset holder, the contractor shall do a risk assessment. All persons involved in the Rope Access shall be provided with and shall use personal protective equipment, in accordance with the requirements Personal Protective Equipment. It is recommended that only equipment that has a current certificate of the safe working load or minimum breaking strength, or other certification as to reliability should be used.

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Check sample testing to failure, or proof testing on individual items, and a proven quality assurance program, in accordance with an appropriate standard. Equipment should be only used in the manner indicated by the manufacturer.

Technician shall establish and monitor a procedure to ensure all items of equipment are inspected before each use.

You should follow the manufacturer's instructions and be trained by a competent person. Safe practices for ropes and support devices:

- Know how to use the equipment.
- Inspect the equipment daily.
- Rig suspension ropes and support devices properly.
- Use an independently anchored personal fall-arrest system.
- Ensure that primary support ropes and lifelines will support at least 5,000 pounds.
- Don't use primary support ropes and lifelines that are worn or damaged.
- Protect primary support ropes and lifelines that contact surface edges.
- Protect primary support ropes and lifelines from extreme temperatures and corrosive chemicals.
- Don't use descent-control devices in strong winds.

Use the "rag-and-visual" method to check for external damage.

Grab the rope lightly and with a rag or cotton cloth, move the rag slowly along the wire. .

Measure the rope diameter. Visually check for abrasions, corrosion, pitting, and lubrication inside the rope. Technician shall demonstrate that all equipment is used, inspected and maintained in accordance with manufacturer's instructions. Technician shall ensure that equipment is



Figure 2.1 Damage rope



Figure 2.1 Using rope

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Self-Check - 1	Written Test
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Directions: Answer all the questions listed below.

1. _____ is a group of yarns, plies, fibers or strands that are twisted
A) Fiber rope B) Lifelines
C) Surface edges D) None
2. What are the safety apply we use rope access in scaffolding work?
A) Don't use primary support ropes
B) Don't use lifelines that are worn or damaged
C) Protect primary support ropes D) All
3. What types of document the team leader shall be prepared for rope access work .
A) Know how to use the equipment.
C) Don't use descent-control devices in strong winds.
B) Inspect the equipment daily. D) All

Note: Satisfactory rating – 3 points

Unsatisfactory - below 3 and 4 points

You can ask you teacher for the copy of the correct answers.

Name: _____

Date: _____

Short Answer Questions

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Information Sheet-2	Whipping rope ends accordance with project specification.
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Introduction

A whipping knot or whipping is a binding of marline twine or whipcord around the end of a rope to prevent its natural tendency to fray. The whipping can be made neat and permanent by tying it off or sewing the ends of the twine through the rope. The purpose of a whipping is to prevent the end of a rope from fraying...A whipping should be, in width, about equal to the diameter of the rope on which it is put, (Two sail maker's whippings) a short distance apart, are put in the ends of every reef point, where the constant "whipping" against the sail makes the wear excessive; this is said to be the source of the name whipping. The other type of stopping knot is a seizing knot. Whipping is suitable for synthetic and natural stranded and braided ropes, lines and cables, including 3-strand rope, 4-strand cable and 8-strand multi plait as well as concentric and braided constructions.



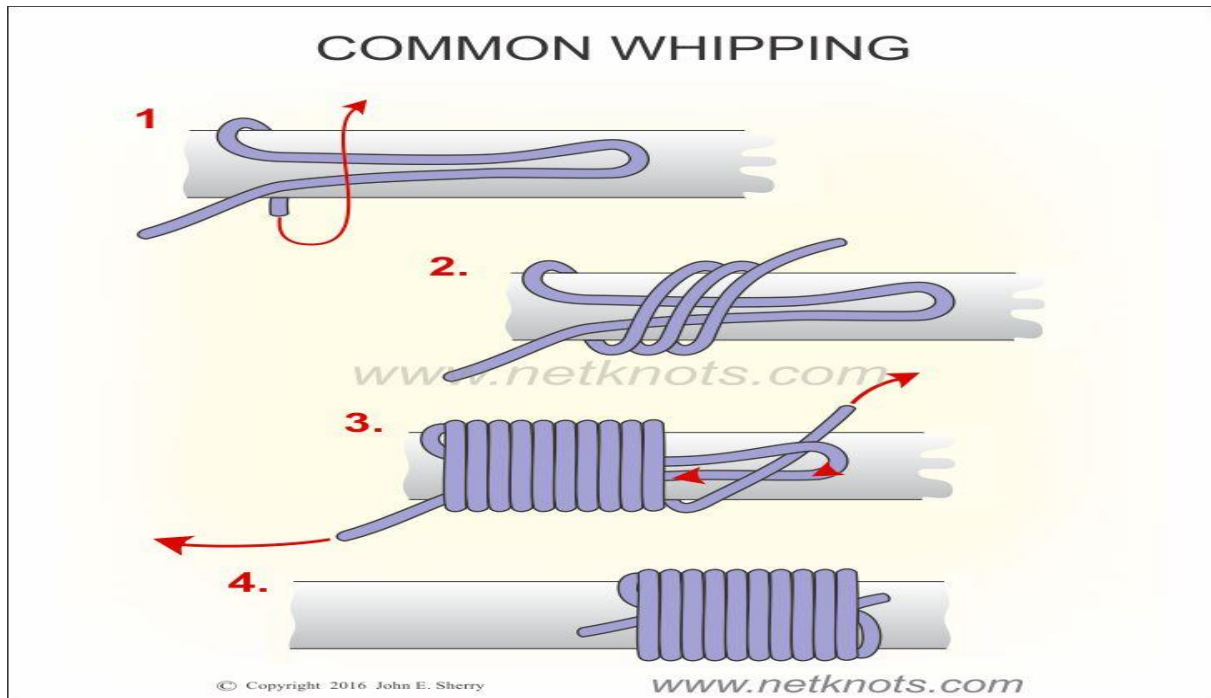
Figure 2.3 Common whipping knots

The common whipping should not be used for rope ends that will be handled. This whipping knot is also called 'wolf' whipping in some parts of the whipping knot or whipping is a binding of marline twine or whipcord around the end of a rope to prevent its natural tendency to fray.

How to tie the Common Whipping Knot: -

The Common Whipping is a knot tied at the end of a rope to keep the end from unraveling. The benefit of the Common Whipping knot is that it is quite easy to tie and no tools are required. However, the knot is more appropriate for temporary use or on decorative ropes as it is known to slip off the rope easily. It is best used on a natural fiber rope and tied with natural twine, both of which afford the maximum friction for the knot to hold its position at the end of the rope. When dealing with synthetic ropes, it is best to wrap with tape and then heat the ends to melting point to fuse the strands. Also see the figure 2.2 French Whipping.

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Common Whipping Knot Tying Instructions

Lay the twine along the rope and make a bight back along the rope. Note that the rope should be whipped a short distance (one and a half times the diameter) from its end.

- Begin wrapping the twine around the rope and bight of twine securely. Wrap until the whipping is one and a half times wider than the rope is thick.
- Run the working end of the twine through the bight. Carefully pull on the standing end of the twine until the bight and working end are pulled under the whipping (Note: It is normally necessary to maintain tension on the working end to prevent the bight from being dragged completely through otherwise the whipping will fall apart.) Cut the twine flush with the edges of the whipping to give the rope end a finished look.

<http://youtube.com/watch?v=0ib2tF-M0sg>

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Self-Check - 2	Written Test
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Directions: Answer all the questions listed below.

1. _____ is a binding of marline twine or whipcord around the end.
A) Whipping B) Lifelines
C) Surface edges D) Fiber rope
2. What is the purpose of a whipping is to _____
A) Prevent the end of a rope from fraying.
B) To control devices in strong winds.
C) Protect primary support ropes D) All
3. What is the benefit of Common Whipping knot _____ is that and
A) It is quite easy to tie B) No tools are required
C) A and B. D) None

Note: Satisfactory rating – 3 points

Unsatisfactory - below 3 and 4 points

You can ask you teacher for the copy of the correct answers.

Name: _____

Date: _____

Short Answer Questions

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Information Sheet-3	Splicing designates rope ends with regulation and specification.
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Introduction

Rope splicing in rope work is the forming of a semi-permanent joint between two ropes or two parts of the same rope by partly untwisting and then interweaving their strands. Splices can be used to form a stopper at the end of a line, to form a loop or an eye in a rope, or for joining two ropes together. Splices are preferred to knotted rope, since while a knot typically reduces the strength by 20–40%, a splice is capable of attaining a rope's full strength. However, splicing usually results in a thickening of the line and, if subsequently removed, leaves a distortion of the rope. Most types of splices are used on 3-strand rope, but some can be done on 12-strand or greater single-braided rope, as well as most double braids. While a spliced 3-strand rope's strands are interwoven to create the splice, a braided rope's splice is constructed by simply pulling the rope into its jacket.

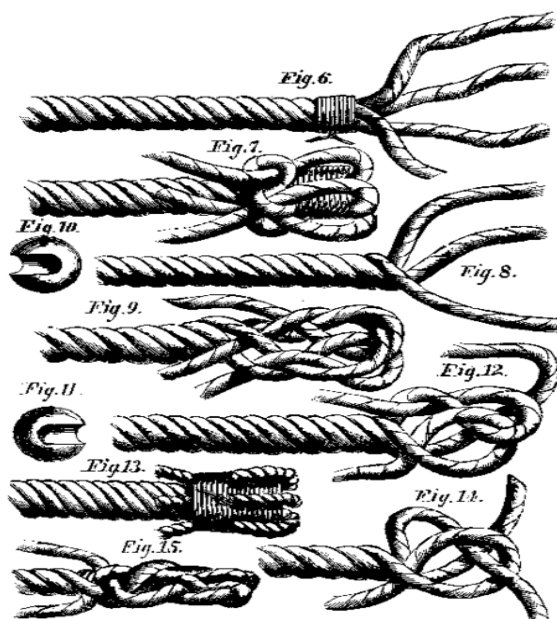


Figure 3.1 Stages in splicing the end

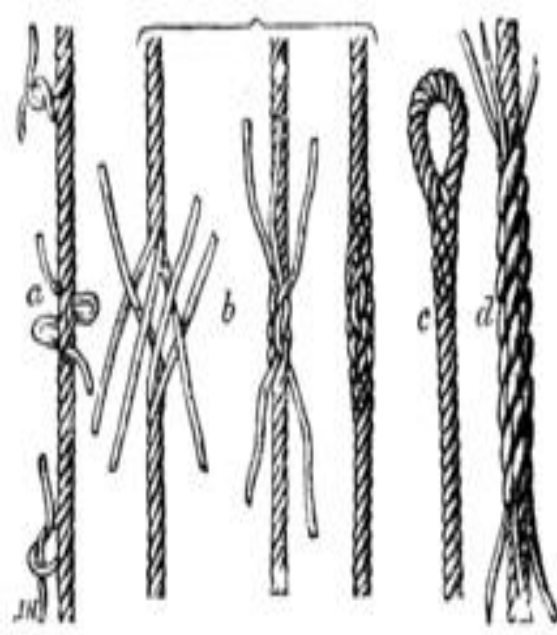


Figure 3.2

Examples of splices in different stages of completion, a) Long splice b) tapered short splice c) eye splice d) short splice



Types of splices

Back splice (also called an end splice):-A splice where the strands of the end of the rope are spliced directly back into the end without forming a loop. It is used to finish off the end of the rope to keep it from fraying. The end of the rope with the splice is about twice the thickness of the rest of the rope. With nylon and other plastic materials, the back splice is often no longer used; the rope strands are simply fused together with heat to prevent fraying.

- **Cut splice** (originally called cunt splice) – A splice similar to the eye splice. It is typically used for light lines (e.g., the log-line) where a single splice would tend to come undone, the rope being frequently wet. It makes a very strong knot. A cut splice is a join between two ropes, made by side splicing the ends slightly apart, to make an eye in the joined rope which lies shut when the rope is taut.
- Eye splice – A splice where the working end is spliced into the working part forming a loop.
- Ring splice – Attached the working end of a rope to a ring or clew.
- Chain splice – Attached the working end of a rope to a chain.
- Figure-eight "splice" knot- A splice-like bend knot used for joining two ropes.
- Horseshoe splice – A cut splice where the two sides of the loop are of unequal length.
- Long splice – A splice used to join two rope ends forming one rope the length of the total of the two ropes. The long splice, unlike most splice types, results in a splice that is only very slightly thicker than the rope without the splice, but sacrifices some of the strength of the short splice. It does this by replacing two of the strands of each rope end with those from the other, and cutting off some of the extra strands that result. The long splice allows the spliced rope to still fit through the same pulleys, which is necessary in some applications.
- Short splice – Also a splice used to join the ends of two ropes, but the short splice is more similar to the technique used in other splices and results in the spliced part being about twice as thick as the non-spliced part, and has greater strength than the long splice. The short splice retains more of the rope strength than any knots that join rope ends.

Splices are often tapered to make the thicker splice blend into the rest of the line. There are two main types of tapering, the standard and the "West Coast Taper".

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- Standard tapers progressively remove a portion of each remaining strand—one-third at a time is typical, resulting in a taper of two additional tucks beyond the splice—thus Making each successive tuck produce a narrower splice. This is only practical with laid-lines, i.e....., those made up of numerous strands laid side by side.
- **West Coast taper** (also known as a Fisherman's Taper) is effected by extra-tucks of entire strands, such that the second strand is interweaved one more time than the first and the third is interweaved an additional time after the second.

Unfinished cut splice



FIG. 109.—Cut splice.



Line eye-splice to a snap shackle.



Short splice, with ends whipped

Splicing tools

- A fid is a hand tool made from wood, plastic, or bone and is used in the process of working with rope. A variety of fid diameters are available depending on the size of rope being used. Styles of fid designs include:
 - Swedish fid is conical instrument with a somewhat long taper.
 - Tubular fid aid in splicing double-braided rope.
 - Uni-fid needed to splice braid with a parallel core.
- A Marlinspike is a tool, usually made of steel and often part of a sailor's pocketknife, which is used to separate strands of rope from one another. They can range in size anywhere from 3 inches to 5 feet long, with a round or flattened point.
- A pulling fid is often used for smaller diameters of braided ropes. Also a Soft fid is a great tool when dealing with tightly braided ropes.

<http://youtube.com/watch?v=6CpKlwyPYWY>

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Self-Check -3	Written Test
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Directions: Answer all the questions listed below.

1. _____ is the forming of a semi-permanent joint between two ropes.
A) Rope splicing in rope work B) Prevent the end of a rope from fraying
C) Protect primary support ropes D) None
2. In what percent reduces the strength knotted rope _____
A) By 10–20% B) By 30–50%
B) By 20–40% D) None
3. A splice used to join two rope ends forming one rope the length of the total of the two ropes.
A) Long splice B) Ring splice
B) Horseshoe splice D) None

Note: Satisfactory rating – 3 points

Unsatisfactory - below 3 and 4 points

You can ask you teacher for the copy of the correct answers.

Name: _____

Date: _____

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Information Sheet-4	Applying bends hitches and inspect with project specification.
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Introduction

Just like when you learnt to tie your shoelaces when you were young, knot tying is a skill that requires considerable practice in varying conditions and application. Learning to tie bends and hitches for your scaffold license takes time and practice but once you have learnt these skills, they will be useful in many more areas than just scaffolding, like: boating, camping, caving, outdoors, rigging, rock climbing, sailing, scoutingetc.

Below you learn the technic how to tie bends and hitches for scaffold works.



Clove Hitch

The clove hitch is a simple hitch that is widely used in domestic, commercial and recreational activities. The clove hitch is often used to secure the end of a line to a rail or beam in many applications. A clove hitch is quick to tie and very easy to adjust.



Rolling Hitch

The rolling hitch is similar to a clove hitch with an extra loop or turn. The extra turn adds additional friction to help the hitch resist sideways movement in a certain direction



Bowline

The bowline it one of the best knots out there and it used a lot by sailors because it is so easy to tie and untie. The bowline loop is the workhorse of knots, it never slips, comes loose, or jams under strain



Timber Hitch

A good knot for securing the end of a rope to a tree, pole, or log. It does not jam or slip, no matter how heavy the load and is easy to tie and untie.

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Sheet Bend

A sheet bend is ideal for joining two ropes of unequal diameter or a rope to an object such as a tarp or plastic sheeting. The sheet bend is one of the easiest ways To connect two pieces of rope or cord together. It is one of the basic knots used for survival and offers a quick way to join cordage.



Crown Knot and Back Splice

The Back Splice provides a secure method of preventing the end of a rope from fraying.



Side Eye Splice

Is used to place a permanent loop at the end of a rope.



Common Whipping

Use to prevent natural fiber rope ends from fraying or unraveling



Short Splice

A short splice can be used in place of a knot to join two ropes, or the ends of the same rope together

<http://youtube.com/watch?v=UoIH2L9vmOo>



Self-Check - 4	Written Test
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Directions: Answer all the questions listed below.

1. _____ is a simple hitch that is widely used in domestic, commercial and recreational activities
A) The clove hitch B) Side Eye Splice
C) Short splice D) None
2. _____ is one of the best knots out there and it used a lot by sailors because it is so easy to tie and untie
A) The bowline B) The clove hitch
B) Side Eye Splice D) Short splice
3. A good knot for securing the end of a rope to a tree, pole, or log
A) Timber Hitch B) Horseshoe splice
C) Ring splice D) None

Note: Satisfactory rating – 3 points

Unsatisfactory - below 3 and 4 points

You can ask you teacher for the copy of the correct answers.

Name: _____

Date: _____

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List of Reference Materials

REFERENCES

The following is a listing of the legislation, regulations and standards that apply to scaffolding.

1. Safe use scaffolding program/ Department of Facilities Management Occupational Health and Safety
2. Instructional Scaffolding /to Improve Learning Northern Illinois University, Faculty Development and Instructional Design Center
3. Safety and health in construction /Copyright © International Labour Organization 1992 First published 1992
4. Scaffolding General Requirements /This Joint Australian/New Zealand Standard was prepared by Joint Technical Committee BD-036, Scaffolding. It was approved on behalf of the Council of Standards Australia on 2 October 2009 and on behalf of the Council of Standards New Zealand on 5 March 2010. This Standard was published on 19 March 2010.
5. Training Requirements in OSHA Standards/Occupational Safety and Health Administration U.S. Department of Labor
6. Part 12 Scaffolds and Scaffold Platforms by Miosha education and training services July 10, 2017
7. Estimation and Planning Methodology for Industrial Construction Scaffolding By Chandan Kumar © Chandan Kumar Fall 2013 Edmonton, Alberta
8. CODE OF PRACTICE FOR ACCESS AND WORKING SCAFFOLD
9. Health and Safety /Advice for Scaffolder CITB-ConstructionSkills NI Nutts Corner Training Centre 17 Dundrod Road Crumlin Co. Antrim BT 29 4SR
10. Erect & dismantle restricted height scaffolding
11. SUPPORT MATERIALS/ Published by: Australian Training Products Ltd
12. 13 .804 Study Guide
13. Introduction to scaffolding and working platforms/22216VIC – Certificate II in Building and Construction (Carpentry) Copyright LAPtek Pty. Ltd

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