Carpentry

Level-II

Learning Guide-60

Unit of Competence: Construct Stairs and Stair Components

Module Title: Constructing Stairs and Stair Components

LG Code: EIS CRP2 M13 0919Lo-61LG-60

TTLM Code: EIS CRP2 M13 0919V1

LO6: Assemble and install stair case components

Instruction Sheet	Learning Guide # 60

This learning guide is developed to provide you the necessary information regarding the following content coverage and topics –

- Forming stair balustrade.
- Checking Balusters to ensure fitted plumb.
- Checking Newels prior to final fixing.
- Fitting and fixing Handrails

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:

- ✓ Balusters/intermediate railing and handrails fitted to form stair balustrade to specification.
- ✓ Balusters checked to ensure fitted plumb.
- ✓ Newels checked prior to final fixing to ensure plumb.
- ✓ Handrails to wall fitted and fixed in accordance with specifications

.**Learning Instructions:**

Read the specific objectives of this Learning Guide.

Follow the instructions described below

Read the information written in the information Sheets below

Accomplish the Self-check

If you earned a satisfactory evaluation from the “

Do the “LAP test” (if you are ready).

Information sheet #1	Forming stair balustrade.

1.1 Forming stair balustrade

Other than at the two bottom steps, a barrier is required to protect users of the stair from falling. This is often provided by a balustrade formed by individual balusters or spindles. So as to provide the necessary protection it is important that the balustrade is fixed securely. Once the stair has been fully assembled and secured in place the balustrade can be fitted. If the balustrade has been delivered as an assembled unit then fit in accordance with the manufacturer's instructions. If the balustrade has been delivered as components, start to form the balustrade by cutting to length and angling the ends of the string capping, balusters or spindles and infill piece. The string capping should be cut to fit tightly between the newels with its ends angled to suit the pitch of the flight. Once cut the string capping should be screw fixed to the string starting 50mm from each end and then at no more than 450mm centers. The balusters or spindles should be cut to length so that they fully engage into the groove in the underside of the handrail and the upper face of the string capping. Again, the ends of the balusters should be angled to the pitch of the stair. It is important that balusters are fully housed by the handrail and string capping or they may not provide the necessary protection to users of the stair.

1.1.1 Four easy steps:

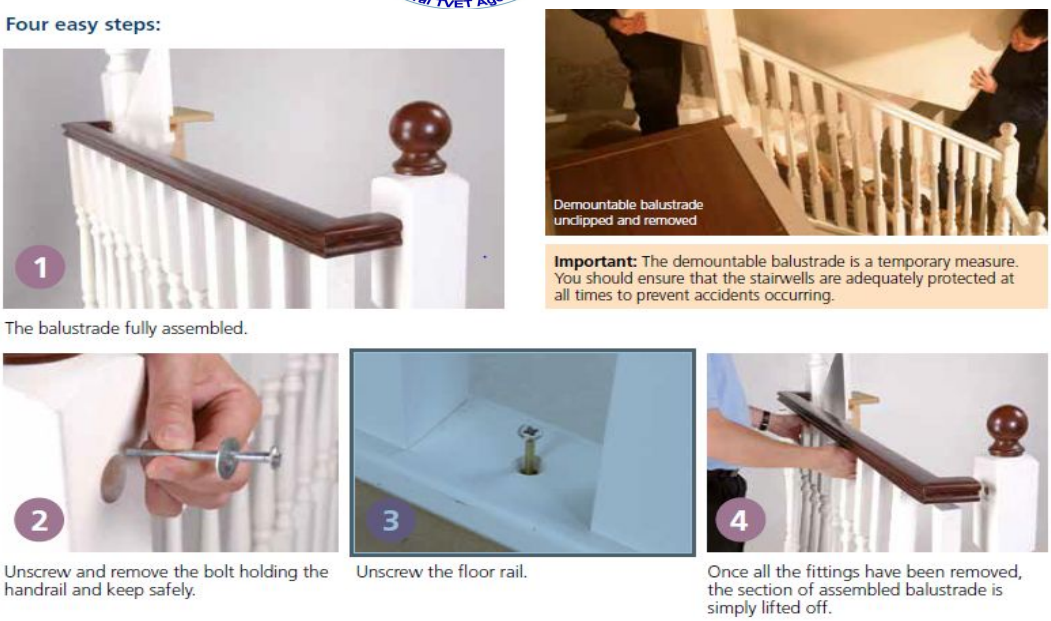


Fig-1-4 steps forming balustrade

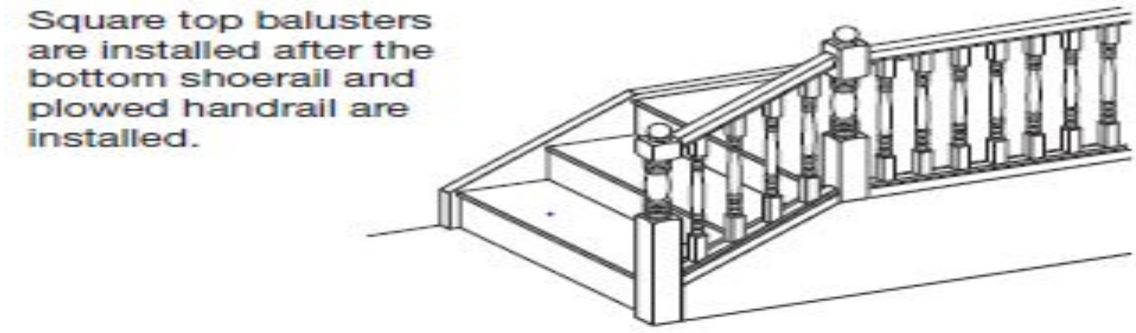
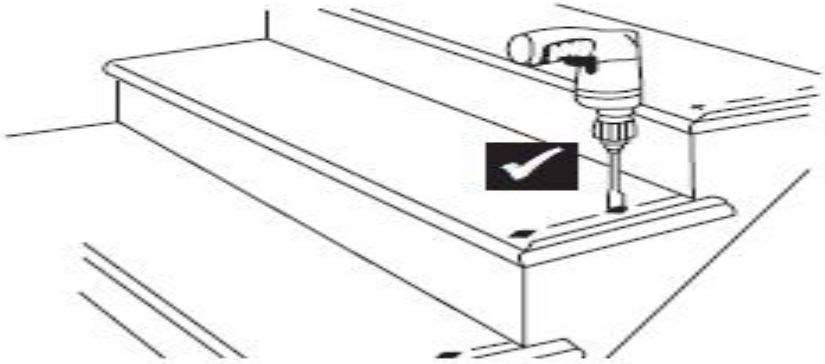


FIG 5-1: MARK STAIR FOR INSTALLATION O. BALUSTERS ON OPEN STAIRCASE.



Note. Some balusters do not have pins on the bottom. If your balusters do not have pins, skip this step.

Fig -2 assembled blustered

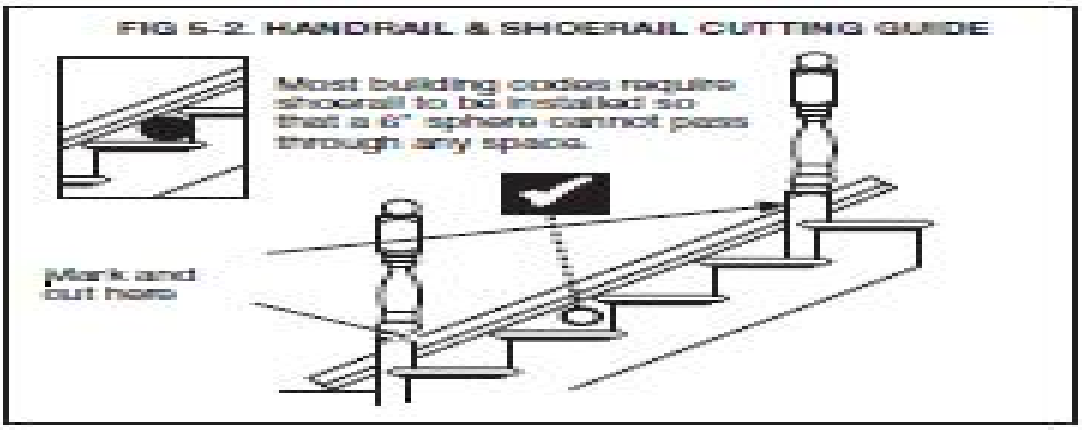
Cut balusters to correct length.

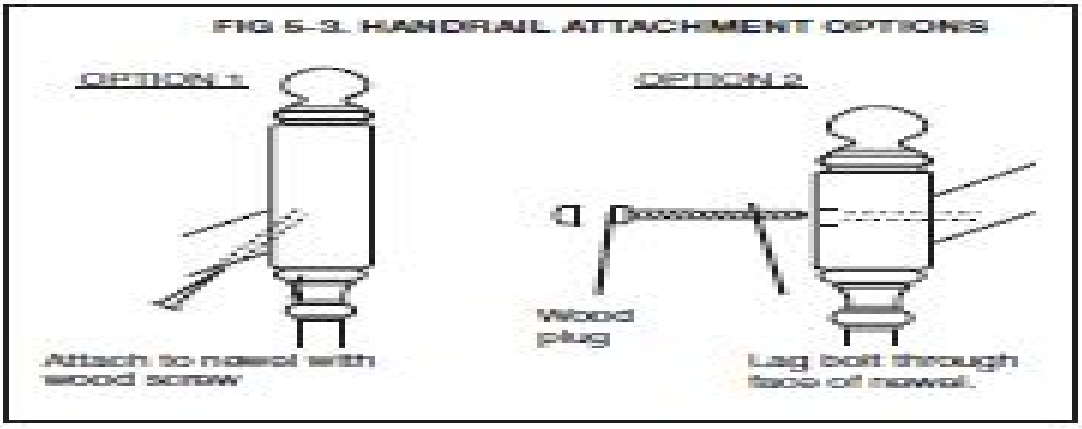
• Insert baluster into handrail and adjust with level.

• Apply wood glue and nail baluster in place, making sure balusters are evenly spaced.

Check your local building code for baluster spacing requirements.

• Cut handrail fillet, being sure to match angles. Glue and nail in place using 1/2" finishing nails.





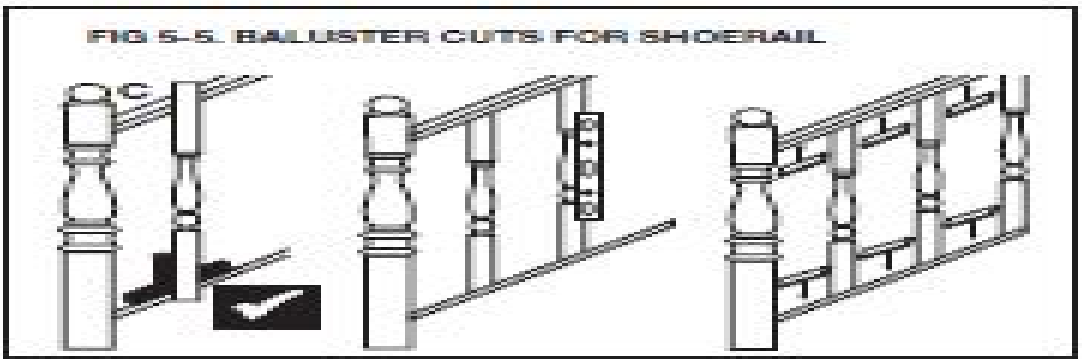


Fig -3 prepared baluster

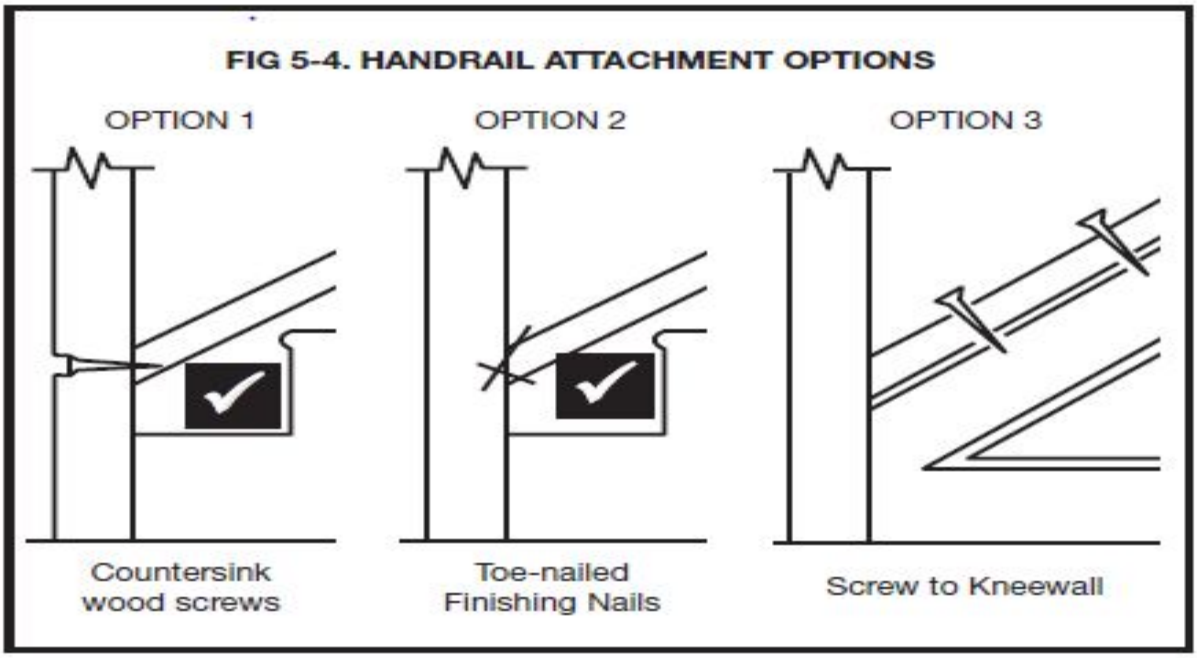


Fig- prepared hand rail

operation sheet #1	Forming stair balustrade.

Procedures for forming stair balustrade

1. For open stairs only. To install square top balusters, drill holes (FIG 5-1) in treads according to your layout from Step 3. Use same size drill bit as the size of the pin on the bottom of baluster (ex: 3/4" pin = 3/4" bit. Make sure baluster holes are spaced evenly. Check local building codes for proper baluster pacing requirements.

2. See FIG 5-2 (next page). Lay handrail and shoe rail (if used) along stairs, marking where they intersect with newels. Cut rail along marks using miter saw. Use scrap lumber to test cuts before cutting finish material.

3. Attach handrail (**FIG 5-3**) (next page) using option #1 (3” wood screws) or option #2 (4-1/2” lag bolts through front of rail). Both options require pre-drilling a pilot hole.

4. Shoe rail option. Measure and cut shoe rail using same angles as handrail cuts. See **FIG 5-4** (next page). Attach shoe rail using option 1 (3” wood screws), OPTION 2 (toe-nailed finish nails), or option 3 (screwed to knee wall).

5. Baluster installation on shoe rail (**FIG 5-5**): Use an adjustable square (**C**) and level to determine the angle to cut balusters. Allow for 1/4” plow depth on handrail and shoe rail. Cut balusters to correct length. Once spacing is determined, glue and toe nail balusters in place.

Check your local building code for baluster spacing requirements**.** Cut fillet pieces, being sure to match angles. Glue and nail in place using 1/2” finishing nails.

6. Open treads option. Using marks on tread made from Step 2, drill holes using the same size bit as the pin on the bottom of baluster (ex: 3/4"). If your balusters do not have pins on the bottom, do not drill holes in your treads.

Flow the stapes and balusters.

Lap Test -1	Practical Demonstration

Name: _____ Date: _____

Time started: _____ Time finished: _____

Instructions: Given necessary equipments, tools and materials you are required to perform the following tasks within 2 hour.

Task1. Forming stair balustrade landing

Note: Satisfactory rating – above 50% **Unsatisfactory - below 50%**

2.1 Checking Balusters to ensure fitted plumb

2.1.1 Blusters

Balusters: Upright support of a handrail that prevents objects or people from going over the edge of a balcony or open side of a stair. Balusters are also referred to as spindles, pickets or turnings. The balustrade is the system of railings and balusters that prevents people from falling over the edge. A term for the vertical posts that hold up the handrails. Sometimes simply called guards or spindles.

Treads often require two balusters. The second baluster is closer to the riser and is taller than the first. The extra height in the second baluster is typically in the middle between decorative elements on the baluster. That way the bottom decorative elements are aligned with the tread and the top elements are aligned with the railing angle. It's one of a series of upright supports for a handrail, also providing protection, providing a barrier at the side and a grip for those ascending or descending.

The balustrade is a part of the stair, which is installed for the purpose of safety of the STAIR. Besides that, balustrades may help to beautify the stair case.

Fig-1 pre-assembled baluster

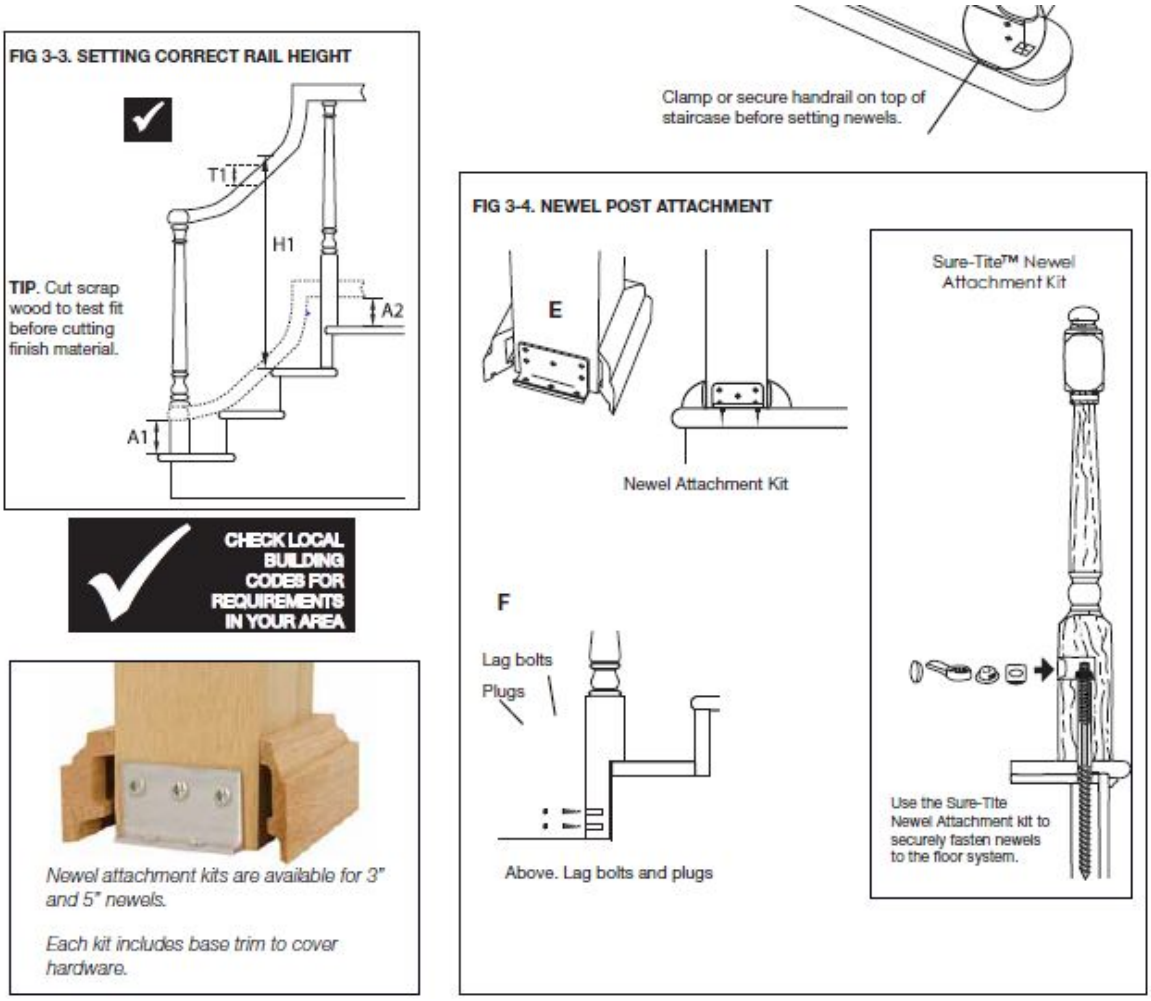


Fig-3.3 setting correct height

Operation sheet #2	Checking Balusters to ensure fitted plumb.

Procedures for checking balusters to ensure fitted plumb. .

1. See fig 16 Mark baluster placements on treads allowing for equal spacing and no greater than 4” on center.

• Drill treads the same size and depth as pin on the bottom of baluster.

• Lay handrail along stairs allowing extra length for proper fit to newel posts.

• Being sure that rail does not move, use framing square to transfer wood tread markings from each tread to side of handrail.

• Transfer markings to bottom center of handrail. Locate markings on bottom of handrail. Mark center line of handrail.

2. Post-to-post. (Fig 17)Rotate handrail 180o on stairs so balcony side of handrail is at base of stairs.

3. Using newels as guides, mark handrail (**a**) and cut to proper length.

Lap Test -2	Practical Demonstration

Name: _____ Date: _____

Time started: _____ Time finished: _____

Instructions: Given necessary equipments, tools and materials you are required to perform the following tasks within 1 hour.

Task1. Checking Balusters to ensure fitted plumb.

.

Note: Satisfactory rating – above 100% **Unsatisfactory - below 100%**

Name: _____ Date: _____

Information sheet # 3	Checking Newels prior to final fixing

3.1 Checking Newels prior to final fixing

A large baluster or post used to anchor the handrail. Since it is a structural element, it extends below the floor and sub floor to the bottom of the floor joists and is bolted right to the floor joist. A half-newel may be used where a railing ends in the wall. Visually, it looks like half the newel is embedded in the wall. For open landings, a newel may extend below the landing for a decorative newel drop.

Information sheet #4	Fitting and fixing Handrails

4.1 Fitting and fixing Handrails

Handrails and balustrades should be designed in accordance with BS 5395-1. Stairs with a rise of over 600 mm should have a handrail. Where the stair width exceeds 1000 mm a handrail should be fitted on both sides. On winder flights the handrail should be fitted on the wider side of the stair, see also NHBC guidance document.

Individual lengths of handrail to a stair flight should be capable of being held continuously without interruption from any fixing or support. Demountable components In order to facilitate the movement of furniture it may be necessary to construct stairs with demountable handrails and newels. These components must still be designed to the same criteria as fixed components.

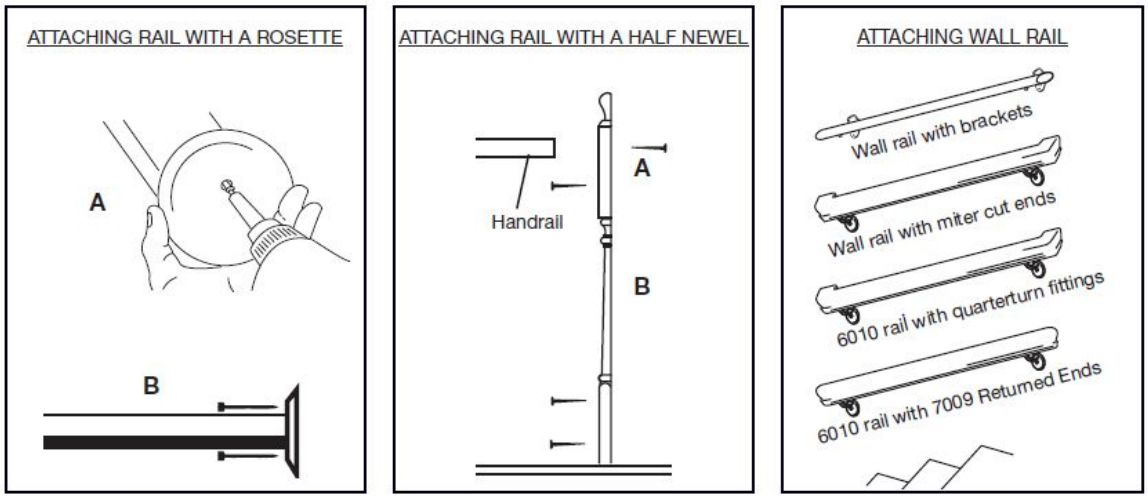


Fig 3.6 fixing of hand rails

Operation sheet #4	**Fitting and fixing Handrails**

Procedures fitting and fixing handrails

Stapes

1. Attach rosette or half newel directly to handrail through the back of rosette (**A**)
2. Secure handrail and rosette or half newel to wall with finish nails or screws (**B**). Use wood plugs to plug screw holes.
3. Leave no less than 1-1/2” of space between wall and wall rail.
4. Secure wall rail to walls with handrail brackets. Be sure handrail brackets are anchored into studs through dry wall.
5. If attaching fittings to ends of wall rail is preferred, use the same method for attaching fittings from.

Lap Test -4	Practical Demonstration

Name: _____ Date: _____

Time started: _____ Time finished: _____

Instructions: Given necessary equipments, tools and materials you are required to perform the following tasks within 1 hour.

Task1. Fitting and fixing Handrails.

Note: Satisfactory rating – above 100% **Unsatisfactory - below 100%**

Name: _____ Date: _____

Reference

Publications about wood Order at www.swedishwood.com/publications.

Prepared by: Colin mackenzie Timber Queensland Limited First produced: April 2007 Revised: May 2012, October 2013

Www.jeld-wen.co.uk

© 2013 British Woodworking Federation www.bwf.org.uk

Design Guide 34 Steel-Framed Stairway Design

The Trainers Prepare TTLM

No.	Name	Region	Qualification level	TVET College	Phone number
Zeyede Tekle	B	Dire Dawa	DDPTC	0921153259	zedjesus22@gmail.com
Yibeltal Shitie	B	Amhara	Motta PTC	0912455288	yibecon2019@gmail.com
Mihiretu Hambisa	B	Oromia	Nekemtie PTC	0910195546	mihambi@gmail.com
Tariku Wondimagegn	A	SNNP	Dilla PTC	0916512167	mamush572@gmail.com
Fikre Shiferawu	A	Somali	Jijiga PTC	0913294412	Shiferawufikre@yahoo.com

Facilitator

No	Name	Region	TVET Bureau	Email & Phone Number	Phone No
1	Tilahun Tesfaye	Amhara	Amhara TVED Bureau	Tilahuntesfaye Eewnetu@Gmail.Com	0940651823
2	Abere Dagnaw	Amhara	Amhara TVED Bureau	Aberedagnaw10@Gmail.Com	0918014111
3	Abdulahi Muktare	Somali	Somalia TVET Bureau		0935635068