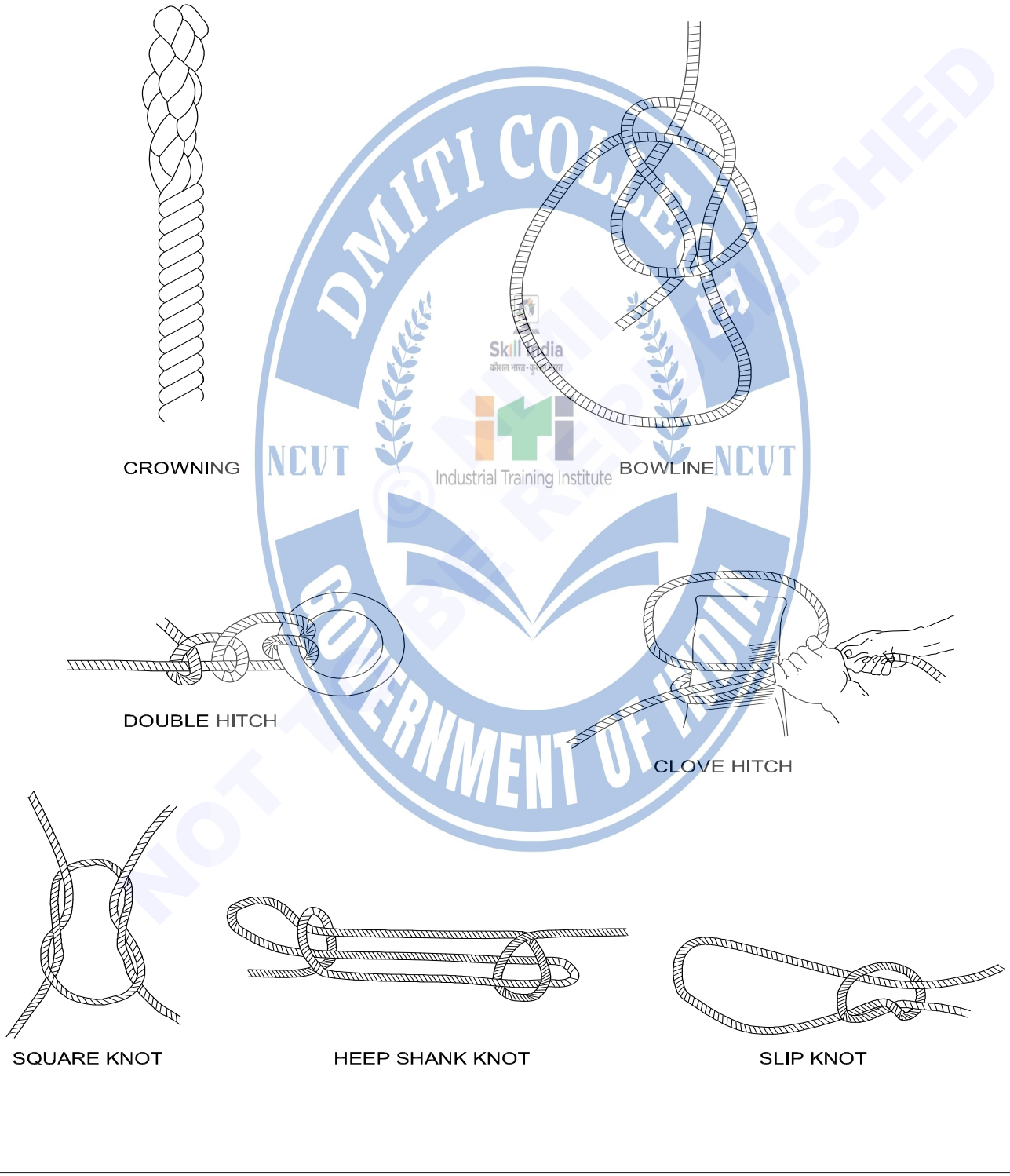
Practicing, making various knots, correct loading of slings, correct and safe removal of parts

Objectives: At the end of this exercise you shall be able to
- **bind the rope ends with binding wire**
- **tie six type of knots which is used in material handling using manila rope.**

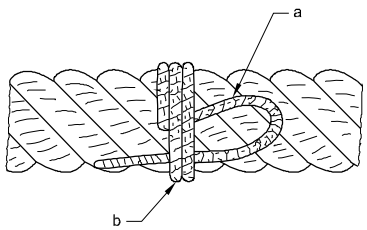
Fig 1



Job sequence

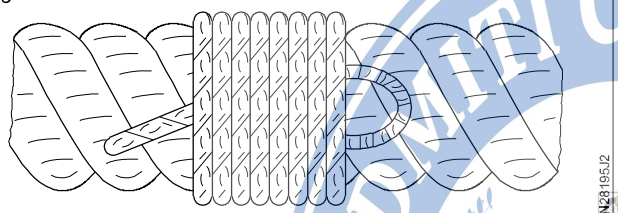
- Place one end of the soft copper or iron wire along the axis of the rope by forming a loop. (Fig 1a)

Fig 1



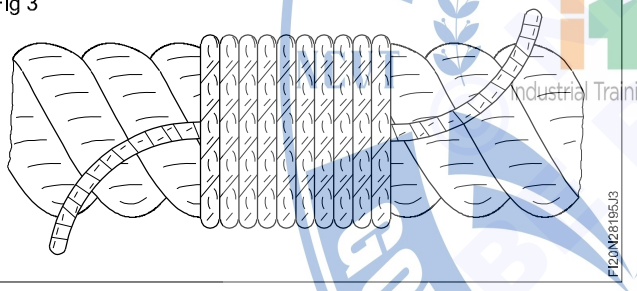
- Wind the other end of the wire around the rope 10 to 15 turns towards the rope end. (Fig 1b)
- Pass the end of the wire through the loop formed by the first end. (Fig 2)

Fig 2



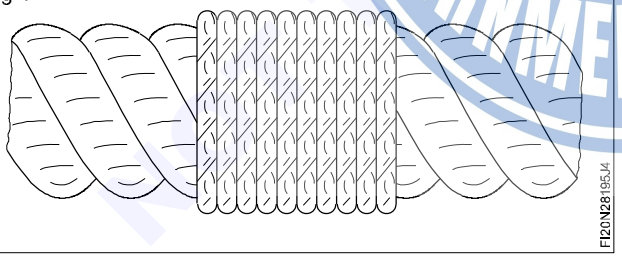
- Pull the first end to make it tight. (Fig 3)

Fig 3



- Cut off the excess wire ends to make simple seizing. (Fig 4)

Fig 4



Binding of rope ends by wire adopting self-tightening seizing method

- Take a soft wire and pull one end of the wire between the strands of the rope. (Fig 5)
- Wind around the rope for 5 to 6 turns towards the rope end. (Fig 6)
- Place the second end of the wire along the rope between the strands and wind around by the bights 5 to 6 turns after forming a loop. (Fig 7)

Fig 5

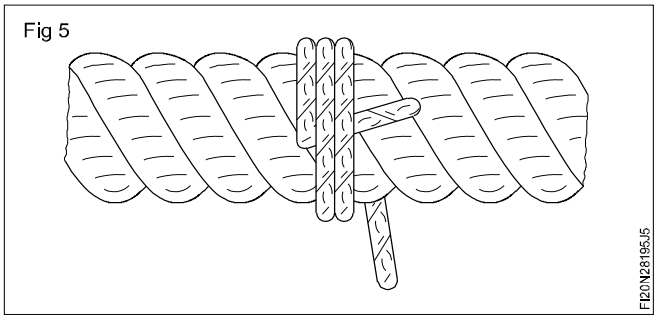


Fig 6

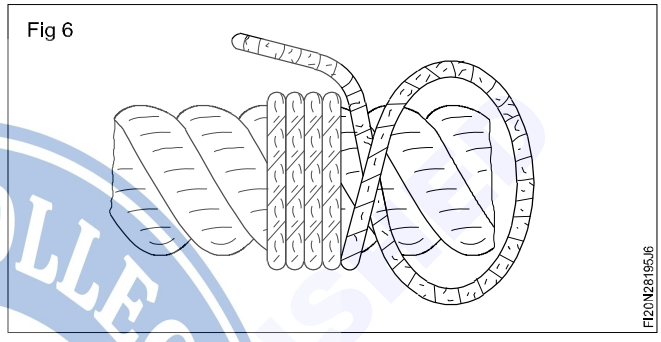
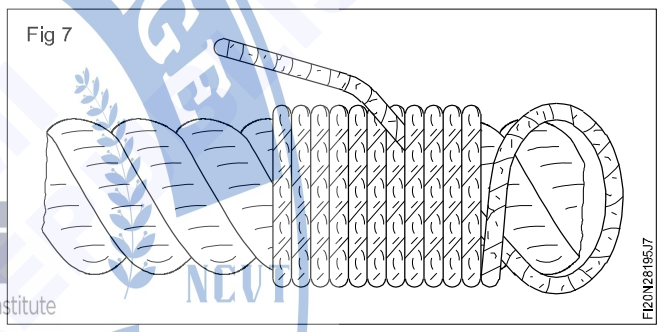
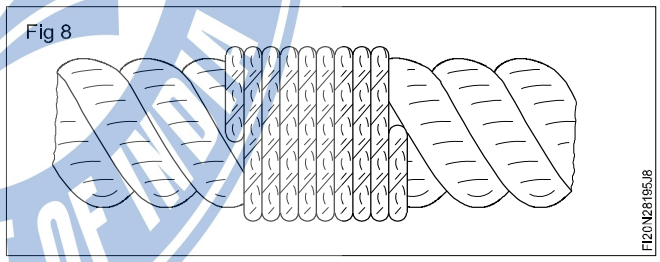


Fig 7



- Pull the free end of the loop under the bights to make it tight (Fig 8).

Fig 8



- Cut off the excess wire to form self-tightening seizing.

Binding of rope ends by wire using crowning method

- Unwind the wire strands to separate themselves to a length of 250 to 300mm. (Fig 9)
- Take strand No.1 to form a loop and pass the end in between the strands of the rope. (Fig 10)
- Pass strand No.2 in between the strands as shown in Fig 11.
- Insert strand No.3 through the loop formed by the No.1 strand and pull it tight. (Fig 12)
- Put a spike inbetween the strands to form a passage. (Fig 13)

Fig 9

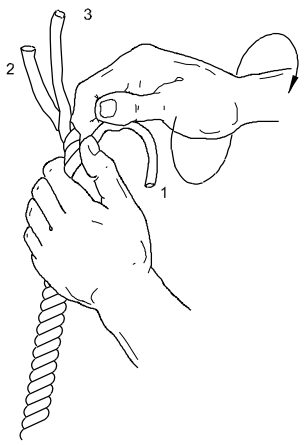


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Fig 10

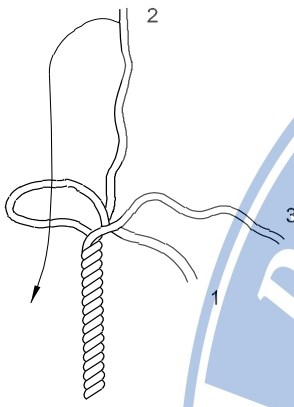

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Fig 11

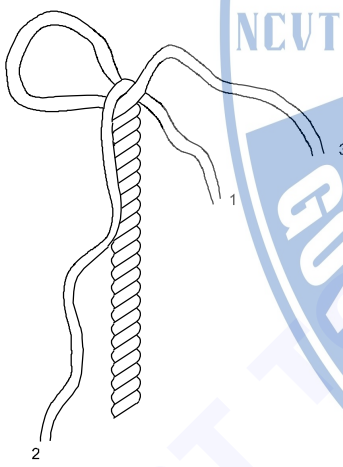

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Fig 12

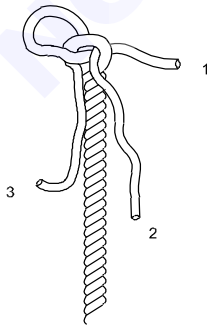

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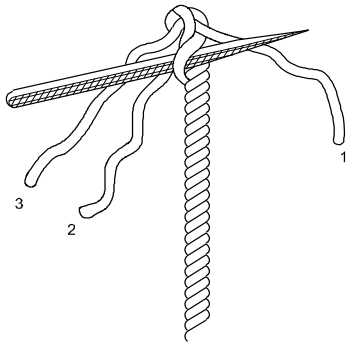
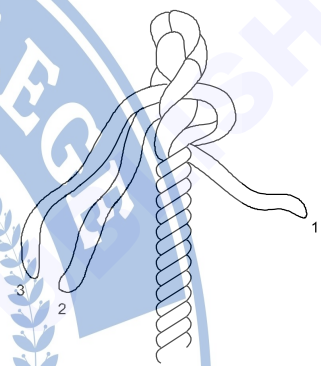
Fig 13



FI20N28195JD

- Spike is a tool with pointed end. It is used to poke in as shown in Fig 13 to make room for inserting rope strand end for binding.
- Insert the No.1 strand through the opening passage and pull tight. (Fig 14)

Fig 14



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- Insert also strand No.2 in a similar way and pull tight to form crowned binding of rope end. (Fig 15)
- This method is used for fibre and cotton rope binding.

Fig 15

FI20N28195JF

Prepare square and reef knot for slinging

- Take two pieces of manila/cotton/polypropylene ropes of the same diameter. Pass the ends of the ropes one above the other and bend in the opposite direction. (Fig 16)
- Insert the bent ends one above the other in a similar way. (Fig 17)
- Pull the ends tight to get square knot Fig 18.
- Fig 19 Shows the reef knot.

Fig 16

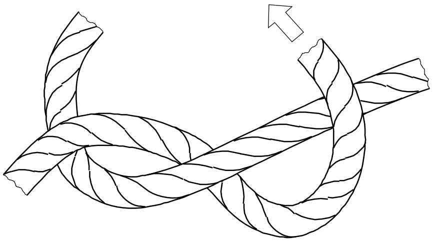


Fig 17

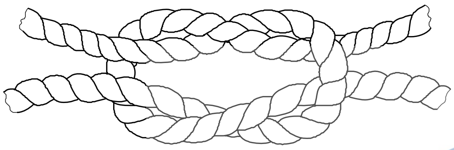
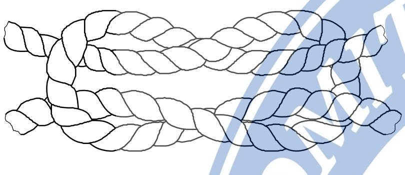
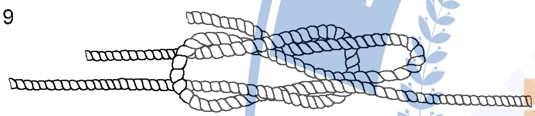


Fig 18



SQUARE KNOT

Fig 19

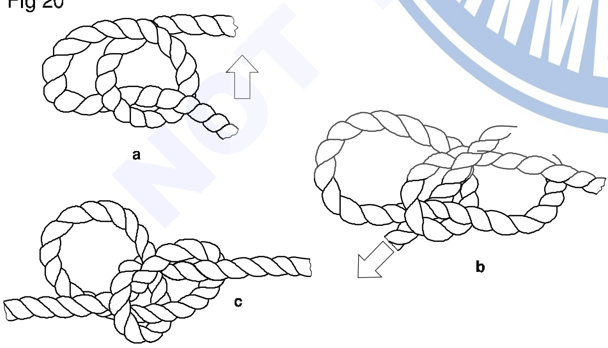


REEF KNOT

Prepare a bowline knot with a reef knot

- Hold the A end of the rope by the left hand. (Fig 20a)
- Form a bight and a loop thereafter by the B end.
- Turn and hold end A by the right hand and end B by the left hand. (Fig 20b)
- Pass end A of the rope through the loop formed by end B and pull it tight to form a bowline knot. (Fig 20c)

Fig 20



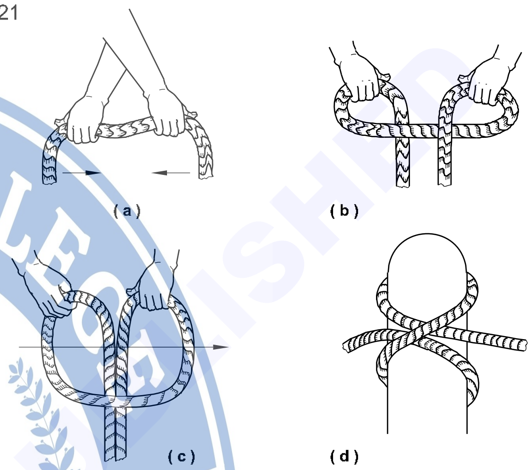
THE BOELINE KNOT

Forming clove hitch knot using rope and sheep shank knot

Clove hitch knot

- Hold the rope by both the hands in across way as shown in Fig 21a.
- Turn round the hands to form loops in the rope as shown in Fig 21b.
- Close down the loops together as shown in Fig 21c to put it around a post
- Fasten it to the post to make a clove hitch. (Fig 21d)

Fig 21

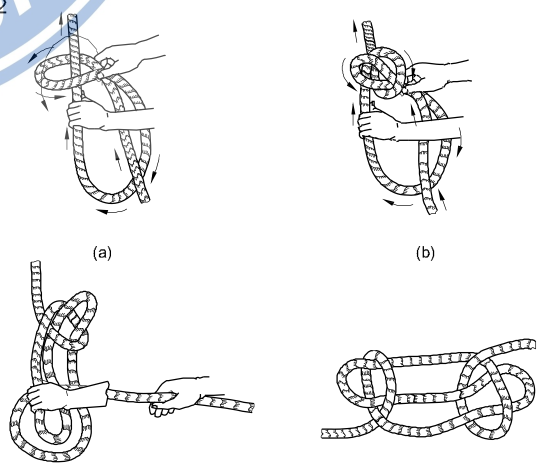


CLOVE HITCH KNOT

Sheep shank knot

- Hold the rope by both the hand and form a loop around one end of the rope (Fig 22a).
- Form a reverse loop around the former loop by the top end of the rope as directed by the arrows in Fig 22b.
- Turn the rope around as shown in Fig 22c to proceed in the final formation
- Turn the rope ends through the loops at the top and bottom ends as shown in Fig 22d to complete the sheep shank knot.

Fig 22

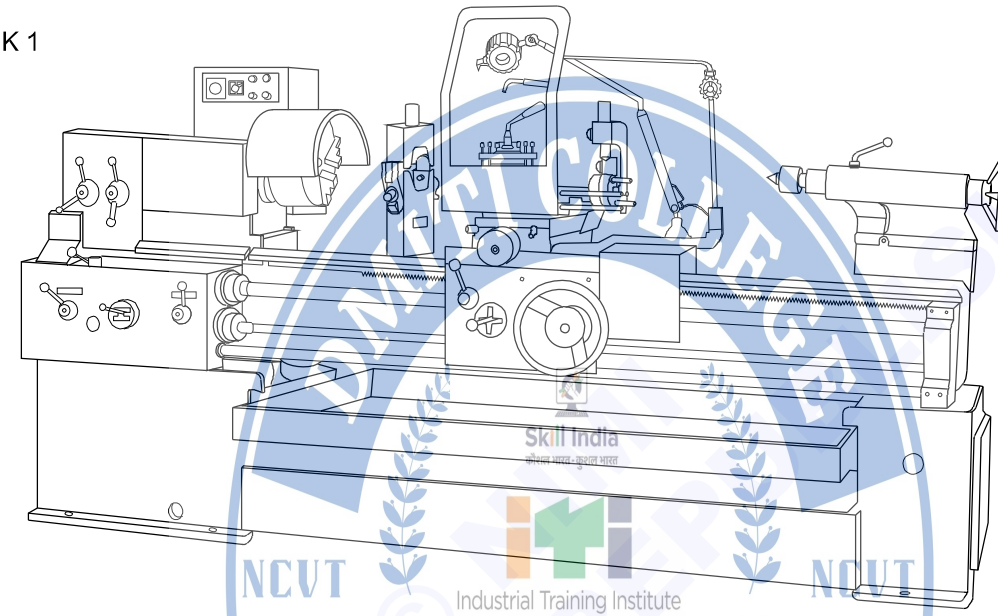


Erect simple machines

Objectives: At the end of this exercise you shall be able to
- **erection of lathe machine**
- **erection of drilling machine**
- **erection of power hacksaw machine**
- **testing the machines after erection.**

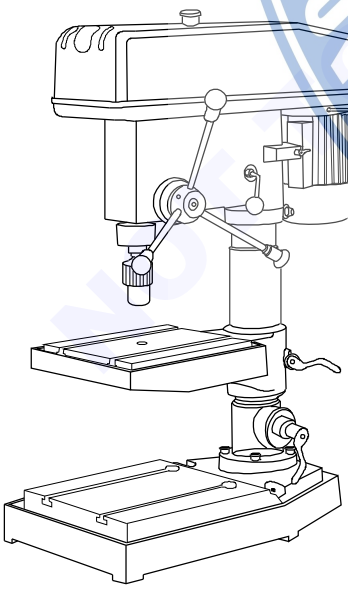
Fig 1

TASK 1



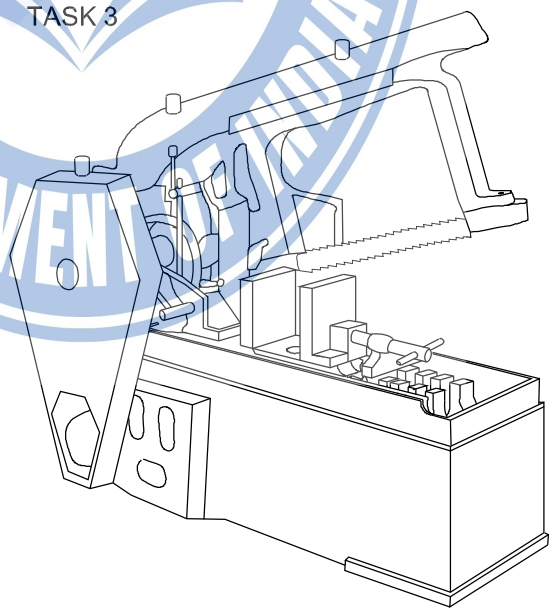
LATHE MACHINE

TASK 2



DRILL MACHINE

TASK 3



POWER SAW MACHINE

FI20N28196H1

Job sequence

TASK 1: **Erection of lathe machine**

- Select the space for proper functioning of machines such that machines normally must be conveniently accessible.
- Prepare the foundation plan as per the manufacturer instruction.
- As per the plan foundation can be made.
- Insert the holding down bolt before the foundation set down.
- According to the weight of the machine the depth of the foundation be made.
- Machine may be placed in position for levelling and aligning.
- Before setting the foundation, a foundation bolt inserted through the holding down hole in the basic of the machine.
- After setting the concrete the machine is put on the foundation bolt in floor.
- Align the machine perfectly horizontal position using sprit level.
- The sprit level is applied to certain measuring areas, both in longitudinal and cross direction.
- Insert wedges must be driven into the gap under the machine bed.
- After inserting wedge check the level using sprit level.
- Grouting is carried out by pouring creamy mixture of almost pure cement.
- After setting grouting the wedges may be removed.
- The machine base is then tightly screwed to the foundation bolts.
- After tightening the nuts, the correct position of the machine must once more be checked by means of the sprit level.
- Finally do the practical test and geometrical test.

Safety precautions

- When loading, slings should be protected from sharp edged by packing soft wood
- Before lifting ensure the load is securely slung before taking the lift.
- When unloading make sure that you have a firm foundation for your stack, and make provision for the removal of slings without disturbing the stack.

TASK 2: **Erection of drilling machine**

TASK 3: **Erection of power hacksaw**

- Follow the job sequence of TASK 1.

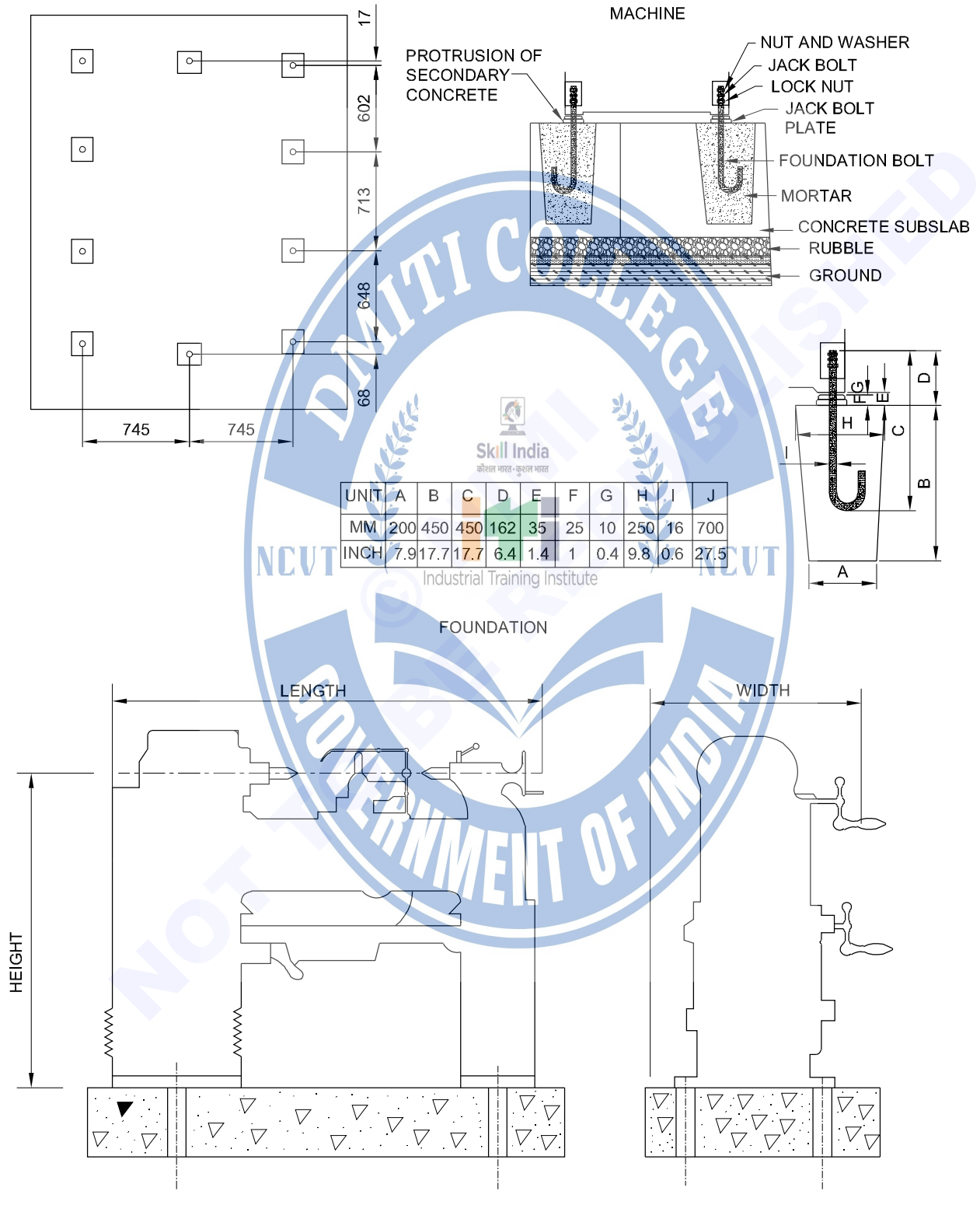
Skill sequence

Foundation plan

Objective: This shall help you to.

- **mark foundation layouts.**

Fig 1

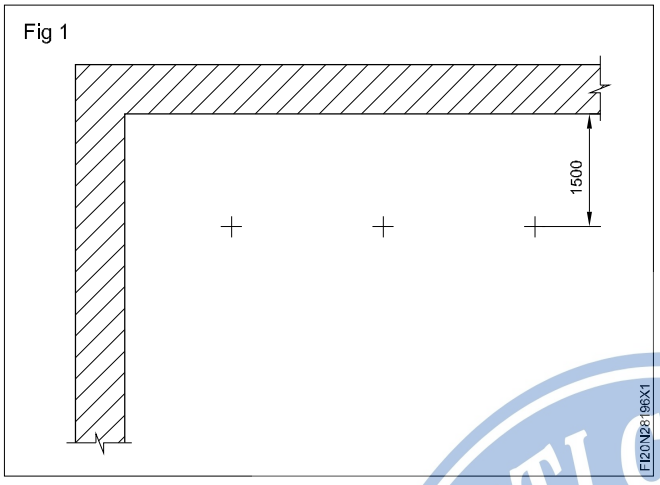


UNIT	A	B	C	D	E	F	G	H	I	J
MM	200	450	450	162	35	25	10	250	16	700
INCH	7.9	17.7	17.7	6.4	1.4	1	0.4	9.8	0.6	27.5

Select the space for the erection of a centre lathe machine.

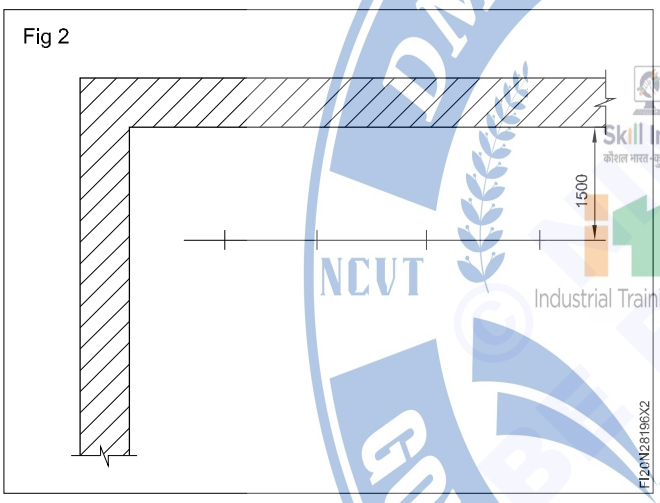
Mark points at a distance of 1.5 m (maximum) from the pillar or wall. (Fig 1)

Fig 1



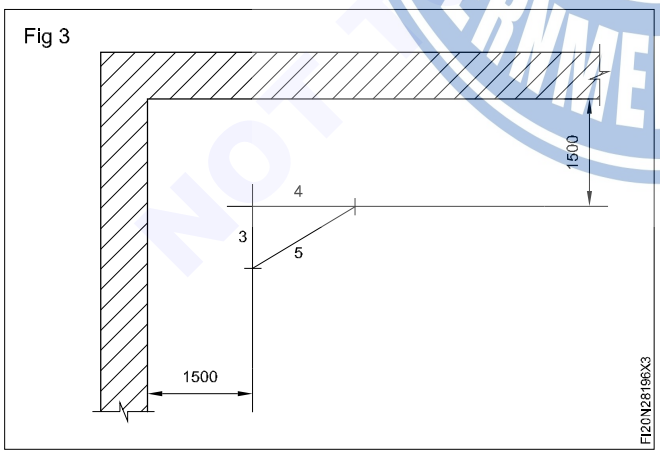
Draw the base line with the help of twine thread dipped in chalk powder or chalk solution. (Fig 2)

Fig 2



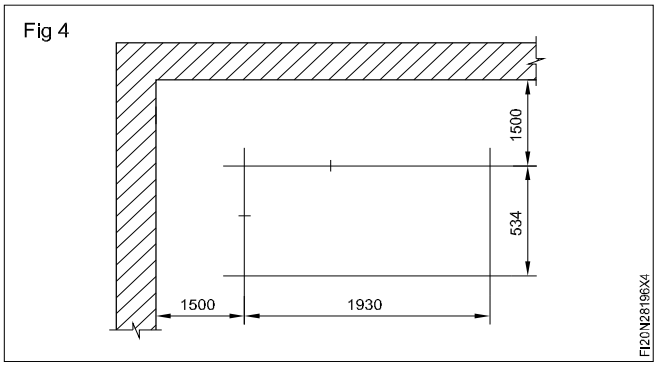
Construct the vertical base line using 3, 4, 5 method (Fig 3) as in a right angled triangle.

Fig 3



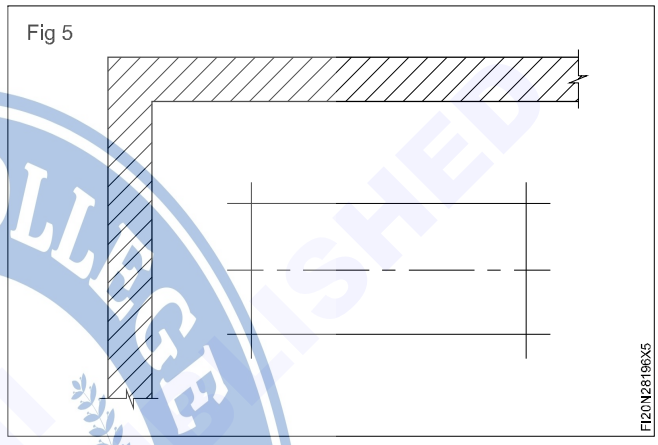
Mark the total base area of the machine. (Fig 4)

Fig 4



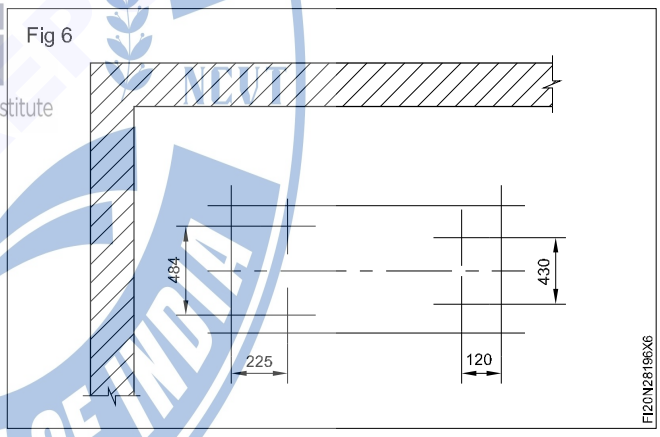
Draw the central line of the base horizontally. (Fig 5)

Fig 5



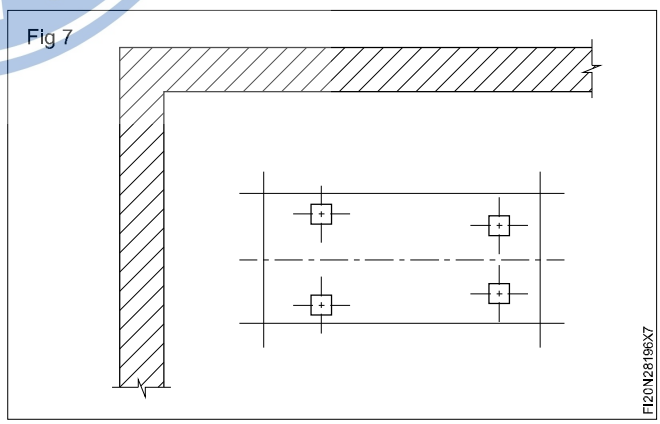
Locate the position of the holes. (Fig 6)

Fig 6



Mark the foundation holes for grouting. (Fig 7)

Fig 7



Mount and level machine on anti - vibration pads

Objective: This shall help you to.

- **level the machine on anti - vibration pads.**

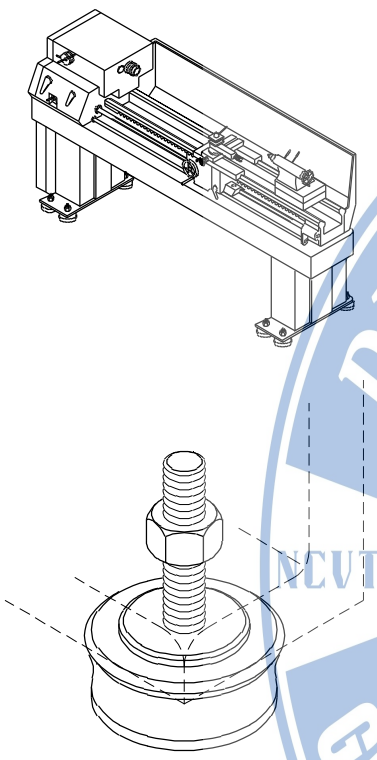
Lift the machine by crowbars and place wooden blocks under the machine at all the four corners.

Select suitable anti-vibration pads depending upon the weight of the machine.

Remove the levelling bolts from the metal casting.

Mount anti-vibration pads under the machine. (Fig 1)

Fig 1



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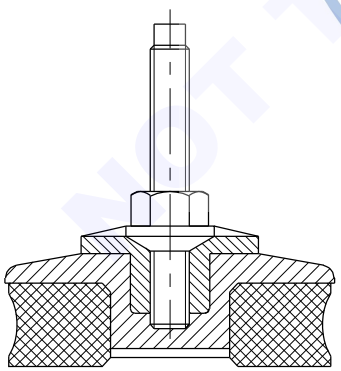
Fix levelling bolts to the metal casting through the foundation holes of the machine.(Fig 2)

Fig 2



FI20N28196Y2

Lift the machine slightly by crowbars and remove the wooden blocks from the machine.

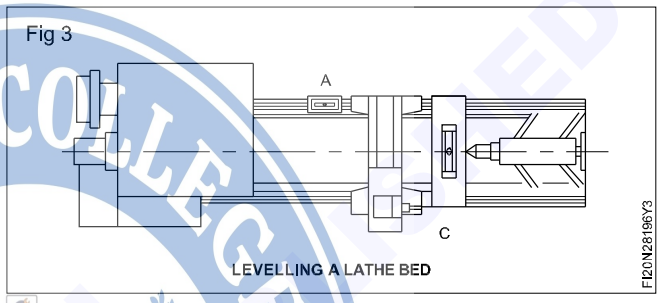
Level the machine both in longitudinal and tranverse directions using a precision spirit level of accuracy 0.02 to 0.05 mm/metre.

Position the carriage in the middle of the bed.

Keep the spirit level on the rear slideway (i.e. the slideway opposite the operator's side) longitudinally at the position 'A'. (Fig 3)

Keep the second spirit level transversally at the position 'C' (Fig 3)

Fig 3



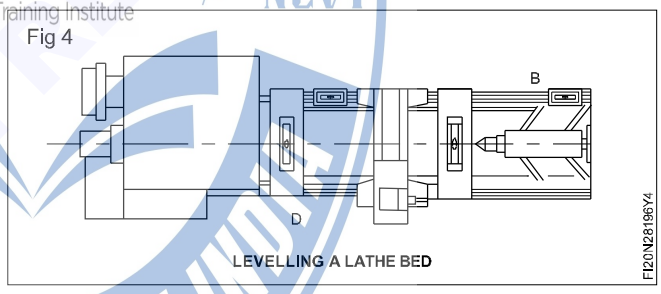
FI20N28196Y3

Take the readings of both the spirit levels.

Adjust the level of the bed till both the spirit levels show the same readings.

Keep the spirit levels longitudinally and transversally at positions 'B' and 'D' (Fig 4)

Fig 4

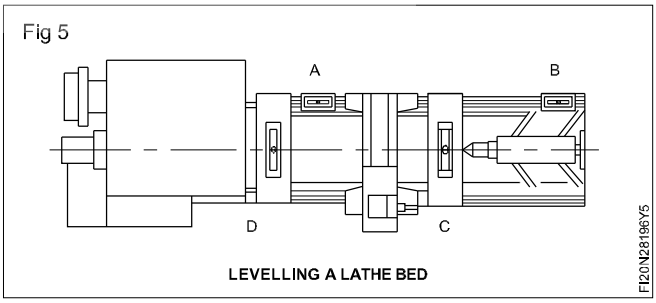


FI20N28196Y4

Adjust the bed till both the spirit levels show the same readings.

Repeat the sequence of operation till both the spirit levels show the same reading in all the positions A, B, C & D. (Fig 5)

Fig 5



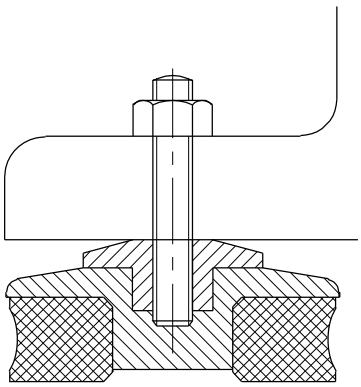
FI20N28196Y5

Adjust the level of the machine as required by screwing or unscrewing the levelling bolt.

Finally check the level of the machine with a spirit level.

Lock the position of the machine by levelling lock-nuts after completion of work. (Fig 6)

Fig 6



FI20N28196Y6

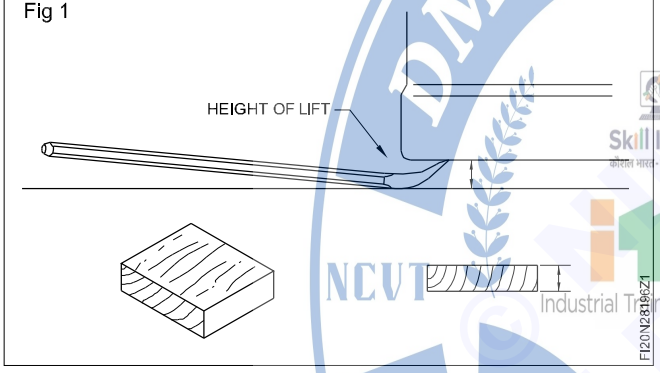
Moving machine on rollers (Drilling Machine & Power Saw Machine)

Objective: This shall help you to.

- **lift and move a drilling machine and power saw machine to the desired location using rollers.**

Keep a wooden block ready to be placed under base of the machine when it is lifted. (Fig 1)

Fig 1



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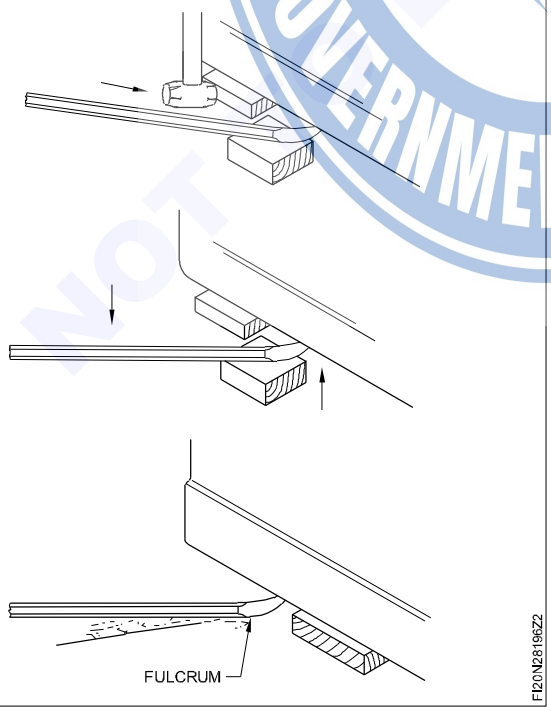
Lift one corner of the machine using crowbars and place the wooden block under the machine. (Fig 2)

Fig 2



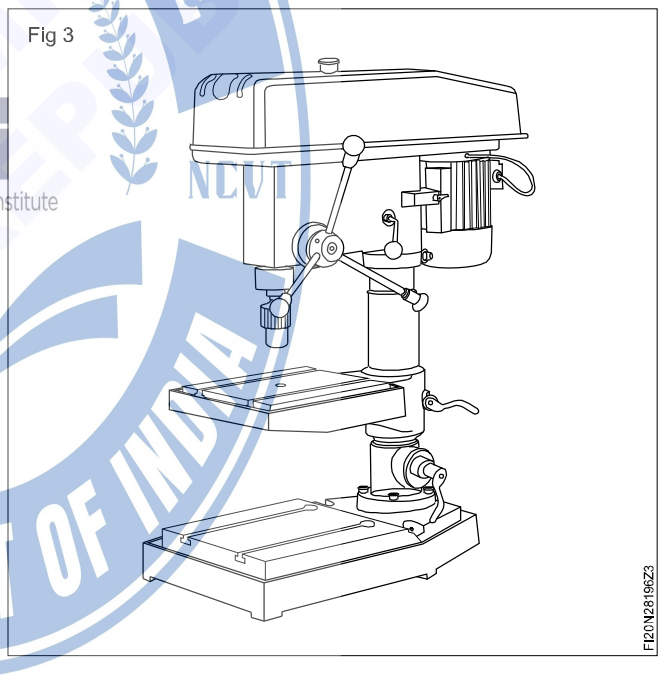
FI20N28196Z2

Lower the machine on to the wooden block.

Repeat the same procedure for the opposite corner of the machine.

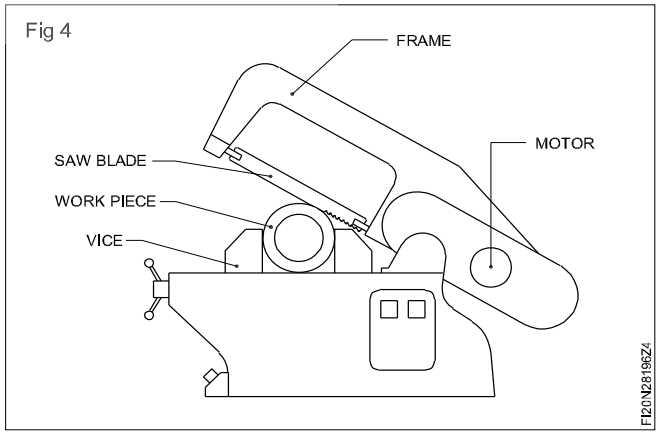
Place three or four rollers evenly distributed under the machine. (Fig 3 & 4)

Fig 3



FI20N28196Z3

Fig 4



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Lift the machine with crowbars and remove the wooden blocks.

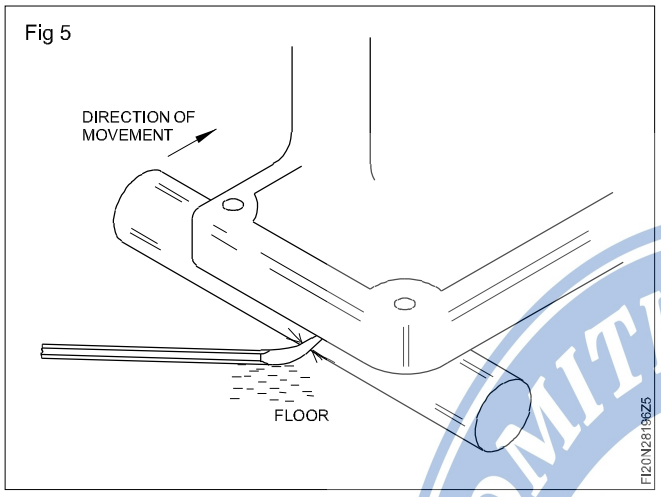
Lower the machine evenly on to the rollers. (Fig 3 & 4)

Check that the route is clear of obstacles before moving.

Place a roller in front of the machine.

Push the load forward slowly with the crowbars upto located place. (Fig 5)

Fig 5



As and when a roller is left behind the load, take it out and place the same in front of the load.

Note: Fig 6 shows the correct and incorrect method of handling crow bar.

Fig 6