



सत्यमेव जयते

(Govt. of India)
(Ministry of Railways)

HAND BOOK ON STANDARDISATION OF HAND TOOLS FOR COACH MAINTENANCE



(For official use only)
IRCAMTECH/2011/Mech/Handtools/1.0

April 2014

अभ्यास RDS
रेल अग्रदूत Transforming Railways



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FOREWORD

Hand-Book on Standardisation of Hand Tools for Coach maintenance is an important step towards ensuring implementation of effective and uniform maintenance procedures in coaching workshops and open line. CAMTECH has taken an important lead in this direction by preparing this hand-book giving compiled list of hand tools required for workshops and open line coach maintenance.

In this Hand Book, detailed description of each hand tool with important parameters will prove to be useful to the workshops and maintenance depots. As a result of introduction of hand tool kit, quality & timely maintenance can be ensured to meet traffic requirements of coaches in the present scenario..

CAMTECH, Gwalior
April, 2014

(A.R.TUPE)
Executive Director

PREFACE

- Railway Board vide letter No. 2007/M(C)/141/1 dated 12.03.2014, given project for preparing hand book on standardization of hand tools for coach maintenance. Accordingly this hand book is developed considering factual requirement of work shop & open line staff for better and timely maintenance of coach.
- Hand tools are backbone of maintenance & repair work. Sub standard/ poor quality hand tools not only results in poor maintenance work but also has many other drawbacks like – injury to working staff, exerting more labour, fatigue to the staff, disinterest in work, non standard work out put etc.
- Based on the suggestion collected from various workshops and divisions, and seminars attended with tools manufactures, full specification of hand tools has been prepared (with approx.estimated cost) with the purpose that appropriate indents may be prepared to get appropriate tools. Standard list of tools for each working spot like – Washing pit line, Train passing examination, Sick line etc. have also been prepared.
- The budgetary estimated cost for the tools is subjected to variation on account of market factors or number of units purchased or any other factor. Hence, current budgetary quotation must be collected to estimate the cost at the time of preparing indents for procurement.
- The instruction in this handbook is for the purpose of guidance only. This handbook does not supersede any instructions laid down in the “Maintenance Manual for Coaches”, issued by CAMTEC & instructions given by Railway Board & RDSO time to time.
- CAMTECH wishes to have your comments/remarks on this handbook for further improvements.

CAMTECH, Gwalior
April, 2014

(K.P.Yadav)
Director (Mech.)

BOOK DETAILS

1. **Name:-** *Hand Book on Standardisation of hand tools for Coach maintenance.*
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3. **Edition:-** *First Edition*
4. **Year of publication:-** *2014*
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CORRECTION SLIPS

The correction slips to be issued in future for this handbook will be numbered as follows:

CAMTECH/2014/M/C/TOOLS/1.0/C.S. # XX date-----

Where “XX” is the serial number of the concerned correction slip (starting from 01 onwards).

CORRECTION SLIPS ISSUED

Sr. No. of C.Slip	Date of issue	Page no. and Item no. modified	Remarks

CHAPTER 1

1.1 List of Hand Tools for Coach Maintenance (Fitter-Repair/ Examination Gang at Train Passing)

1. Allan Key (Full Set)
2. Bar with flat nose (local made)
3. Chiesel : Octagonal chiesel 150x16 mm
4. Chiesel : Flat chiesel 300x25 mm
5. Hammer: Ball pein hammer 600 grams
6. Hot axle detector (Non contact type)
7. Pipe wrench : 400x60 mm
8. Punch : Centre punch 8” long
9. Punch : Cotter punch 8” long
10. Spanner 17x19 mm
11. Spanner 22x24 mm
12. Spanner 24x27 mm
13. Spanner 30x32 mm
14. Spanner 32x36 mm
15. Spanner adjustable 305x35 mm
16. Screw driver
17. Universal Key (Carriage lock)

Gauges

1. Dummy palm
2. Tyre defect (profile) gauge

Others:

1. Hand gloves
2. Helmet
3. LED headlight
4. Tool bag
5. Walkie talkie
6. Safety shoes

Note

1. The hand book is prepared on hand tools for coach maintenance. The details of gauges and other items have not been given in the hand book.
2. Quantities of the hand tools/gauges to be carried by fitter are to be decided locally depending on the gang strength.

**1.2 List of Hand Tools for Coach Maintenance
{SE/JE (Incharge)/Tool Room at Train Passing}**

1. Allen key (Full set)
2. Bar with flat nose (local made)
3. Chiesel : Chiesel 8" with wire handle
4. Chiesel : Flat chiesel (full set)
5. Chiesel : Octagonal chiesel (full set)
6. Circlip plier (inner & external 19-60 mm)
7. Hammer : Sledge hammer 7 kg (local made)

Hand Tools for Coach maintenance

8. Hammer :Ball pein hammer 600 & 800 grams
9. Hammer :Cross pein hammer 600 & 800 grams
10. Pipe wrench (300,350 & 450mm)
11. Power drill 110 V AC
12. Power grinder
13. Punch : Centre punch 8” and 12” long
14. Punch : Cotter punch 8” and 12” long
15. Punch : Punch 8” with wire handle
16. Scale/tape : Measuring tape 5 meter
17. Scale/tape : Steel rule 6”
18. Screw driver 8x250mm
19. Socket 12.5mm (22 sockets) and accessories
20. Spanner: Double open end spanner 04 pcs set (3/8 to 7/8 inches)
21. Spanner: Double open end spanner 13 pcs set (6-36 mm)
22. Spanner: Ring 12 pcs.set (6-32 mm)
23. Spanner: Spanner adjustable 305x35 & 255x30 mm
24. Tongue (local made)
25. Wire punch

Gauges

1. 7.5 mm test plate and 8 mm and 12 mm test palm
2. Air pressure gauge
3. Bolster clearance gauge
4. Buffer height gauge

5. Tyre defect gauge

Others

1. Danger board (glow sign)/lamp
2. Hand gloves
3. Helmet
4. Intermediate coupling
5. Jacks 20t, 5t (Hydraulic type)
6. Ladder with platform 6 ft. height
7. Line block skid
8. LED headlight
9. Search light
10. Tool bag
11. Walkie talkie
12. Wooden packing for jacks
13. Wooden wedges

Note:

1. List should be displayed in SE/JE(C&W) office for the knowledge of working fitters.
2. Quantities of the hand tools/gauges to be carried by fitter are to be decided locally depending on the gang strength.

1.3 List of Hand Tools for Coach Maintenance

{Fitter-Repair/Examination Gang at Pit Line Maintenance}

1. Allen key (Full set)
2. Bar with flat nose (local made)
3. Chiesel : Flat chiesel 200x25 mm
4. Chiesel : Octagonal chiesel 150x16 mm, 125x9 mm
5. Hammer: Ball pein hammer 800 & 1200 grams
6. Pipe wrench : 450x60 mm
7. Punch : Cotter punch 8” and 12” long
8. Punch : Drift punch 8” and 12” long
9. Scale/tape : Measuring tape 5 meter
10. Scale/tape : Steel rule 6”
11. Screw Driver with magnetic tip
12. Socket 12.5mm (22 sockets) and accessories
13. Spanner 13x17 mm
14. Spanner 17x19 mm
15. Spanner 22x24 mm
16. spanner 24x27 mm
17. Spanner 30x32 mm
18. Spanner 32x36 mm
19. Spanner adjustable 305x35 mm
20. Tongue (local made)

Gauges

1. Comb gauge for flange thickness
2. Crown clearance gauge
3. Dip stick
4. Gauge for A dimension of SAB
5. Gauge for buffer height
6. Piston stroke gauge
7. Tyre defect gauge
8. Wheel dia. measuring gauge
9. Wheel gauge

Others

1. Gum boot
2. Hand gloves
3. Helmet
4. LED headlight
5. Tool bag (local made)
6. Trolley for pit line
7. Walkie talkie

Note:

1. Quantities of the hand tools/gauges to be carried by fitter are to be decided locally depending on the gang strength.

1.4 List of Hand Tools for Coach Maintenance

{Fitter- (Brake Testing) at Pit Line Maintenance}

1. Adjustable spanner
2. Allen key (full set)
3. Chiesel : Octagonal chiesel 135x9 mm
4. Hammer : Ball pein hammer 600 grams
5. Pipe wrench : 450x60 mm
6. Punch : Centre punch 8” long
7. Scale/tape : Measuring tape : 3 meter
8. Scale/tape : Steel rule 6”
9. Screw driver with magnetic tip
10. Spanner 10x11 mm
11. Spanner 13x17 mm
12. Spanner 17x19 mm
13. Spanner 22x24 mm
14. Spanner 24x27 mm
15. Tongue (local made)
16. Water pump pliers

Gauges

1. Air pressure gauge (0.1 kg/cm² least count)
2. Dummy palm (BP& FP with gauge)
3. Gauge for ‘A’ dimension of SAB
4. Piston stroke gauge

5. Piston stroke gauge for BMBC
6. Spring balance with weight gauge

Others

1. Gum boot
2. Hand gloves
3. Helmet
4. LED headlight
5. Stop watch
6. Tool bag
7. Walkie talkie

Note:

Quantities of the hand tools/gauges to be carried by fitter are to be decided locally depending on the gang strength.

1.5 List of Hand Tools for Coach Maintenance {Fitter- Pipe Fitting Tools at Pit Line Maintenance}

1. Bar with flat nose (local made)
2. Cordless drill
3. Hacksaw with blade 12"
4. Hammer :Ball pein hammer 600 & 800 grams
5. Pipe wrench 450 mm
6. Punch : Centre punch 8" and 12" long
7. Scale/tape : Measuring tape 3 meter

Hand Tools for Coach maintenance

8. Scale/tape : Steel rule 6”
9. Screw driver 8x250mm
10. Spanner 13x17 mm
11. Spanner 17x19 mm
12. Spanner 22x24 mm
13. Spanner 30x32 mm
14. Spanner 32x36 mm
15. Spanner: Single open end slogging spanner 30 to 36 mm
16. Spanner: Spanner adjustable 305x35 & 255x30 mm
17. Star type screw driver
18. Water pump pliers

Others

1. Helmet
2. Hand gloves
3. LED headlight
4. Tool bag

Note:

Quantities of the hand tools/gauges to be carried by fitter are to be decided locally depending on the gang strength.

1.6 List of Hand Tools for Coach Maintenance [Carpenter- Tools at Pit Line Maintenance]

1. Adzes
2. Axes
3. Brace
4. Chisel hexagonal 6"
5. Clamp
6. Claw hammer
7. Cutting pliers 6" PVC coated
8. Diamond cotter
9. Electric operated Saw 4" & 7"
10. File half round bastard 16" long
11. Foot rule folding
12. Grinding stone 8"
13. Hacksaw
14. Hammer: Cross pein hammer with wooden handle 200 Gms & 500 Gms
15. Hand drill machine 110 V AC
16. Pin punch 4"
17. Pincer
18. Plane – i Try plane
ii Smoothing plane

19. Pop rivet gun hand operated
20. Saw – i Cross cut saw
ii Rep saw
21. Scale/tape: Measuring tape 3 meter
22. Scale/tape: Steel rule 6”
23. Screw driver 8”, 10”
24. Socket Spanner 12.5mm (22 sockets) and accessories
25. Star type Screw driver
26. Triangular file 6”

Others

1. Hand gloves
2. Ladder with platform 5 to 6 feet
3. LED headlight
4. Tool bag
5. Wooden wedges

Note:

1. The handbook is prepared on hand tools. Hence, details of gauges & other items have not been given in the handbook.
2. This handbook is on hand tools for coach maintenance. No detail has been given for M&P including jacks etc.

3. Quantities of the hand tools/gauges to be carried by fitter are to be decided locally depending on the gang strength.

1.7 List of Hand Tools for Coach Maintenance

[Welder- Tools at Pit Line Maintenance]

1. Cutting blow pipe/Gas cutter
2. Gas torch for welding
3. Hammer : Chipping hammer 300 grams
4. Nozzles clean wire
5. Nozzles of different sizes (as per requirement)
6. Punch : Pin punch 8" long
7. Screw driver
8. Spanner cum cylinder key
9. Welding electrode holder

Others

1. Apron
2. Bucket
3. Gas lighter
4. Goggles
5. Hand gloves
6. Hand shield
7. Leg pad (leather)
8. Mask

9. Pin (to clean nozzle)
10. Safety shoes
11. Wire brush
12. Tongue (Local made)

Note:

1. The handbook is prepared on hand tools for coach maintenance. No details of gauges & other items have been given in the handbook.
2. This handbook is on hand tools only. No detail has been given for M&P including jacks etc.
3. Quantities of the hand tools/gauges to be carried by fitter are to be decided locally depending on the gang strength.

1.8 List of Hand Tools for Coach Maintenance

[Cleaning - Tools at Pit Line Maintenance]

1. 14" long cleaning brush
2. Broom
3. Bucket
4. Carriage washing brush
5. Commode chute (Chimney) brush
6. Disposal begs
7. Duster
8. Hand sweeping brush (Brush banister)

9. Harpic brush
10. Mopping brush with handle
11. Mopping cloth
12. Multipurpose brush big
13. Multipurpose brush small (with soap solution storing facility)
14. Scotch Brite
15. Scrubbing brush
16. Spoke brush
17. Tooth brush
18. Washing brush with 6 ft bamboo handle
19. Window squeegee

Others

1. Apron
2. Hand gloves
3. Mask

1.9 List of Hand Tools for Coach Maintenance [Trimmer - Tools at Pit Line Maintenance]

1. Bent niddle
2. Cutting pliers
3. Hammer with wooden handle, 500 gms
4. Hot air gun for PVC flooring
5. Paint brush for patching 3"
6. Scissors – 10"

7. Straight niddle
8. Trailer measuring tape 40''

Note:

1. Quantities of the hand tools/gauges to be carried by fitter are to be decided locally depending on the gang strength.

1.10 List of Hand Tools for Coach Maintenance
[Painter - Tools at Pit Line Maintenance]

1. ½", 1", 2", 3", Hand brush (Writing)
2. Coir brush
3. Hand brush (Stencil)
4. Paint brush
5. Painting Roller
6. Portable spray painting gun
7. Stencil cotter
8. Templates
9. Tool for pulley

Others

1. Bucket 10,20 litters
2. Cotton cloth piece (thick) 2 feet x 2 feet
3. Duster

Note:

1. Quantities of the hand tools/gauges to be carried by fitter are to be decided locally depending on the gang strength.

**1.11 List of Hand Tools for Coach Maintenance
[SE/JE (Incharge)/ Tool Room at Pit Line Maintenance**

1. Allen key (full set)
2. Bar with flat nose (local made)
3. Chisel : Chisel 8” with wire handle
4. Chisel : Flat chisel (full set)
5. Chisel : Octagonal chisel (full set)
6. Circlip plier (inner & external 19-60 mm)
7. Hacksaw with blade 12”
8. Hammer : Sledge hammer 7 kg (local made)
9. Hammer :Ball pein hammer 600 & 800 grams
10. Hammer :Cross pein hammer 600 & 800 grams
11. Pipe wrench (300,350 & 450mm)
12. Power drill
13. Power grinder
14. Punch : Centre punch 8” and 12” long
15. Punch : Cotter punch 8” and 12” long
16. Punch : Punch 8” with wire handle
17. Scale/tape : Measuring tape 3 meter
18. Scale/tape : Steel rule 6”
19. Screw driver 8x250mm

Hand Tools for Coach maintenance

20. Socket 12.5mm (22 sockets) and accessories
21. Spanner: Double open end spanner 04 pcs set (3/8 to 7/8 inches)
22. Spanner: Double open end spanner 13 pcs set (6-36 mm)
23. Spanner: Ring 12 pcs.set (6-32 mm)
24. Spanner: Spanner adjustable 305x35 & 255x30 mm
25. Tongue (local made)

Gauges

1. 7.5 mm test plate and 8 mm and 12 mm test palm
2. Air pressure gauge
3. Buffer height gauge
4. Digital wheel diameter gauge
5. Gauge for 'A' dimension of SAB
6. Piston stroke gauge
7. Tyre defect gauge
8. Wheel gauge
9. wheel profile gauge

Others

1. Danger board (glow sign)/lamp
2. Gum boot
3. Hand gloves
4. Helmet
5. Jacks ,20t, 5t (Hydraulic type)

6. Ladder with platform 10 ft. height
7. LED headlight
8. Line block skid
9. Rain coat
10. Tool bag
11. Walkie talkie
12. Wooden packing for jacks
13. Wooden wedges

Note:

1. The handbook is written on hand tools. No details of gauges & other items have been given in the handbook.
2. This handbook is on hand tools only. No detail has been given for M&Ps including jacks etc.
3. Quantities of the hand tools/gauges to be carried by fitter are to be decided locally depending on the gang strength.
4. List should be displayed in SE/JE(C&W) office for the knowledge of working fitters

1.12 List of Hand Tools for Coach Maintenance
[Fitter-Repair/ Examination Gang at Sick Line Maintenance]

1. Bar with flat nose (local made)
2. Chiesel : Flat chiesel 200x25 mm
3. Chiesel : Octagonal chiesel 150x16 mm, 125x9 mm

4. Hammer: Ball pein hammer 800 or 1200 grams
1. Pipe wrench : 450x60 mm
2. Punch : Cotter punch 8” or 12” long
3. Punch : Drift punch 8” or 12” long
4. Punch with wire
5. Scale/tape : Measuring tape 3 meter
6. Scale/tape : Steel rule 6”
7. Screw driver with star also
8. Socket 12.5mm (22 sockets) and accessories
9. Spanner 12x13 mm
10. Spanner 13x17 mm
11. Spanner 17x19 mm
12. Spanner 22x24 mm
13. Spanner 24x27 mm
14. Spanner adjustable 305x35 mm
15. Tongue (local made)

Gauges

1. Buffer height gauge
2. Dash pot oil level gauge
3. Gauge for A dimension of SAB
4. Gauge for CBC projection
5. Piston stroke gauge
6. Tyre defect gauge

Other Gauge Required for “C” Schedule

Others

1. Helmet
2. Hand gloves
3. Tool bag (local made)
4. Wooden packing
5. Wooden wedges
6. Safety shoes
7. Rail skied

Note:

1. The hand book is prepared on hand tools. No details of gauges and other items have been given in the hand book.
2. Quantities of the hand tools/gauges to be carried by fitter are to be decided locally depending on the gang strength.

1.13 List of Hand Tools for Coach Maintenance**[Fitter- (Brake testing) at Sick Line Maintenance)]**

1. Adjustable spanner
1. Allen key (full set)
2. Chiesel : Octagonal chiesel 135x9 mm
3. Chipping hammer
4. Hammer : Ball pein hammer 600 grams
5. Pipe wrench : 450x60 mm

6. Punch : Centre punch 8” or 12” long
7. Scale/tape : Measuring tape 3 meter
8. Scale/tape : Steel rule 6”
9. Screw driver 8x250mm
10. Screw driver with magnetic tip
11. Spanner 13x17 mm
12. Spanner 17x19 mm
13. Spanner 24x27 mm
14. Spanner 22x24 mm
15. Spanner 24x27 mm
16. Tongue (Local made)
17. Troque wrench

Gauges

1. Air pressure gauge
2. Piston stroke gauge for BMBC
3. Stop watch
4. Spring balance with standard weight

Others

1. Hand gloves
2. Helmet
3. Stop watch
4. Megna flax flaw detater
5. Tool bag

Note:

1. The hand book is prepared on hand tools. No details of gauges and other items have been given in the hand book.
2. Quantities of the hand tools/gauges to be carried by fitter are to be decided locally depending on the gang strength.

1.14 List of Hand Tools for Coach Maintenance**[Fitter- Pipe Fitting Tools at Sick Line Maintenance]**

1. Bar with flat nose (local made)
2. Cordless drill
3. Hacksaw with blade 12"
4. Hammer :Ball pein hammer 600 & 800 grams
5. Pipe wrench 450 mm
6. Punch : Centre punch 8" and 12" long
7. Scale/tape : Measuring tape 3 meter
8. Scale/tape : Steel rule 6"
9. Screw driver 8x250mm
10. Spanner 13x17 mm
11. Spanner 17x19 mm
12. Spanner 22x24 mm
13. Spanner 30x32 mm
14. Spanner 32x36 mm

15. Spanner: Single open end slogging spanner 30 to 36 mm
16. Spanner: Spanner adjustable 305x35 & 255x30 mm
17. Star type screw driver
18. Water pump pliers

Others

1. Helmet
2. Hand gloves
3. LED headlight
4. Tool bag

Note:

1. The hand book is written on hand tools. Hence, no details of gauges and other items have been given in the hand book.
2. Quantities of the hand tools/gauges to be carried by fitter are to be decided locally depending on the gang strength.

1.15 List of Hand Tools for Coach Maintenance

[Carpenter- Tools at Sick Line Maintenance]

1. Adzes
2. Axes
3. Brace
4. Chisel hexagonal 6"

5. Clamp
6. Claw hammer
7. Cutting pliers 6" PVC coated
8. Diamond cotter
9. Electric operated Saw 4" & 7"
10. File half round bastard 16" long
11. Foot rule folding
12. Grinding stone 8"
13. Hacksaw
14. Hammer: Cross pein hammer with wooden handle 200 Gms & 500 Gms
15. Hand drill machine 110 V AC
16. Pin punch 4"
17. Pincer
18. Plane – i Try plane
ii Smoothing plane
19. Pop rivet gun hand operated
20. Saw – i Cross cut saw
ii Rep saw
21. Scale/tape: Measuring tape 3 meter
22. Scale/tape: Steel rule 6"
23. Screw driver 8", 10"
24. Socket Spanner 12.5mm (22 sockets) and accessories
25. Star type Screw driver

26. Triangular file 6”

Others

1. Hand gloves
2. Ladder with platform 5 to 6 feet
3. LED headlight
4. Tool bag
5. Wooden wedges

Note:

1. The handbook is prepared on hand tools. Hence, no details of gauges & other items have been given in the hand-book.
2. No detail has been given for M&P including jacks etc.
3. Quantities of the hand tools/gauges to be carried by fitter are to be decided locally depending on the gang strength.

1.16 List of Hand Tools for Coach Maintenance
[Trimmer - Tools at Sick Line Maintenance]

1. Bent niddle
2. Cutting pliers
3. Hammer with wooden handle, 500 gms
4. Hot air gun for PVC flooring
5. Paint brush for patching 3”
6. Scissors – 10”

7. Straight niddle
8. Trailer measuring tape 40''

Note:

1. Quantities of the hand tools/gauges to be carried by fitter are to be decided locally depending on the gang strength.

1.17 List of Hand Tools for Coach Maintenance
[Welder- Tools at Sick Line Maintenance]

1. Cutting blow pipe/Gas cutter
2. Gas torch for welding
3. Hammer : Chipping hammer 300 grams
4. Nozzles clean wire
5. Nozzles of different sizes (as per requirement)
6. Punch : Pin punch 8'' long
7. Screw driver
8. Spanner cum cylinder key
9. Welding electrode holder

Others

1. Apron
2. Bucket
3. Gas lighter
4. Goggles

5. Hand gloves
6. Hand shield
7. Leg pad (leather)
8. Mask
9. Pin (to clean nozzle)
10. Safety shoes
11. Wire brush
12. Tongue (Local made)

**1.18 List of Hand Tools for Coach Maintenance
[Cleaning - Tools at Sick Line Maintenance]**

1. 14" long cleaning brush
2. Broom
3. Bucket
4. Carriage washing brush
5. Commode chute (Chimney) brush
6. Disposal begs
7. Duster
8. Hand sweeping brush (Brush banister)
9. Harpic brush
10. Mopping brush with handle
11. Mopping cloth
12. Multipurpose brush big
13. Multipurpose brush small (with soap solution storing facility)

14. Scotch Brite
15. Scrubbing brush
16. Spoke brush
17. Tooth brush
18. Washing brush with 6 ft bamboo handle
19. Window squeegee

Others

4. Apron
5. Hand gloves
6. Mask

Note :

1. No details of gauges & other items have been given in the hand-book.
2. Quantities of the hand tools/gauges to be carried by fitter are to be decided locally depending on the gang strength.

1.19 List of Hand Tools for Coach Maintenance [Painter - Tools at Sick Line Maintenance]

1. ½", 1", 2", 3", Hand brush (Writing)
2. Coir brush
3. Hand brush (Stencil)
4. Paint brush
5. Painting Roller

6. Portable spray painting gun
7. Stencil cotter
8. Templates
9. Tool for pulley

Others

1. Bucket 10,20 litters
2. Cotton cloth piece (thick) 2feet x 2feet
3. Duster

Note:

Quantities of the hand tools/gauges to be carried by fitter are to be decided locally depending on the gang strength.

1.20 List of Hand Tools for Coach Maintenance

[SE/JE (Incharge)/ Tool Room at Sick Line Maintenance]

1. Allen key (full set)
2. Bar with flat nose (local made)
3. Chiesel : Flat chiesel (full set)
4. Chiesel : Octagonal chiesel (full set)
5. Circlip pliers (inner, external & universal 19-60 mm and 10-40 mm respectively)
6. Combination pliers 150,200 mm length
7. File : Flat, round and half round 12"
8. Hacksaw with blade 12"
9. Hammer : Nylon hammer with handle 2 lbs

Hand Tools for Coach Maintenance

10. Hammer :Cross pein hammer 600 & 800 grams
11. Hammer: Ball pein hammer 600,800,1000,1500 grams
12. Pipe wrench (350,450mm)
13. Pneumatic chipping hammer
14. Power drill
15. Power grinder
16. Punch : Centre punch 8” or 12” long
17. Punch : Cotter punch 8” or 12” long
18. Scale/tape: Measuring tape 3 meter
19. Scale/tape : Measuring tape 30 meter
20. Scale/tape : Steel rule 6”
21. Screw driver 8x250mm, 8x300 mm
22. Sockets 12.5 mm (22 sockets) and accessories
23. Spanner : Single end spanner AF-27,32,50,63,65 mm
24. Spanner : Spanner adjustable 305x35 & 380x43 mm
25. Spanner: Double open end spanner 04 pcs set (3/8 to 7/8 inches)
26. Spanner: Double open end spanner 13 pcs set (6-36 mm)
27. Spanner: Ring 12 pcs.set (6-32 mm)
28. Tongue
29. Torque wrench 7-35 kg.m, 7-50 kg.m

Gauges

1. Air pressure gauge (0.1 kg/cm² least count)

2. Bolster clearing gauge (Adjustable)
3. Buffer face wear gauge
4. Buffer height gauge
5. Buffer projection gauge
6. CBC height gauge
7. Digital caliper of wheel diameter
8. Filler gauge
9. Gauge for 'A' dimension of SAB
10. Gauge for CBC
11. Piston stroke gauge
12. Shank wear gauge
13. Trammeling gauge
14. Tyre defect gauge
15. B.P/FP gauge
16. Wheel gauge

Others

1. Danger board (glow sign)/lamps
2. Hand gloves
3. Helmet
4. Jacks 20t, 5t
5. Ladder with platform 10 ft. height
6. LED headlight
7. Line block skid with locking arrangement
8. Tool bag

9. Walkie talkie
10. Wire brush
11. Wooden packing for jacks (2', 1.5' and 1 foot long)
12. Wooden wedges

Note:

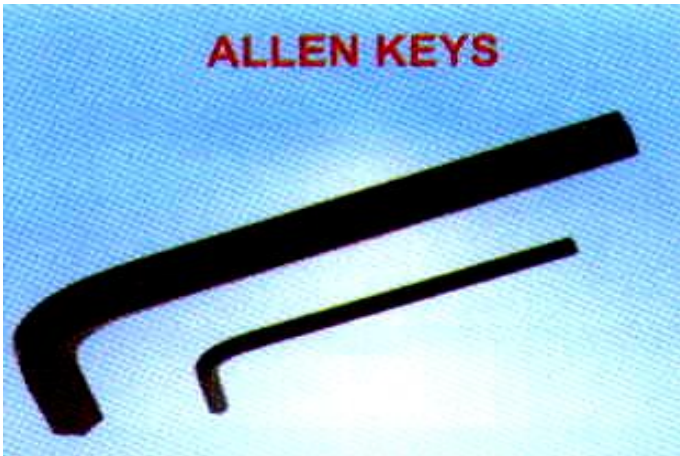
1. No details of gauges and other items have been given in the hand book.
2. No detail has been given for M&P including jacks etc.
3. Quantities of the hand tools/gauges to be carried by fitter are to be decided locally depending on the gang strength.
4. List should be displayed in SE/JE (C&W) office for the knowledge of working fitters.

2.1 GENERAL TOOLS:

2.1.1 ALLEN KEY

Description: Chrome Vanadium Steel, Burnished finish
Generally conforming to IS 3082-1988

Range of set	No. of pieces	Price/Set
1.5-10 mm (1.5mm,2mm,2.5mm,3mm,4mm,5mm,6mm,8mm,10mm)	09	126.00



2.1.2 BOX JOINT TYPE WATER PUMP PLIERS

Description: Seven-position slip joint, with induction hardened jaws, ribbed handles for slip free gripping. Box joint for perfect working provision of special protection against crushing grip injury.

Drop forged chrome vanadium steel. Generally Conforming DIN5231D

Length mm	Weight Gms	Price per p.
250	290	130.00



2.1.3 CHISELS

Description:

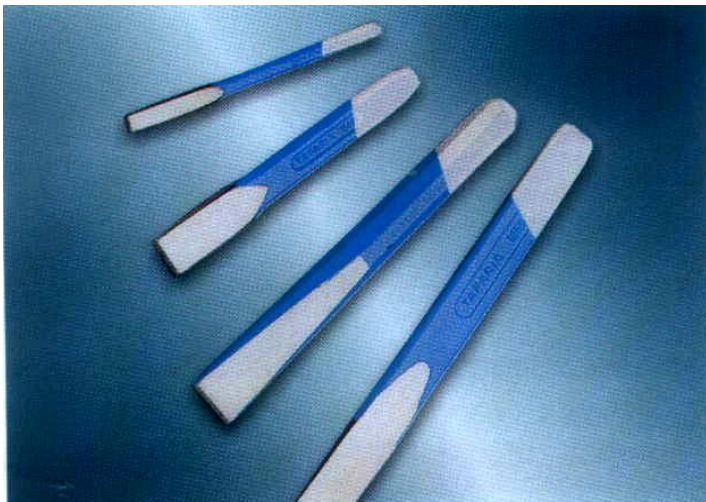
Octagonal Chisel made from high grade steel, forged and ground. Differential heat treatment for cutting edge and striking end to ensure long life.

As per IS 402/ 1990

Length In mm	Cutting Edge in mm	Price Each Rs.
150	16	44.00
200	25	83.00
250	30	110.00
300	32	135.00

Flat Chisel

Length In mm	Cutting Edge in mm	Price Each Rs.
150	25	78.00
200	25	90.00
250	25	95.00



2.1.4 CIRCLIP PLIERS

Description:**Inner, External and Universal Circlip Pliers**

Insulated With Thick C.A. Sleeve

Generally Conforming to IS 7989-1976

High grade steel

Description	Capacity mm	Length in mm	Price Each Rs
Straight Nose	19-60	155	116.00
Bent Nose	19-60	160	123.00
Universal	10-40	140	158.00



2.1.5 FILE

Description: Engineer's file with plastic handle
Generally Conforming to IS 1931-1962

Description	Finish	Size (mm)	Price each(Rs.)
Flat file	Bastard	200	74.00
Flat file	Bastard	300	120.00
Flat file	Smooth	200	114.00
Flat file	Smooth	300	184.00
Half round file	Bastard	200	167.00
Half round file	Bastard	300	292.00
Half round file	Smooth	200	198.00
Half round file	Smooth	300	332.00
Round file	Bastard	200	98.00
Round file	Bastard	250	138.00
Round file	Smooth	150	107.00
Round file	Smooth	250	153.00

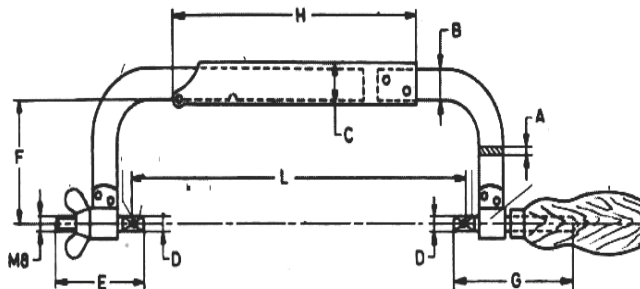


2.1.6 HACK SAW

Description :

Generally Conforming to IS: 2594

Dimensions for type C Straight Adjustable Flat Hacksaw	
Nominal size L	Rs. each
250, 300	80, 95



2.1.7 HAMMER WITH HANDLE

Description: Head drop forged from high grade steel and heat treated with good quality knotless seasoned wooden handles.

(Ball Pein, Cross pein)

Head as per IS 841-1983

Ball pein and Cross pein

Weight in gms.	Price Each Rs.
200	83.00
500	121.00
600	143.00
800	168.00



CROSS PEIN HAMMER

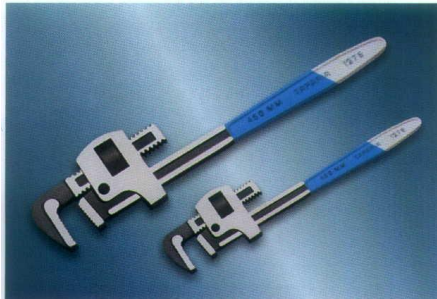


BALL PEIN HAMMER

2.1.8 PIPE WRENCHES

Description: Conforming to IS 4003-1978 (Part-I), Heavy duty housing with integral I-beam handle made of SG Iron for maximum strength. Suitably proportioned handle for comfortable grip (powder coated).

Size mm	Capacity mm	Price each Rs
250	35	142.00
300	44	197.00
350	48	234.00
450	60	348.00
600	76	643.00



2.1.9 PUNCHES

Description : Generally Conforming to IS 7177-1974

Made out of high grade chrome steel accurately machined and heat treated. Deep knurling on the body to ensures firm grip.

Description	Length in mm	Price each Rs.
Centre Punch	100	22.00
Centre Punch	125	29.00
Drift Punch	100	23.50



2.1.10 SPANNERS

2.1.10.1 Adjustable Spanners

Description : Standard pattern Chrome Vanadium steel Generally Conforming to IS 6149-1984 Grade II

Length mm	Capacity (mm)	Black Phosphate Finish Price Each Rs	Nickel Chrome Plated Price Each Rs
150	19	81.00	97.00
205	26	100.00	116.00
255	30	132.00	152.00
305	35	174.00	194.00
380	43	358.00	388.00



2.1.10.2 Double Open End Spanners

Description : Drop forged Chrome Vanadium Steel, Chrome Plated, Generally Conforming IS 2028-1998

Size in mm	Price Each Rs.	Size in Inch	Price Each Rs
6 x 7	17.00	3/8 x 7/16	14.00
8 x 9	18.00	9/16 x 5/8	25.00
10 x 11	23.00	5/8 x 3/4	32.00
12 x 13	29.00	3/4 x 7/8	44.00
14 x 15	32.00		
16 x 17	42.00		
18 x 19	50.00		
20 x 22	61.00		
21 x 23	68.00		
24 x 26	87.00		
25 x 27	97.00		
30 x 32	125.00		
30 x 36	142.00		



2.1.10.3 RING SPANNERS

Bi-hexagonal and Hexagonal

Deep Off Set

Description : Chrome vanadium steel, Chrome plated polish Generally Conforming to IS-2029-1981

Range of set	No. of pieces	Approx. Price/Set
6-22 mm	08	429.00
6-32 mm	12	1096.00

No. of Pieces	Contents	Price in Rs.
6	Size M 6x7, 8x9, 10x11, 12x13, 14x15, 16x17	223.00
6	16x17, 18x19, 20x22, 24x26, 25x28, 30x32	416.00
6	1/8x3/16, 3/16x1/4, 1/4x5/16, 5/16x3/8, 3/8x7/16, 7/16x1/2	359.00



2.1.10.4 SINGLE OPEN END SLOGGING SPANNER

Description: Heavy-duty spanner with strong profiled handle and durable striking end. Drop forged HIGH GRADE Chrome Vanadium Steel with head set at 15 ° angles. Generally Conforming IS 4508-DIN133

Size mm	Length mm	Weight Gms	Price per p.
30	200	520	308.00
32	200	500	325.00
36	210	705	358.00
41	225	950	468.00
46	280	1800	545.00
50	280	1750	737.00
55	320	3025	913.00
60	320	2905	1073.00
65	342	3850	1529.00
70	370	4700	1749.00
75	370	4550	2409.0
80	408	6850	3069.00



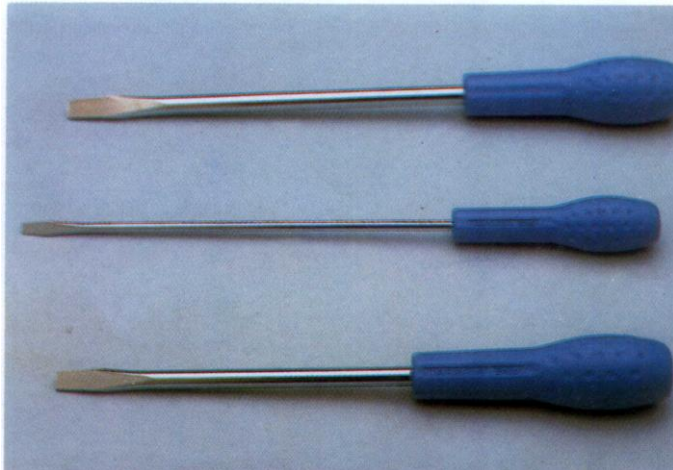
2.1.11 SCREW DRIVERS

Description:

Generally conforming to IS 844

Blade made from high-grade chrome vanadium steel, chrome plated fully hardened to give long life, Handles from high impact cellulose acetate.

Blade size (mm)	Tip size (mm)	Price Each Rs
3x50	3 x 0.4	22.00
3x80	3 x 0.5	23.00
8x250	8x1.2	71.00
8x300	8x1.2	77.00



2.1.12 SOCKETS- 12.5 mm (1/2”), SQUARE DRIVE AND ACCESSORIES

Description: High Grade Chrome Vanadium Steel.

As per IS 6131-1980 & 7381-1986

Bi-hexagonal & Hexagonal

One Set

Product Item	Sockets (mm)	Price Per Set Rs.
22 Sockets	10,11,12,13,14,15,16, 17,18,19,21,22,23,24, 26,27,28,29,30,32,33, 34	2750.00
5 Accessories	Extension bar 125mm,255mm, Universal joint T Handle , Ratchet Handle	



2.112.1 Sockets Accessories

As per IS: 7991 & IS: 7975-1991

Item	Length in mm	Price each Rs.
Extension Bar	125	108.00
Extension Bar	255	130.00
Universal Joint	75	177.00
“T” Handle	300	124.00
Ratchet Handle	250	398.00
Offset handle	189	78.00



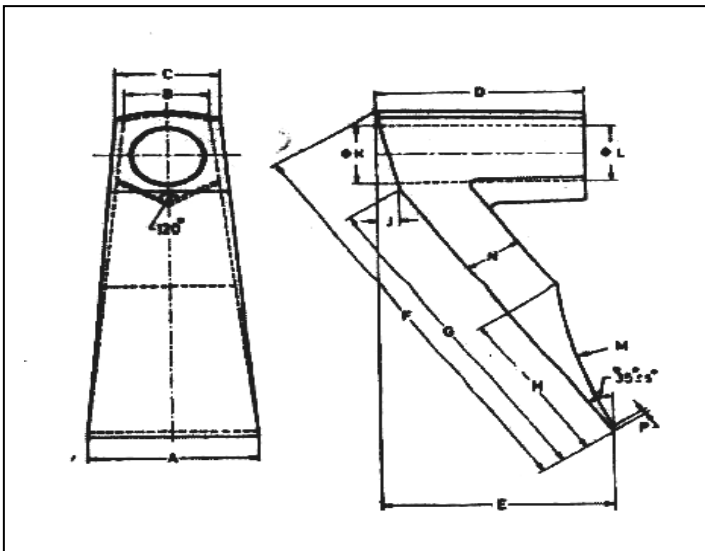
Product No.	Contents	Price each (Rs.)
11 sockets + 4 accessories	10,11, 13,14,17, 19,22, 24, 27, 30, 32 Extension bar 125mm,250mm,ratchet reversible 265 mm, sliding handle	1618.00
14 sockets + 4 accessories	8, 9,10,11, 12,13,14,15,16,17, 18,19, 21, 22 Extension bar 125mm,250mm, T Handle, Offset handle	1379.00
6 sockets + 1 accessory	11, 14,17, 19,22, 24 Accessory (Offset handle)	440.00

2.2 CARPENTER TOOLS:

2.2.1 ADZES

IS : 663

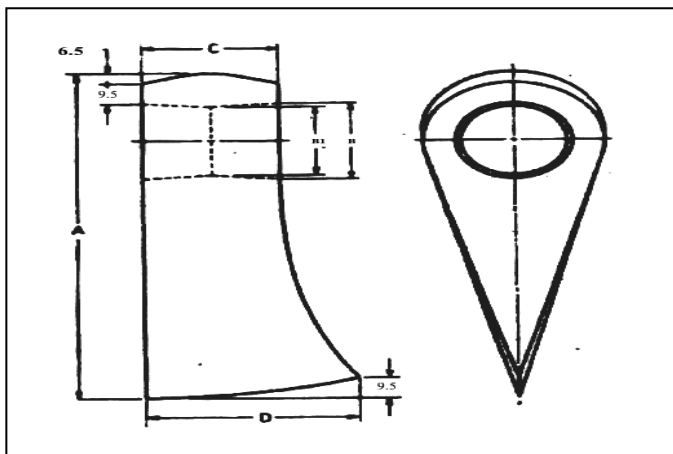
Dimensions for Adzes (Dimensions are in mm)				
Nominal mass Kg	A	E	Dia of Hole	Rs.
1	50	80	24	95
2	75	100	23	165



2.2.2 AXES

IS : 703

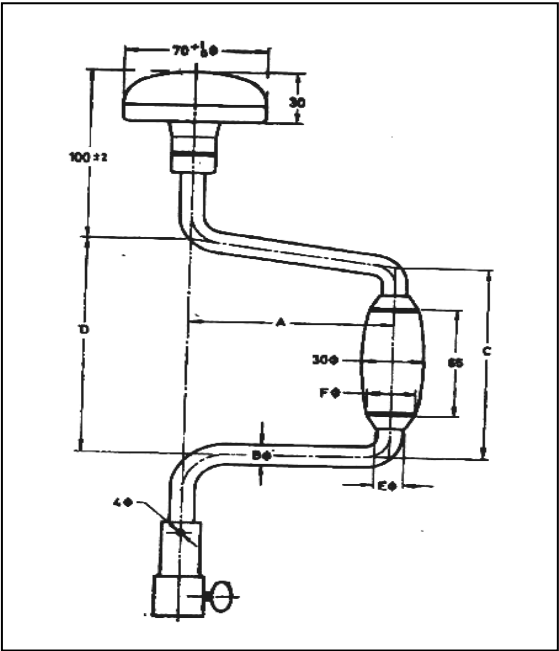
Weight and dimensions for Axes						
Weight Kg	A \pm 3	B \pm 3	B ₁ \pm 3	A \pm 3	A \pm 3	Rs.
1.80	171	35	32	51	70	140
2.70	216	41	38	51	83	165



2.2.3 BRACE

IS : 7041, 7042

DIMENSIONS FOR CARPENTERS BRACE (Dimensions are in mm)							
Normal size (2 x A)	A±2	B	C±3/0	D±3/0	E	F	Rs.
250	125	12	130	150	14	24	110
300	150	12	145	160	14	24	125



2.2.4 CLAMP

Length in mm	Price in Rs. each
105	230.00
205	520.00

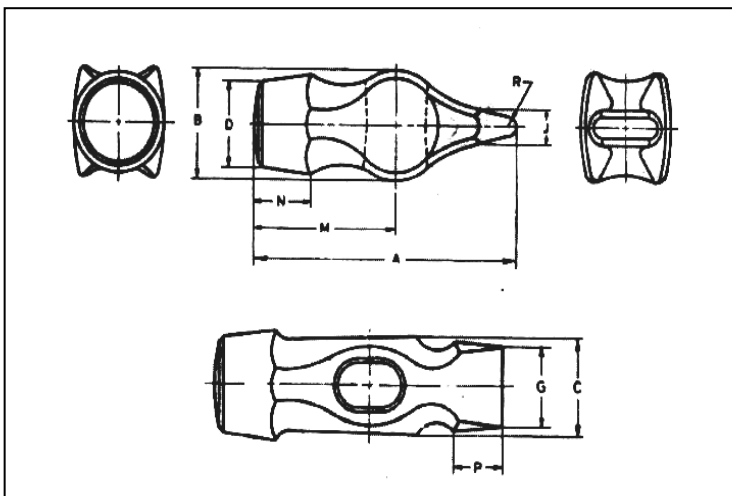


2.2.5 HAMMER

2.2.5. A Cross Pein Hammer with Handle

IS : 841-1983

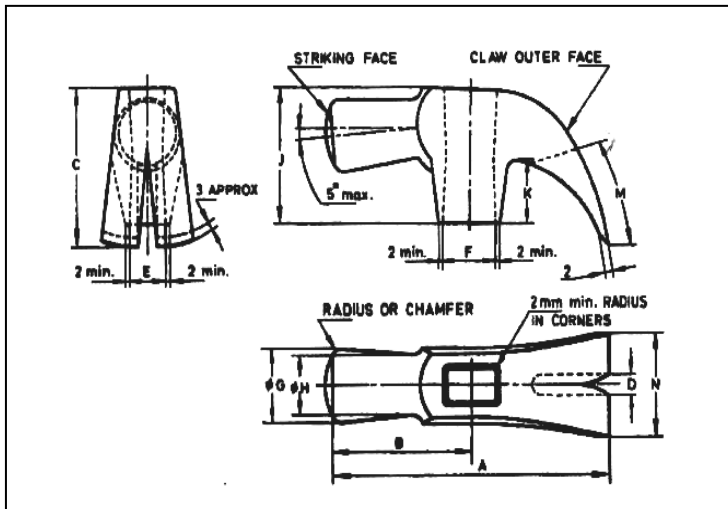
Dimensions for Cross Pein Hammer (Dimensions are in mm)				
Nominal mass grams	A	D	G	Rs.
200	75	24	20	89
500	105	35	25	127



2.2.5. B Claw Hammer

IS : 6546

Dimensions for Claw Hammer (Dimensions are in mm)				
Nominal size grams	A	G \pm 1.5	N min.	Rs.
450/500	120	28	30	143
700	135	30	35	225



2.2.6 PLANE

2.2.6. A Try Plane

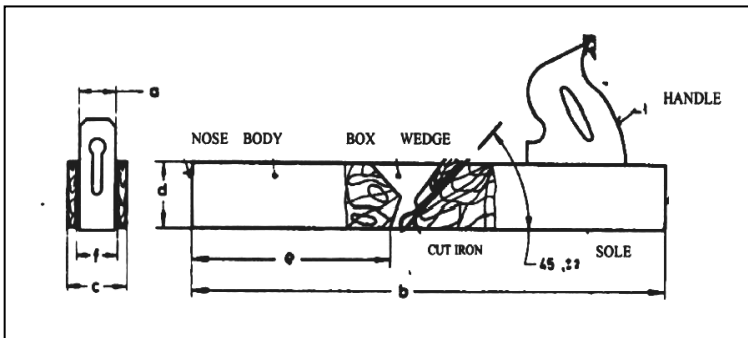
IS : 8205

Dimensions for Carpenters Wooden Bodied Try Plane						
Normal size a	B \pm 5	c \pm 2	D \pm 3	e \pm 3	F \pm 1.5 /0	Rs.
54	600	75	75	250	55.5	150
57	600	78	75	250	58.5	165

2.2.6. B Smoothing Plane

IS : 8206

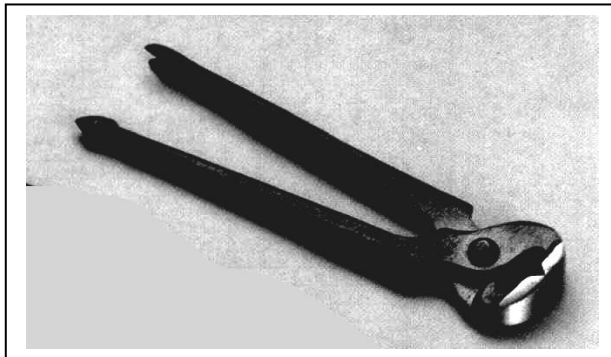
Dimensions for Carpenters Wooden Bodied Smoothing Plane						
Normal size a	B \pm 5	c \pm 2	d \pm 3	e \pm 3	F \pm 1.5 /0	Rs.
45	200	75	63	60	46.5	105
51	200	75	63	60	52.3	125



2.2.7 PINCER

Generally confirming to IS: 2615

Length in mm	Price in Rs. each
200	131.00



2.3 WELDING TOOLS/EQUIPMENT

2.3.1 ELECTRODE HOLDERS

Conforming to IS: 2641-1989



2.3.2 CUTTING NOZZLES

Conforming IS: 7653-1975



2.3.3 CUTTING TORCH (With back fire arrestor)

Description:

Conforming to IS: 7653-1975

Body and head are of forged brass to eliminate casting porosity. Standard model is 450 mm in length with right-angled head.



2.3.4 WELD FLUX CHIPPER (Pneumatic)

Description:

Blows per minute	: 4200
Approx. Weight	: 2 Kg
Overall Length	: 257 mm
Air Inlet	: Rc ½"
Type of handle	: Straight
Make/model no.	: CP-455 L Chicago Pneumatic
Approximate price	: 6590/-



CP-455-L

2.4 CLEANING TOOLS/EQUIPMENTS

2.4.1 CARRIAGE WASHING BRUSH

Feature: Made of wood & coconut fibre

Use: External cleaning

Cost: Rs.80/-



2.4.2 COMMODE CHUTE (CHIMNEY) BRUSH

Feature: Made of wood & coconut fibre also available in plastic

Use: Inside cleaning & commode chute

Cost: Rs.100/-



2.4.3 DUSTER

Feature: Khadi cloth

Use: Dusting work, panel, window glass etc cleaning work.

Cost: Rs.8



2.4.4 HAND SWEEPING BRUSH (BRUSH BANISTER)

Feature: Made of wood & coconut fiber

Use: Lavatory washing & floor dusting

Cost: Rs. 50/-



2.4.5 HARPIC BRUSH

Feature: Made of plastic & nylon fibre

Use: cleaning of critical area, glass shutter, chequered plates

Cost: Rs.20/-



2.4.6 MOPPING BURSH WITH HANDLE

Feature: Made of plastic & rubber pad or mopping cloth

Use: Mopping of floor, side wall etc.

Cost: Rs. 50



2.4.7 MOPPING CLOTH

Feature: Made of thick cotton fibre

Use: Mopping of floor

Cost: Rs.10/-



2.4.8 MULTIPURPOSE BRUSH BIG

Feature: Made of plastic & nylon fibre (with soap solution storing facility)

Use: To clean curved profile section

Cost: Rs.50/-



2.4.9 MULTIPURPOSE BRUSH SMALL (WITH SOAP SOLUTION STORING FACILITY)

Feature: Made of plastic & nylon fibre

Use: Wash basin, drain hole & curved profile portion

Cost: Rs.30/-



2.4.10 SCOTCH BRITE

Feature: Abrasive cleaning pad

Use: for abrasive cleaning purposes

Cost: Rs.10/-



2.4.11 SCRUBBING BRUSH

Feature: Made of wood & coconut fibre

Use: for scrubbing work as per requirement

Cost: Rs.60/-



2.4.12 SPOKE BRUSH

Feature: Made of wood & coconut fibre

Use: for external washing, external cleaning panel & rexine

Cost: Rs. 35/-



2.4.13 TOOTH BRUSH

Feature: Made of plastic & nylon fibre

Use: cleaning of ridge area area, moulding corners, sides

Cost: Rs.6/-



2.4.14 WINDOW SQUEEGEE

Feature: Made of plastic & rubber pad

Use: Mopping of Window glass area

Cost: Rs. 30 –40



2.4.15 Chock Remover for Bio-Toilet

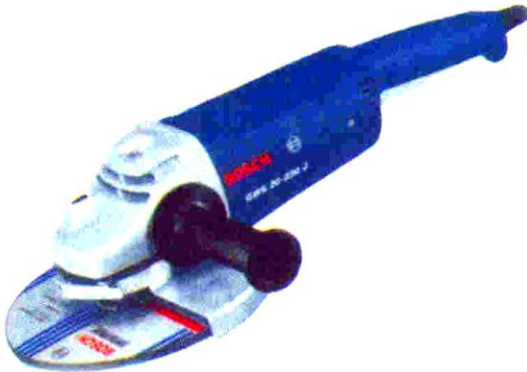


2.5 POWER TOOLS

2.5.1 ANGLE GRINDER

Description:

Grinding disc dia.	: 180 mm
Spindle thread	M 14
Power input	: 2000 W
No-load speed	: 8500 rpm
Weight	: 4.2 kg
Make/Model No.	: BOSCH
Approx. Price	: Rs. 11795/-



2.5.2 CIRCULAR SAW

Description:

Saw blade dia.	: 184 mm
Cutting depth at 90°/45°	: 62 mm/49 mm
Power input	: 1400 W
No-load speed	: 4800 rpm
Weight	: 4.1 kg
Make/Model No.	: BOSCH



2.5.3 HIGH TORQUE DRILL

Description:

Dia. In steel	: 10 mm
Power input	: 420 W
No-load speed	: 2200 rpm
Weight	: 1.4 kg
Make/Model No.	: BOSCH
Approx. Price	: Rs. 3885/-



2.5.4 HOT- AIR GUN

Description:

Power input	: 2000 W
Temperature	: 100° to 600° C
Airflow rate	: 350/550 l/min
Airflow regulation	: 2-stage
Weight	: 0.7 kg
Make/Model No.	: BOSCH
Approx. Price	: Rs.



2.5.5 JIGSAW

Description:

Cutting depth – in wood	: 85 mm
Cutting depth – in aluminium	: 10 mm
Cutting depth – in steel	: 4 mm
No load stroke rate	: 500-3100 spm
Power input	: 580 W
Weight	: 2.5 kg
Make/Model No.	: BOSCH



2.5.6 LONG NECK STRAIGHT GRINDER

Description:

Grinding points max. dia.	: 25 mm
Power input	: 500 W
No-load speed	: 27000 rpm
Weight	: 1.6 kg
Make/Model No.	: BOSCH
Approx. Price	: Rs. 15185/-



2.5.7 PLANER with HSS Blade

Description:

Cutting depth adjustment	: 0-1 mm
Rebate depth	: upto 24 mm
Planing width	: upto 82 mm
Power input	: 750 W
No load speed	: 13000 rpm
Weight	: 2.8 kg
Make/Model No.	: BOSCH
Approx. Price	: Rs. 3225/-

]



2.5.8 ROUTER

Description:

Max.plunge depth	: 50 mm
Tool holder	: 8 mm
Rated power consumption	: 1200 W
No load speed	: 23000 rpm
Weight	: 4.7 kg
Make/Model No.	: BOSCH



2.6 MISC. TOOLS

2.6.1 LED HEADLIGHT

LED Headlight with 4,8,12-LED option (adjustable strap)
Approx. Price : Rs. 250/-



2.6.2 SAFETY HELMET

IS No. : 2925, To use during maintenance

SIZE	Price
540 mm to 590 mm	Labour Helmet – Rs.45/- Supervisor Helmet-Rs.55/-



Note : It is preferable to use Fibre Reinforced Plastic Fluorescent Helmet.

2.6.3 SPRAY GUN

Description:

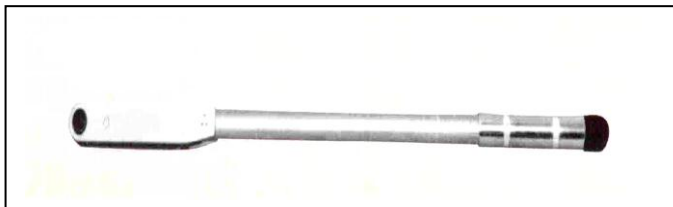
Cup capacity	: 1000 cc
Air pressure	: 18 –70 psi
Optional nozzle	: 1.2 mm,1.5 mm,1.8 mm
Weight	: 4.7 kg



2.6.4 TORQUE WRENCHES

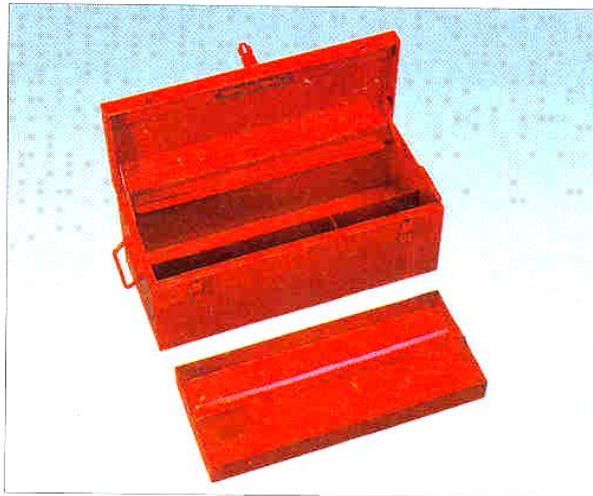
Description : The Torque wrench is a calibrated tool recommended for use in controlled tightening of nuts and bolts to avoid over/under stressing. To set simply turn an adjusting lever and set the reading on the scale. To operate, just pull the handle and when set torque is reached, the wrench will signal with an audible “click”. Release the wrench, it is set for the next operation.

Torque capacity	Square drive mm	Price /piece
1-7 kg.m 7-50 Lb.Ft.	12.5	2673
7-35 kg.m 50-250 Lb.Ft.	12.5	2808.00
14-56 kg.m 100-400 Lb.Ft.	12.5	5328.00



2.6.5 TOOL BAGS/BOXES

Tool Bag/Boxes has to be made as per requirement.



CHAPTER 3

DESCRIPTION AND DETAIL OF SOME MODERN HAND TOOLS

In this chapter we provide information's above some new/modern tools, which many prove to be more useful than the tools presently being used. However these new tools are not included in the list of tools recommended work-spot-wise. These new/modern tools may be procured and utilised in the field as per requirement at the work spot.

3.1 AUTOMATIC SELF-ADJUSTING SMALL SPANNER

Description: Automatic self- adjusting small spanner having functional capacity A/F 6 mm to 22 mm or SAE A/F 1/4" to 7/8"

Material: -Alloy steel duly hardened jaw, nylon 6 moulded upon steel strip & insulated up to - 1000 volts and stainless steel rivet.

(Source of supply – M/s. A Dinisha Marketing Co.)



3.2 AUTOMATIC SELF-ADJUSTING BIG SPANNER

Description: Automatic self- adjusting big spanner having functional capacity A/F 15 mm to 41mm or SAE A/F 5/8" to 1 5/8"

Material:-Alloy steel duly hardened jaw; nylon 6 moulded upon steel strip & insulated up to - 1000 volts and stainless steel rivet.

(Source of supply – M/s. A Dinisha Marketing Co.)



3.3 AUTOMATIC SELF-ADJUSTING SMALL PIPE WRENCH

Description: Automatic self- adjusting small pipe wrench with aluminum handle having functional pipe capacity 1/8" to 3/4" Opening Φ 10 mm to 30 mm.

Material:-Alloy steel duly hardened jaw & cam; nylon 6 moulded on metal pipe handle and stainless steel rivet.

(Source of supply – M/s. A Dinisha Marketing Co.)



3.4 AUTOMATIC SELF-ADJUSTING BIG PIPE WRENCH

Description: Automatic self- adjusting big pipe wrench with aluminum handle having functional pipe capacity 1/2" to 2" Opening Φ 20 mm to 60 mm.

Material:-Alloy steel duly hardened jaw & cam; nylon 6 moulded on metal pipe handle and stainless steel rivet.

(Source of supply – M/s. A Dinisha Marketing Co.)

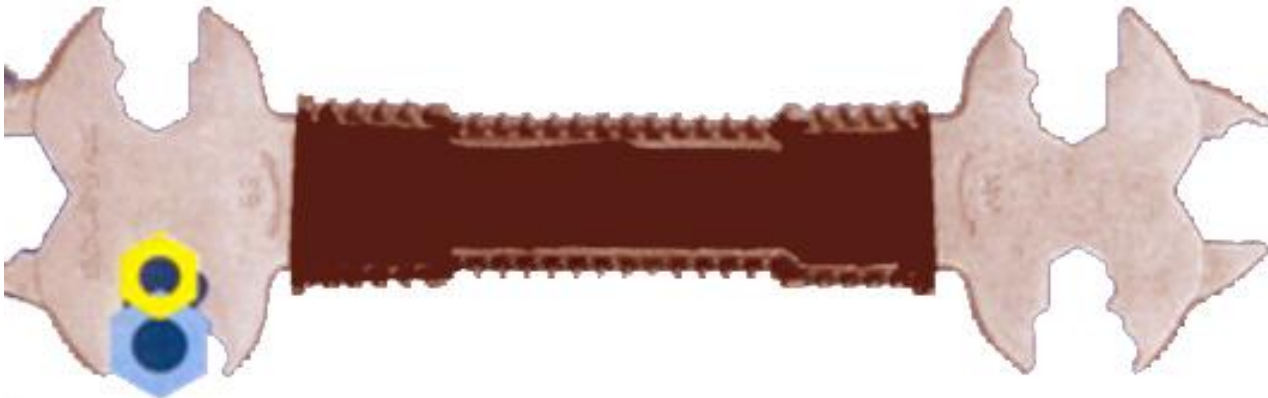


3.5 SPANNER MULTI-WRENCH (RATCHET TYPE) 10 IN ONE

Description: Spanner multi-wrench (ratchet type) -16 effective sizes in one wrench having functional capacity A/F 10,12,16,17,19 mm & BS 1/4", 4/16, 3/8", 7/16", 1/2" 1/2".

Material:-Alloy steel duly hardened jaw; nylon 6 moulded on steel strip handle.

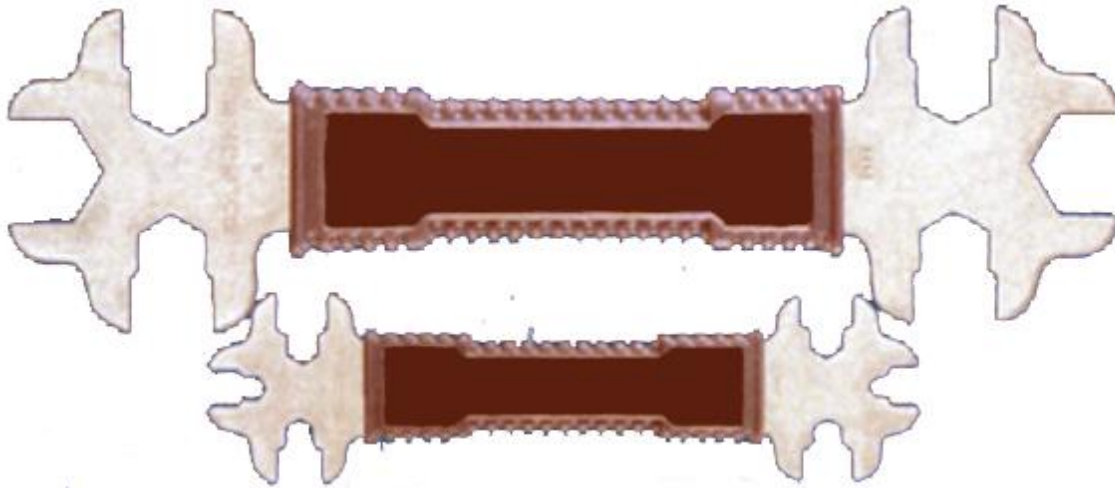
(Source of supply – M/s. A Dinisha Marketing Co.)



3.6 MULTI-WRENCH/ SPANNER

Description: Multi-wrench/ Spanner (22 sizes of METRIC and SAE in two wrenches) having functional capacity A/F MM 5,7,8,10,12,13 & MM 14,15,17,18,21.

Material:-Alloy steel duly hardened jaw; nylon 6 moulded on steel strip handle
(Source of supply – M/s. A Dinisha Marketing Co.)

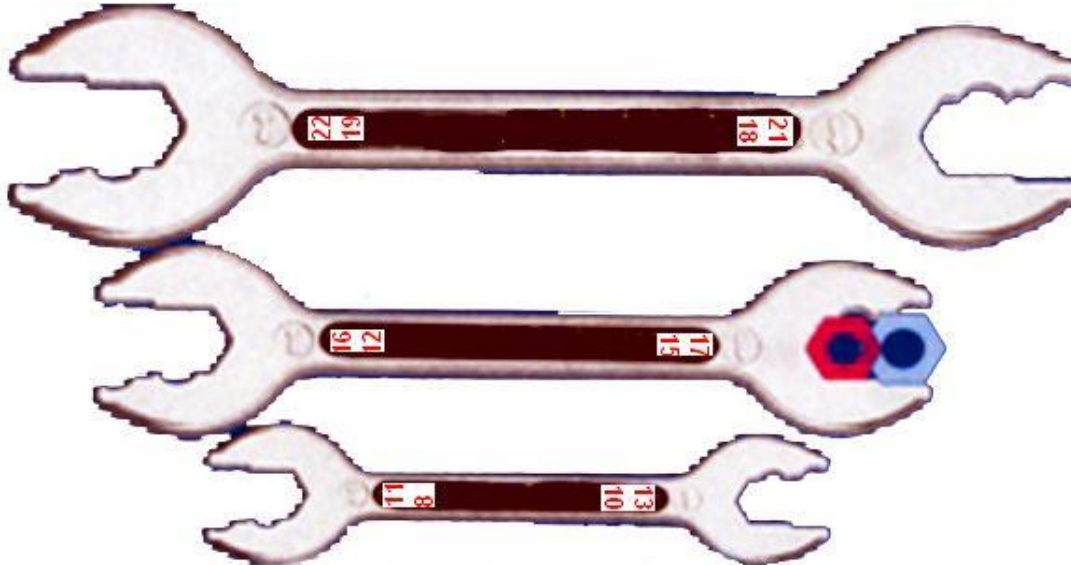


3.7 RATCHE WRENCH-RATCHET TYPE SPANNER

Description: Ratchet wrench- ratchet type spanner (12 sizes of MM & 5 sizes of SAE in three wrenches). The three spanners cover 12 sizes in MM – 8,10,11,12,13,15,16,17,18,19,21,22.

Material:-Alloy steel duly hardened.

(Source of supply – M/s. A Dinisha Marketing Co.)

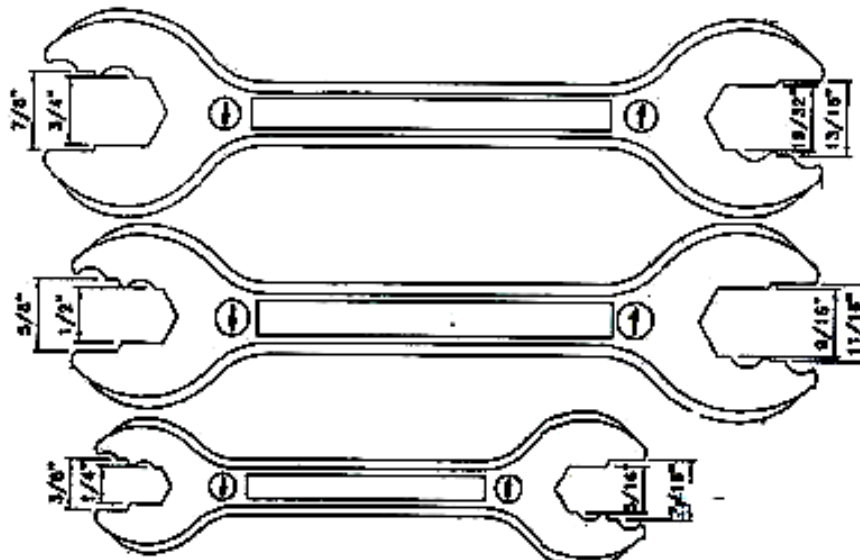


3.8 RATCHE WRENCH-RATCHET TYPE SPANNER

Description: Ratchet wrench- ratchet type spanner (12 sizes of SAE & 7 sizes of MM in three wrenches). The three spanners cover 12 sizes in MM – 8,10,11,12,13,15,16,17,18,19,21,22.

Material:-Alloy steel duly hardened

(Source of supply – M/s. A Dinisha Marketing Co.)

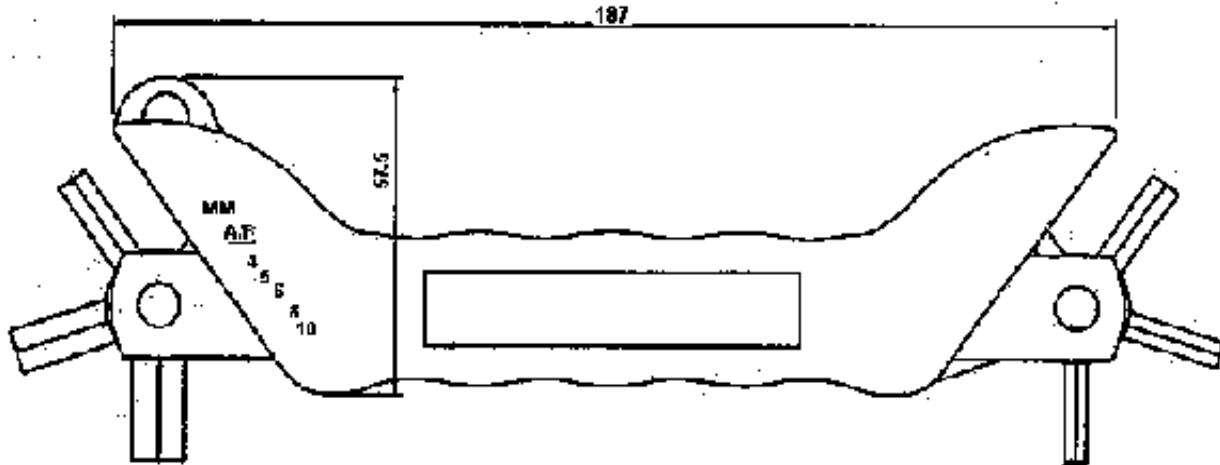


3.9 HEX KEYS

Description: Hex keys having functional A/F capacity of 4, 5, 6, 8, 10 mm

Material:- Alloy steel duly hardened keys ; nylon 6 moulded on steel strip handle and stainless steel rivet.

(Source of supply – M/s. A Dinisha Marketing Co.)



OTHER POWER TOOLS FOR COACHING STOCK

Some other power tools are also available in the open market which are pneumatic and electrically operated. These tools are considered to be useful for various applications in the coach maintenance in the workshops and open line coaching depots.

1.0 OBJECTIVE OF APPLICATION OF MODERN TOOLS

- Standardization of Tools
- Time Saving
- Ease of operation
- Reduction in ineffective (Yard/Intensive exami)
- Overall Cost effective

2.0 TYPES OF POWER TOOLS

- Pneumatic operated tools
- Battery Operated tools
- Electrically Operated Tools

3.0 ADVANTAGE OF USING POWER TOOLS

- Reduction in manpower requirement
- Time saving & improves efficiency of Manpower.
- Fatigue of artisan staff minimized.
- Results in improved work culture.
- Better quality of repairs resulting in higher reliability in operations and safety.
- Avoid damage to parts and assemblies due to non standard tools.
- Safe working for operators
- Avoid shortcut during maintenance

4.0 AREAS IDENTIFIED FOR POWER TOOL APPLICATIONS **Bogie Repair**

- Stripping & Fitment of Axle Guide, Bolster Safety brackets
- Shock Absorbers
- Fitment of pin for lever hanger on bogie frame
- Break head nut
- Centre-pivot silent block fitting in bogie bolster
- Buffer spindle nut and Buffer casing bolt assembly
- Buffer faceplate riveting.

- S.A. Over haul

Air Brake Section

- Distributor Valve
- Brake Cylinder
- Valves & Angle Cocks

Water Tank Repair

- Water tank man hole cover Opening & Closing

Trimming Section

- Chair car seats (CZ) frame studs
- Rexine stapling

Paint Shop

- Removal of old paint and Putty rub down
- Airless spray painting

Body Repair & Furnishing

- Decolam panel fitting
- Removal and fitment of coach fittings
- Grinding of body panel
- Removal of excess weld deposit/Slag
- Removal & Fitment of berths

Wheel assembly

- Stripping and fitment of axle box bolts
- Stripping and fitment of end locking bolts of Axle

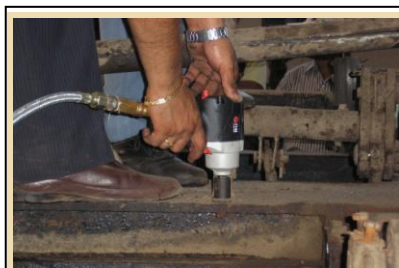
5.0 POWERS TOOLS REQUIRED FOR VARIOUS ACTIVITIES**Bogie Repair**

- Impact Wrenches for M12, M20, M24 Bolts (Model CP726H, CP749, CP772H or similar).



- Deep Impact Sockets are required due to long length bolts
- Time required to dismantle complete bogie frame
- reduces from 120 minutes to 30 minutes
- 50% reduction in manpower





Recommended Tightening Torque Std Bolt Grade ISO 8.8

TIGHTENING TORQUE (N·m)

This table shows the recommended tightening torque for common bolt size M2 to M48.

This table shows the recommended tightening torque for common bolt size and grade.															
Bolt Size		Bolt Grade						Bolt Size	Bolt Grade						
mm		3.0	4.6	4.8	5.8	8.8	10.9	12.9	mm		4.6	4.8	5.8	8.8	10.9
M2		0.10	0.13	0.17	0.22	0.35	0.49	0.58	M18		103	121	172	275	386
M3		0.35	0.46	0.61	0.77	1.20	1.70	2.10	M20		144	170	240	385	541
M4		0.81	1.10	1.40	1.80	2.90	4.00	4.90	M22		194	230	324	518	728
M5		0.60	2.20	2.95	3.60	5.70	8.10	9.70	M24		249	295	416	665	935
M6		2.80	3.70	4.90	6.10	9.80	14.0	17.0	M27		360	435	600	961	1350
M8			8.9	10.5	15	24	33	40	M30		492	590	819	1310	1840
M10			17	21	29	47	65	79	M36		855	1030	1420	2280	3210
M12			30	36	51	81	114	136	M42		1360		2270	3640	5110
M14			48	58	80	128	181	217	M45		1690		2820	4510	6340

Buffer assembly

- Impact wrench to suit M 39 & M 24 bolts.(Model RP9597 of CP Or similar)
- Time & Effort required for tightening & opening of buffer spindle nut reduces drastically

Buffer Faceplate Riveting

- Power riveters (CP 4689 PUGAR or similar with Work stand & fixturisation)

Shock Absorber Overhaul

- Impact wrench to suit M 28 & M 42 bolts.(Model CP 0614 PALED or similar)

Buffer Faceplate Riveting

- Power riveters (CP 4689 PUGAR or similar with Work stand & fixturation)

Shock Absorber Overhaul

- Impact wrench to suit M 28 & M 42 bolts.(Model CP 0614 PALED or similar)

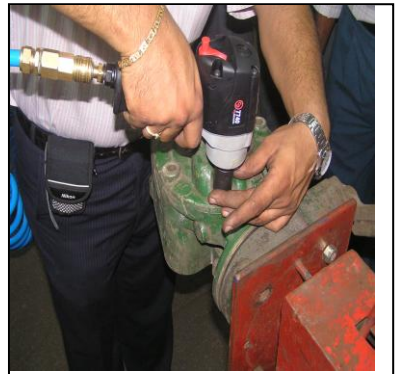
Distributor Valve & Brake Cylinder over hauling

- Impact wrench to suit M-50, 36, 32, 27, 24, 22, 19, 18, 17, 16.(Model CP772 H & CP 749 or similar)



- Time required to disassemble reduces from 90 minutes to 20 minutes with power tools per DV.

- Time required for assembling reduces from 120 minutes to 30 minutes with power tools per DV



Water tank man hole cover Opening & refitment

- Impact wrench to suit M 12 Bolts
(Model CP 726H or Makita 6918
Battery Impact
Wrench or similar)



Trimming Section Chair car seats (CZ) Stripping and Fitment

- Impact wrench to suit M 12 (Model CP 726H or Makita 6918 Battery Impact Wrench or similar)



Paint Shop Painting of coaches

- Airless paint sprayer
- Reduces Coach painting time considerably
- Improved finish
- Higher paint transfer rate means less paint wastage

Putty Rub down and old paint removal

- Random Orbital sanders with Self vacuum dust extraction for putty rub down (Model CP SC-3-14 or similar)
- Right Angle Sander for old paint removal (Model CP 869S or similar)
- Very fast compare to manual rubdown by sand paper
- Pollution free & minimizes occupational hazards

**Body Repair****Decolam panel fitting**

- Pneumatic Drilling machine (10mm) (CP 785 or similar)
- Cordless drilling machine with rechargeable batteries (6280DWPE of Makita or similar)
- Pneumatic Screwdriver (RP 2015 of CP or similar)
- Cordless Screw driver with in built LED Light (TD090DWE Makita or similar)

Grinding of body panel

- 125 mm Angle grinder (RP9121 of CP or similar)
- 25 mm straight grinder (CP-3050-N8000 or similar)

Removal of slag

- Power chipping Hammer (CP 455L Weldflux Chipper or similar)

Removal & fitment of berth

- Power Impact Wrench (Makita 6918 Battery Impact Wrench or similar)



Impact Wrench (Cordless)

DRILL CORDLESS AND DRILL KIT



Wheel Assembly

Stripping and fitment of axle box bolts and End locking bolts of Axle

- Impact wrench to suit M 16 & M 20 Bolts.similar)
- Electronic Tightening System for End cap bolts with accuracy of $\pm 3\%$



Electronic Tightening System for End Cap Bolts



Facilities required for pneumatic Power tool

- Good quality pneumatic pipe line with filter, regulator and lubricating unit with 6Kg/cm² of pressure & correct air flow.
- Training of staff
- Regular maintenance
- Lockers at shop floor for safe storage of tools



Approx. Cost of various power tools:

Item	Approx. Cost (in INR)
Hi Speed Pistol Sander	9,000
Electric Angle Grinder, 1050Watts	10,000
10mm Drill Machine	10,000
Weld flux Chipper	12,000
25mm Straight Grinder	12,000
Battery Drill 10mm	14,000
125mm Angle Grinder	15,000
Impact Wrench ½" Sq Dr	16,000
Needle Scaler	17,000
Impact Wrench ½" Sq Dr	20,000
Battery Screwdriver with in built LED light	21,000
PUGAR – Hot Riveter	31,000
Pistol Screwdriver – Shutoff type	33,000

APPENDIX-A

Safety Rules For Hand Tools

1. Always use the right size and type of tool for the job being done. Keep tools in proper working condition. Never alter a tool from its original condition.
2. Always wear safety goggles when using punches, chisels, hammers and cutting tools.
3. Never use a tool as a hammer unless manufactured for that purpose.
4. Never use a pipe extension to increase the leverage of any wrench.
5. Adjustable wrenches should be tightly adjusted to the nut and pulled so that the force is on the side of the fixed jaw.
6. Never use a pipe wrench to bend, raise or lift a pipe.
7. Ratchet mechanisms should be cleaned and lubricated periodically with light grade oil.
8. Keep hammer heads tight on the handle. Never use a hammer with a loose or damaged handle.
9. Metal cutting chisels are intended for cutting, shaping and removing metal softer than the cutting edge itself.
10. Always strike the struck base of a Chisel or punch. The striking face of the hammer should have a dia. approximately 10 mm larger than the struck face of the punch or Chisel.
11. Never use screw drivers with rounded tips.
12. Never use a screwdriver as a Chisel, punch, scraper or pry bar. Use screw driver for screw driving only.

List of Source of supply:

1. M/s SNAP-ON Tools Pvt. Ltd.
6/2, Begwmpur, Khatola
Behind TOYOTA, show room
NH-8, Delhi-Jaipur, Gurgaon
PIN- 122004

2. M/s Taparia Tools Ltd.
423/424, A-2, Shah & Nahar
Lower Parel (West)
Mumbai-400013
Web-site : <http://www.tapariatools.com>

3. M/s Mekaster Tools Ltd.
10168, East Park Road (K.C.P.)
Karol Bagh, New Delhi-110005

4. M/s Jhalani Tools (India) Ltd.
Gedore House
51-52, Nehru Place
New Delhi-110019

- 5 M/s BOSCH
Motor Industries Co.Ltd., Power tool division,
Hosur Road, Aduvodi
Bangalore-560030

- 6 Shree Ganesh Fibre Glass Co. (for safety helmet)
New Delhi-34

7. Chicago Pneumatic Sales (for pneumatic tools)
Chemtex house, Hiranandani Gardens
Powai, Mumbai-400076
Website: www.cp.com

8. M/s Hindustan Everest Tools Ltd.
Dohil Chambers, 46 Nehru Place
New Delhi-110019
Web-site : <http://www.eversttools.com>



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