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SYLLABUS FOR

MOTOR VEHICLE BODY BUILDER

Under

APPRENTICESHIP TRAINING SCHEME

As approved by
GOVERNMENT OF INDIA

In consultation with
CENTRAL APPRENTICESHIP COUNCIL



Issued by
GOVERNMENT OF INDIA
Ministry of Labour & Rehabilitation
DIRECTORATE GENERAL OF EMPLOYMENT & TRAINING
SHRAM SHAKTI BHAWAN, NEW DELHI-110001

LIST OF TRADE COMMITTEE MEMBERS FOR THE
SYLLABUS OF MOTOR VEHICLE BODY BUILDER
(APPRENTICES) UNDER NATIONAL APPRENTICE-
SHIP TRAINING SCHEME

MEMBERS :
(S/Shri.)

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|----|---|--|
| 1. | T. Sethuraman,
Dy. Manager (Personnel). | M/s Cholan Roadways
Corporation Limited,
<u>Kumbakonam-612001.</u> |
| 2. | M. Gurusamy,
Assistant Manager. | -do- |
| 3. | J. M. Bhagyanath
Mohandoss,
Works Manager. | M/s Sri Rama Vilas Ser-
vice Ltd. ,
<u>Kumbakonam-612001.</u> |
| 4. | V. Srinivasan,
Special Officer Curri-
culam Development Cell. | Directorate of Employ-
ment and Training,
Govt. of Tamil Nadu
<u>Madras-5.</u> |
| 5. | A. K. Viswanathan,
Apprenticeship Training
Officer. | M/s Standard Motor Pro-
ducts of India Limited,
134- Anna Road,
<u>Madras-600002.</u> |
| 6. | M. Sundaram,
Assistant Production
Manager (Coach Div). | M/s Sundaram Industries
Limited,
211, South Veli Street,
<u>Madurai-625001.</u> |

SECRETARY :

Shri V. M. Raghavan,
Regional Director.

Regional Directorate of
Apprenticeship Training,
Guindy,
Madras-32.

INVITEES :

- | | | |
|----|---|------|
| 1. | S. Kunjithapadam,
Dy. Director of Trg. | -do- |
| 2. | V. V. Narayanan,
Training Officer | -do- |

GENERAL INFORMATION

1. Name of the Trade : Motor Vehicle Body Builder
2. N. C. O. Code No. : 815. 10
3. Duration of Apprenticeship Training : Two years including one year Basic Training.
4. Entry Qualification : Passed 10th class examination under 10+2 system of education or its equivalent.
5. Rebate for Ex-Craftsmen trainees. : One year (Blacksmithy, Sheet metal).
6. Ratio of Apprentices to worker. : 1 : 7

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SYLLABUS FOR THE TRADE OF
MOTOR VEHICLE BODY BUILDER

UNDER
APPRENTICESHIP TRAINING SCHEME

Period of Trg. : 2 Years

PRACTICAL TRAINING 2 YEARS :

Trade : Motor Vehicle Body Builder (Apprentices)

Total Period of Training .. 2 Years.

Basic Training .. 1 Year

Shop Floor Training .. 1 Year

Entrance Qualification :

The Ex-ITI trainees of the trade of Blacksmith and Sheet metal worker can join the 2nd year of this trade. The syllabus for this trade is to be considered as a guide for imparting Apprenticeship Training according to the facilities available in the industry.

Note :

All freshers should undergo one year Basic Training followed by one year training on the Shop Floor. During Basic Training operations/skills to be taught to the apprentices are indicated under the heading 'Basic Training'. The remaining operations/skills given in the list the apprentices should have more practice on those operations/skills which have been already learnt during 'Basic Training.'

2. The operations/skills indicated under the heading 'Basic Training' would also be taught to the trainees in I. T. Is. in the trade of Blacksmith and Sheet Metal Worker. The ex-ITI trainees who would be engaged for the remaining period of one year apprenticeship training learn the operations/skills as indicated under the Shop Floor Training.

Sl. No. List of operations/skill to be learnt during Apprenticeship

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Basic Training : 1 Year

1. Safety Precautions to be observed in the Shop Floor.

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2. Use of common hand tools used in the shop floor such as hammer, chisel, hacksaw, steel rule, dividers, calipers, punches, shears, blow lamp, protractor, vernier, centre punch and scriber.
3. Marking out from Engineering Drawing in mm.
4. Simple fitting operations such as chipping, filing, hacksawing, drilling.
5. Cutting threads with taps and dies.
6. Fine finishing operations such as reaming, scraping, and grinding.
7. Lighting and maintenance of forge.
8. Simple forging operations such as hammering square round, flat, hexagon, octogen, tapered sections and jumping.
9. Hand forging operations such as cold and hot bending spreading, upsetting, drawing, shouldering, punching, drifting, forge welding and shrinking.
10. Grinding of forged articles and hand tools.
11. Simple heat treatment operations such as hardening, tempering, normalising, annealing, case hardening, recambering process of leaf springs.
12. Riveting and riveted joints (hot and cold).
13. Simple welding (Gas & Electric) including brazing of tipped tools. Use of 'Spot Welding Equipment' in Sheet Metal.
14. Marking out end cutting of sheet metal to size.
15. Marking out and making Sheet Metal standard joints using standard tools.
16. Soldering, tinning and brazing and simple Sheet metal operations such as bending, rolling, shaping, flanging, edging, hollowing, reinforcement of sheet metal components.
17. Allied forming and cutting operations such as folding flaring and tapering.
18. Annealing of copper, cutting, bending, flaring and soldering of copper tubing.
19. Use of ferrous and non-ferrous sheet metal in making simple articles.
20. Use of hand operated machines such as guillotine grooving machine folding machine, turning up and wiring

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machine, heading machine, circle cutting machine, pillar drill, nobbling machine and channel angles, flat cutting machine.

Note :

Tools & Equipment required for basic training (1 year training) will be the same as given in ITI syllabus of Blacksmith & Sheet Metal Trade).

SHOP TRAINING - 2ND YEAR :

1. Instructions in Safety Precautions on the Shop Floor.
2. Practice in use of machines utilised in Motor Vehicle Body Building work such as power hacksaw, folding machine, shearing, punching and notching machines, pipe bending machines.
3. Cutting and shearing runner angles, flats and channels to required dimensions.
4. Straightening runner angles flats and channels both by hand and by machine.
5. Making and fixing main platform on chassis.
6. Bending body angles, midgard angles, wheel arch angles.
7. Assembling of body angles and front and rear structure on main frame and welding.
8. Cutting and providing gussets on joints and corners and reinforcing weak areas.
9. Making and fitting sub-assemblies like foot steps, battery box, luggage carrier brackets, ladder, diesel tank brackets front and rear structure.
10. Marking and drilling angles, flats, channels and pipes at various stages.
11. Making jigs and fixture for items like :-
 - (a) Handles,
 - (b) Passenger seat frames
 - (c) Centre posts,
 - (d) Front and rear structure for different types of bodies.
 - (e) Ladder,
 - (f) Wheel arch,
 - (g) Body arch angle.

Pipe bending of seat frames, various handles, partitions and ladder frames.

Balancing entire body structure.

Making fixing and aligning driver door, emergency door and other doors with hinges.

Making and fixing drivers cabin frame and partition.

Marking and cutting sheets to dimensions.

Forming shapes at corners.

Marking and cutting templates.

Cutting, pressing, bending and forming panels for right/left side, rear, front and roof panels and bumper.

Bending door frames and panelling.

Forming of glass frames, front cowl, grill work, side board frames, inner sideguard and hanging mudguards.

Fixing ornamental and ordinary headings and aluminium extrusions.

Making curtain box frames and locking arrangements for small doors and tool boxes.

Panelling sheets on wooden structure.

Final fittings of seats, formica sheets, hand rests, glasses, fan and water carrier brackets and other accessories.

Grinding of tools including drills.

Gas cutting of sheets.

Use of power operated machines such as pneumatic drilling, rivetting and tightening and power hammer.

Use of press tools.

Setting machines for production work.

Leaf spring setting.

operations/skill marked (a) are desirable. This may be carried out where facilities are available in the establishments.

SYLLABUS FOR RELATED INSTRUCTIONS

Related Instruction should be imparted to all apprentices during the entire period of training including Basic Training. The syllabus given for Related Instruction should be considered as a guide.

The subjects to be taught in Related Instructions are :-

1. Trade Theory,
2. Workshop Calculation and Science,
3. Engineering Drawing,
4. Social Studies,

Note :

The contents of the syllabus for apprentice during first and second year training is given below :

Trade Theory :

1. Safety precautions to be observed while working on the Shop Floor.
2. Description and used of common hand tools, such as hacksaw, hammers, chisels, brass rule, calipers gauges, templates, pullers, swages, drifts & files.
3. Description and use of drills taps, dies, reamers, scrapers and grinding wheels.
4. Simple forging operations such as jumping, bending, upsetting drawing, shouldering, punching, drifting and shrinking.
5. Brief description and use of different types of rivets and riveted joints.
6. Constructional details and use of different types of forges and furnaces.
7. Brief description of welding equipment (Gas & Electric) and the processes of welding.
8. Use of reference tables and hand books.
9. Heat treatment of metals different processes and their advantages meaning of hardening, tempering, normalising, annealing and case hardening.
10. Sheet metal workers' hand tools their description and use.

11. Soldering and brazing of metals. Types of solder and fluxes purposes and use of fluxes.
12. Types of sheet metal joints and their uses. Method of strengthening edges and types of edges such as wire edge, folded edge, angle iron edge, split pipe edges. Allowances for various seams.
13. Different types of sheets used in Body Building Protective coats of sheet metal galvanising, anodizing, tinning painting.
14. Description and uses of non-ferrous metals. Copper, aluminium, brass, zinc, lead, tin, muntzmetal bread principles of manufacturing the above metals.
15. Brief outline of the development of Modern Motor Vehicle Body from Horse drawn carriage, names of parts and fittings in common use description of full range of present day type of body.
16. Outline of the development of the construction of composite and all metal bodies description and advantages of using castings and sheet metal for certain components reinforcement of all metal body building, connecting frame members by welding and rivetting use of light alloys to save weights.
17. Properties and use of steel, aluminium, aluminium alloys and their composition.

2nd Year :

18. Brief description of previous years' lesson contents.
19. Description and use of special tools, used in the motor vehicle body building work, such as panel pliers, back bill snips, metal shears, off set screw drivers, door handle tools, dolly block of different types, body panel spon, body file holder, bumping hammer, scumming hammer, pneumatic denting and rivetting attachments, sanding machine, blow lamp, air compressor, air line machine oil and spray guns, different types of trim fasteners and retainers.
20. Methods of forming simple parts by hand work and by mechanical presses tools and equipment and fittings used in this process.
21. Methods of mounting body on the frame rigid and flexible.
22. Techniques in pressing steel body panels, doors, windows, quarter panel mounting clearances to be given relation between their mounting and clearances given to doors.

23. Various methods of finishing and fixing metal panels to body frame work.
24. Special steels used for pressing of steel in body work and alloys for die casting.
25. Adhesives used in Motor Vehicle Body Building sealing compound synthetic glue and cements for body joints and trim assembly.
26. Use of leather, cloth, carpet, linoleum and glass panels, qualities and grades in common use.
27. Provision of clamps and piping for concealed wiring for wiring harness for interior lamps, lamp switches, lighter/heater fans, radio, air conditioner and power operated units.
28. Brief description arrangement and types of seat frame and back rests, handles, partitions, grill assembly rails, inner grab, inside luggage rack ladders, foot board use of rubber materials where required.
29. Repairing of damaged fenders, doors, and frames checking frame alignment, body measurements door alignment, side and rear end repairs sealing against dust and water.
30. Motor vehicles act and rules made under the Act as applicable to Motor Vehicle Body Construction such as overhang, total height, length and width, layout of seating arrangements, emergency exits, door arrangements, safety of passengers.
31. Estimation of materials used for construction of motor vehicle body, cost of construction and weight on the body.

(2) Workshop Calculation and Science (1st and IIInd Year)

1. Elementary calculation of addition, subtraction, multiplication, and division of whole numbers, fractions and decimal fraction and its application to Shop Floor problems.
2. Algebra algebraic symbols, addition, subtraction, multiplication and division of expressions involving algebraic symbols, simple equations and transposition problems - standard algebraic formulae e.g. $(A+B)^2$, $(A-B)^2$ simple simultaneous equations with two unknown quantities.
3. Applied problems on mensuration, work, power, energy and efficiency.