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भारत सरकार
रेल मंत्रालय
GOVERNMENT OF INDIA
MINISTRY OF RAILWAYS

Technical Specification
for
Under Water Cutting Equipment

SPECIFICATION No.-MP – 0.08.00.63 (Rev-01)
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Issued by
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LUCKNOW – 226 011

Price Rs. 1060/-

Technical Specification of Underwater Cutting Equipment

1. General:

- 1.1 The equipment shall be capable of performing efficiently, quickly and with ease, various operations such as cutting of screw couplings, side buffers, window bars, window frame channels, body panel sheet (corten steel sheet), roof sections as well as berth supports, pillars between windows and various body sections of coaches submerged under water. It shall be also capable of cutting through different components like Centre Buffer Coupler, other sections of locomotives and wagons, petrol tanks submerged in water. It shall also be capable of cutting through, efficiently, quickly and with ease, different layers of steel plate, rail pieces etc. submerged under water. The equipment shall also be able to cut the above-mentioned items above water.
 - 1.1.1 This equipment shall be easy to use and work on the cutting torch principle using simple/economic/safe fuels like gasoline and oxygen.
- 1.2 The equipment shall be capable for facilitating rescue operation without causing any additional injury to entrapped passengers likely to result from burns etc.
- 1.3 The coach body sections are fabricated out of mild steel/corten steel sheets up to 5 mm thickness, stainless steel sheets up to 3 mm thickness & round bars up to 13 mm diameter having a tensile strength up to 55 kg / mm². Drawing No. ICF/SK-9-0-300 showing various sections of standard coach body is placed at Annexure-I. For other dimensional details of the BG/MG Coaches, the following drawings may be referred.
 - a) CSC - 1668 for layout of BG day coach. (Annexure – II).
 - b) CSC - 1650 for layout of MG day coach. (Annexure – III).
- 1.4 The tenderer shall clearly explain the methodology and procedure to be adopted for cutting the railway stock submerged in water at depths starting from one foot to the maximum depth upto, which these equipment are capable of cutting. Requirement of special personnel or attachment, if any, shall be clearly brought out.
- 1.5 The equipment shall be highly reliable, of robust design & construction and shall be easily portable. It shall be capable of manual handling during movement from one place to another on rough terrain.
- 1.6 The equipment shall be of lightweight construction and ergonomically designed for ease of handling and operation by single man.
- 1.7 The tenderer will submit quality assurance plan (QAP) being followed at the manufacturer's works for ensuring quality of the product offered along with the offer.
- 1.8 A brief description of the working of each equipment with diagram as well as technical parameters shall be submitted along with the offer.

2. Scope of Supply:

2.1 The equipment shall be of proven design and should have been in use by the railways/ automobile sector/navy etc. for cutting operations under water. One set of under-water cutting equipment shall consist of the following minimum items:

- a) Cutting Torch with 2 Nos. of cutting tips
- b) Constant pressure fuel tank
- c) Shroud Assembly
- d) Igniter
- e) Air carry tank
- f) Oxygen flash back arrestor
- g) Oxygen hose: 15 m (50 feet) long of 5/16" ID single braided
- h) Gasoline hose: 15 m (50 feet) long of 1/4" ID double braided

2.2 The scope of supply shall also cover the spare parts kit for two years maintenance.

- a) Mixer with wick & O-rings
- b) Pre-heat oxygen valve
- c) High pressure oxygen valve
- d) External O-ring for high pressure oxygen valve
- e) Internal O-ring for high pressure oxygen valve
- f) Installation tool for internal O-ring
- g) Lever nut
- h) Lever screw
- i) 2 metre wicks
- j) 1 set of O-rings for mixer
- k) Filler cap for gasket
- l) Leather pump cup
- m) Flat seal for pump check valve
- n) Extra flint for spark

2.3 The scope of supply shall also cover the Tool kit for quick working:

- a) Tip shell reamer
- b) Tip brush
- c) Jack screw
- d) Packing nut wrench
- e) Hex. Allen wrench
- f) Tip drill set

2.4 The supply shall include all the items as given at Clause 2.1, 2.2 & 2.3 and any other accessory/equipment which in the opinion of the tenderer can contribute to better performance/rescue operation. These shall be quoted separately.

2.5 Optional Item:

In order to enable the equipment to be used under water to a greater depth, i.e. below 1.5 m (5 feet), where it may not be possible to be cut while standing

because of buoyancy, the following additional equipment may be quoted separately –

- a) Diving suit
- b) Buoyancy compensator device
- c) Visual mask
- d) Snorkel
- e) Regulator
- f) Fins
- g) Weight belt

The tender shall explain the utility of each item and also propose any other item which he feels is required for fully utilization of the cutting equipment under water.

3. **Basic Design Features:**

- 3.1 **Constant pressure fuel tank:** This will be light weight (5-6 kg), of about 9.5 litre capacity, made out of steel and built to the specifications of pressure vessel. Working pressure will be approx. 7 kg/cm². The tank shall have filler cap and pressure relief valve set to 7 kg/cm².
- 3.2 **Cutting Torch:** This shall be specially designed for under-water cutting and made out of heavy duty forgings with no back flash arrangement. It shall be light weight (about 2 kg), about 50 cm in length and capable of being operated with one hand control. The hand wheels are to be located far apart for easy identification during under-water cutting operation even in zero visibility.
- 3.1 **Shroud Assembly:** This will serve as an igniter and will be a part of cutting torch assembly. The shroud of specialized material to withstand high temperature will be made of three parts. This shall keep the tip warm enough to evaporate and utilize all the gasoline fuel delivered to the cutting torch. There will be an adjustable heat sink to serve as a stand-off.
- 3.2 **Igniter:** This will be a solid-state sparker to give continuous sparking. It shall be made out of light material.
- 3.3 **Air carry tank:** This will include an automatic air pressure regulator to carry compressed air upto 7 kg/cm². It shall be made out of steel sheets and certified for 9 kg/cm² max. Its capacity shall be 20 litres and shall weigh about 8 kg.
- 3.4 **Oxygen flash back arrestor.** This will be fitted at the end of oxygen hose connected to the cylinder.
- 3.5 **Oxygen hose:** This will be tested for 14 kg/cm² with proper end fittings.
- 3.6 **Gasoline hose:** This will be provided with suitable end fittings rated for 22 kg/cm² with quick disconnect coupling.

4. **Safety Features:**

Safety features available shall be explained in the offer.

5. **Marking:**

- 5.1 The equipment shall be provided with a suitable identification plate inscribing the following:
- a) Manufacturer's Name
 - b) Type and Serial Number
 - c) Date of Manufacture

6. **Inspection of Equipment and Testing at Manufacturer's Works:**

- 6.1 Physical dimensional & weight check of each equipment/tool shall be made as agreed and approved by the purchaser.
- 6.2 The required capacity / capability of each equipment shall be checked at manufacturer's premises by the Inspecting agency nominated by the purchaser. Test scheme shall be submitted by the tenderer with the offer. Final test scheme will be as mutually agreed upon by the purchaser and the supplier.

7. **Training & Demonstration:**

- 7.1 In order to ensure optimum utilization and keep the equipment in good working order, an adequate number (say three staff from each consignee) of IR personnel shall be trained in operation and maintenance of this equipment. The contractor shall organize a centralized training for the purpose at a Carriage depot shop/Carriage POH shop for a period of **two days**. The training shall include hands-on training pertaining to operation and maintenance of the equipment.
- 7.2 The training shall include practical demonstration of the equipment on a condemned coach. Time for cutting under water shall be submitted by the tenderer for each cutting operation.
- 7.3 The purchaser shall issue a certificate after successful demonstration of the above timings by the contractor.
- 7.4 The tenderer shall clearly explain the methodology & procedure to be adopted for cutting the railway stock immersed in water at different depths starting from one feet to the maximum depth to which these equipment are capable of cutting. Requirements of any special personnel or attachment will be clearly explained. Depth to which railway personnel capable of cutting shall be clearly elaborated and explained.

8. Commissioning and Proving Test:

- 8.1 A joint check at the consignee's end shall be carried out by the successful tenderer or his agent during unpacking of the equipment in order to ascertain short shipment or transit damages, if any.
- 8.2 The contractor or his agent shall commission the equipment within 30 days from the date of intimation by the consignee regarding receipt of equipment.
- 8.3 The contractor or his agent shall demonstrate performance of the equipment after receipt at the consignee's works. The consignee shall watch the equipment performance for a period of one month before issuing final proving test certificate.

9. Technical Literature, Service Manuals and Spare parts Catalogue:

- 9.1 Detailed operating, maintenance and service manuals for the equipment along with technical literature and spare parts catalogue shall be specially prepared and at least three copies each shall be supplied free of cost per set of equipment ordered by the consignee. In addition, two copies of the above manuals & catalogue shall be dispatched to "The Director General (MP), RDSO, Lucknow – 226011".

10. Annual Maintenance Contract:

- 10.1 The tenderer shall quote separately for comprehensive Annual Maintenance contract

11. After Sales Service:

- 11.1 The contractor shall provide, at his own expense, the services of competent engineers, during commissioning as well as warranty period of the equipment.
- 11.2 The tenderer shall clearly bring out the facilities available with him or his sub-contractor for providing adequate after-sales service during warranty as well as post warranty period. The tenderer shall indicate the service organization at various places in India and the availability of trained staff, maintenance spares etc. at these places.

12. Spare Parts:

- 12.1 The supplier, along with the offer, shall furnish list of initial spares, maintenance spares as well as consumables for two years.
- 12.2 The manufacturer shall be responsible for the subsequent availability of spares to ensure continued trouble free service for entire life of the equipment.

13. Packing:

- 13.1 All the equipments shall be suitably packed to avoid damage during transit.

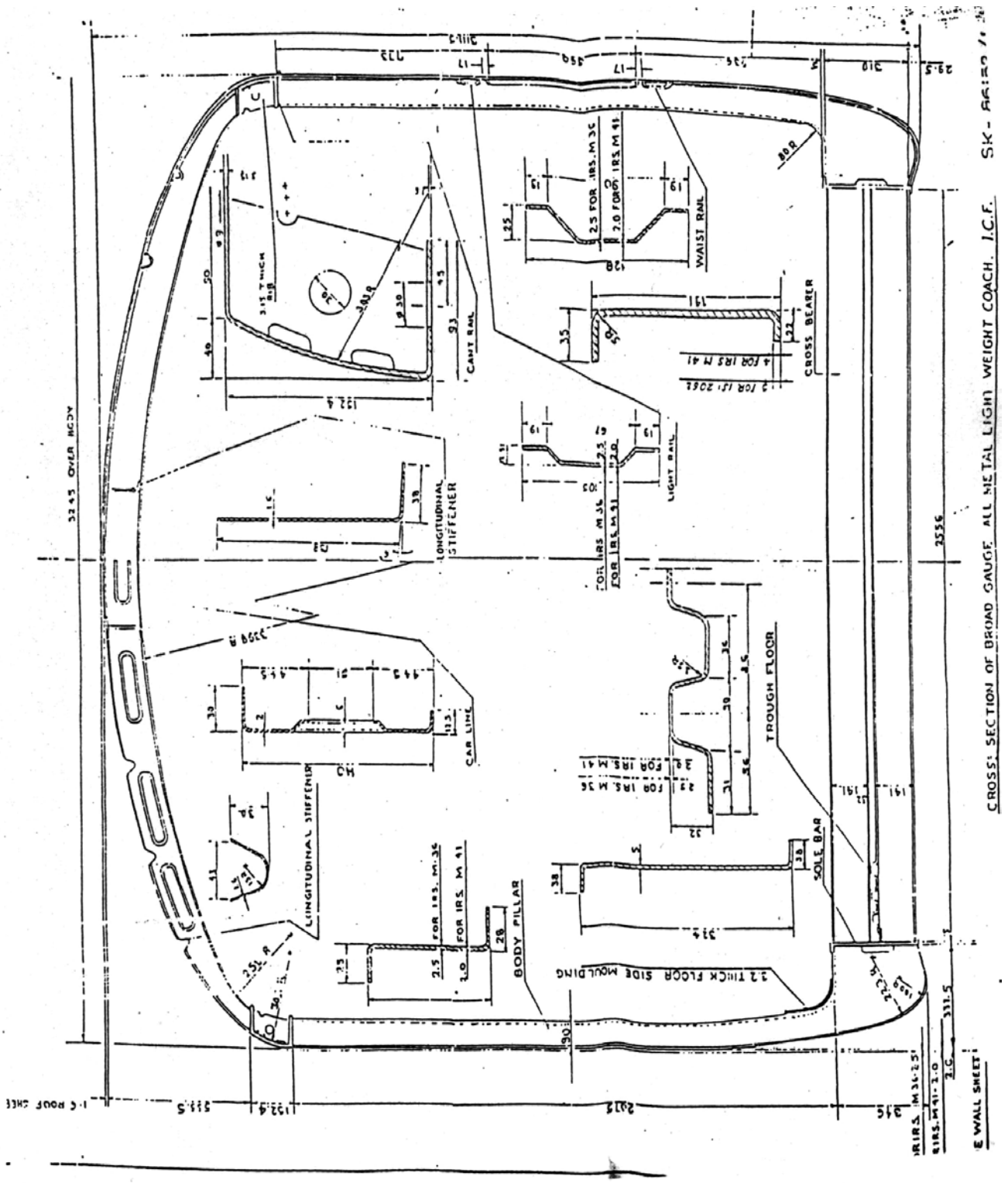
14. Warranty:

- 14.1 The equipment shall be guaranteed for satisfactory and trouble free operation for a period of 24 months from the date of commissioning. The contractor at his own expense at users premises shall replace any part of the equipment failing or proving unsatisfactory in service due to defective design, material or workmanship within 24 months from the date of commissioning. The replaced part shall again be subjected to guarantee of 24 months. The period 24 months would commence from the date the modified part is commissioned in service.

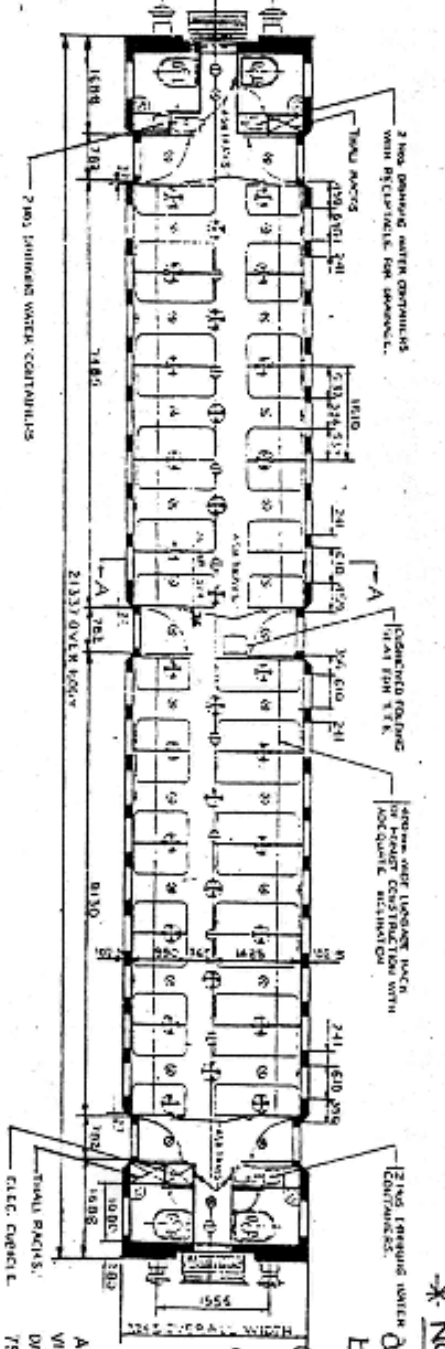
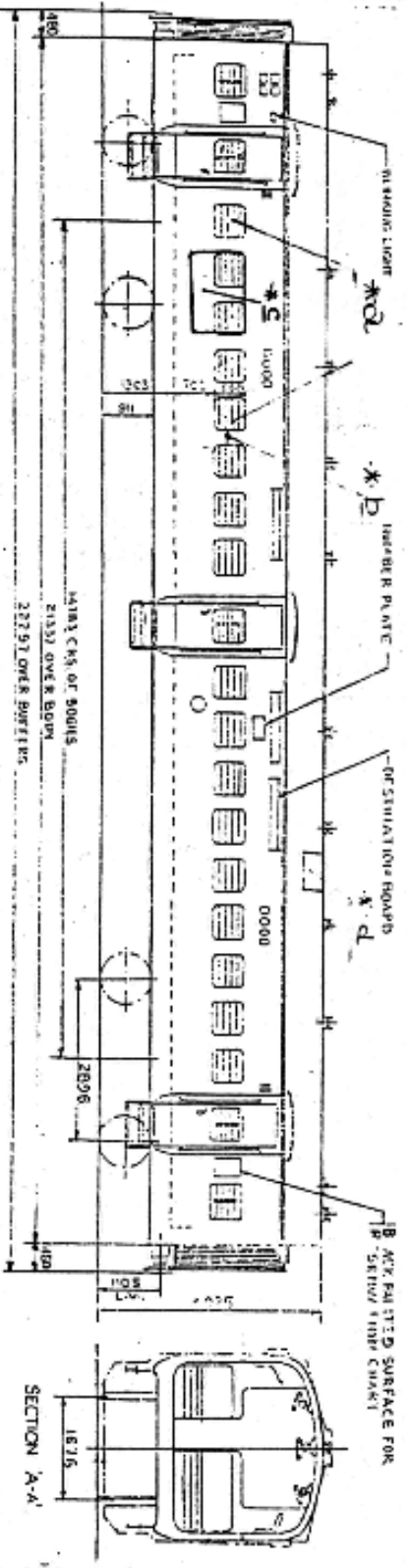
15. Reference:

- 15.1 The tenderer should provide satisfactory evidence acceptable to the purchaser to show that he is licensed manufacturer with adequate plant and manufacturing capacity and follows a Quality Assurance Programme to ensure in house control of consistent quality standards.
- 15.2 The equipment "Under water cutting" quoted should be proven and bidder should furnish a list of how many similar equipment are working in various railways or other sectors in various countries or India. The list should include information on details of order, date of supply and commissioning in last three years.
- 15.3 A minimum number of 10 Nos. of Under water cutting equipment must have been supplied by the supplier and should be working satisfactorily for two years.

In the absence of the above information, the tender is liable to rejected.



R.D.S.O. CARRIAGE DIRECTORATE		SHEET No.54
1.No. OF PASSENGERS TO SEAT-----	95	1- COACH PROFILE & MAX. MOVING DIMENSIONS TO: SKETCH NO-66064. 2- EXTERIOR MARKING TO DRG. N.J.CS-2970.
2.No. OF DOORS ASIDE-----	3	
3.No. OF LAVATORIES-----	4	
4.No. OF PASSENGERS PER DOOR-----	32	
5.No. OF PASSENGERS PER LAVATORY-----	24	



* NOTE:-

- A. TO CUT WINDOW BAR
- B. CUTTING OF PILLARS BETWEEN TWO WINDOWS.
- C. CUTTING OF WINDOW FRAME, WAIST RAIL.
- D. CUT TOP IF CAPSIZED.

DRAWN BY
CHECKED BY
APPROVED BY

LAYOUT OF SECOND CLASS DAY COACH

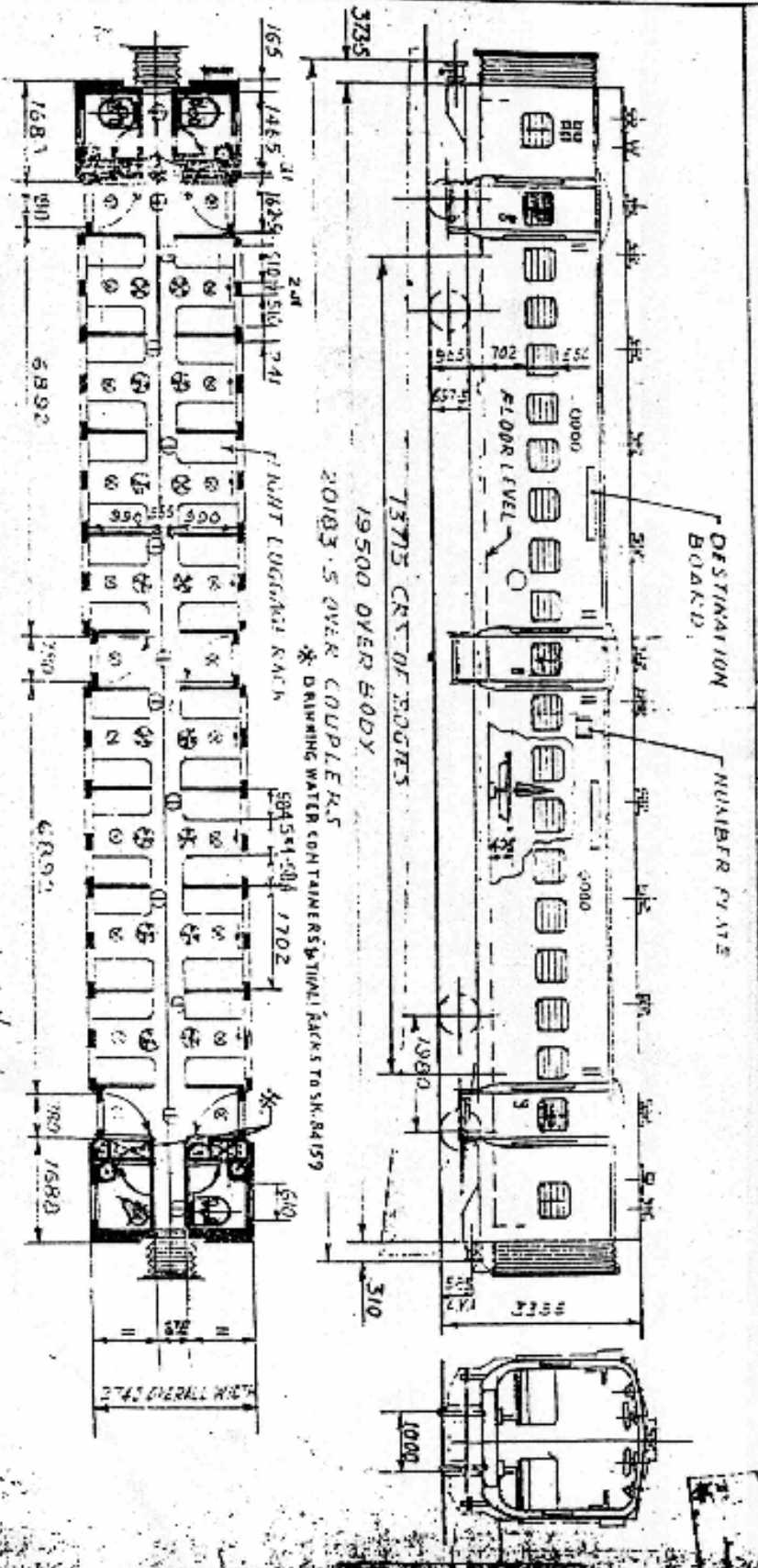
CODE
WGSCZ B.G. CSC-1668

APPROVED BY RAILWAY BOARDS
VIDE LETTER NO.85/MC/102/7
DATED-8-5-84 & 14/20-8-86 (G.M.O.
754 & 757 OF MC/CB/89)

ANNEXURE-1

1. NO. OF PASSENGERS TO SEAT - 61
2. NO. OF DOORS ASIDE - 3
3. NO. OF LAVATORIES - 4
4. NO. OF PASSENGERS PER DOOR - 15
5. NO. OF PASSENGERS PER LAVATORY - 15

NOTE:
 1. GAUGE AND WELL & MAX MOVING DIMENSIONS TO SKETCH
 2. EXTERIOR DIMENSIONS TO BE PER. M/C/EN/78-79. S.No 125.



APPROVED W/RE REV. COACH'S LETTER No 78/h/c/20/14
 DATED 21-6-1980 (R/S/O THE PER. M/C/EN/78-79. S.No 125)

DRAWN BY	83.1	LAYOUT OF SECOND CLASS DAY COACH	CODE	M.G.	CSC-1650
CHECKED BY	73.1		WGSCZ		
APPROVED BY			JESSOP	COACHES	