



St. PETER'S UNIVERSITY
St. PETER'S INSTITUTE OF HIGHER EDUCATION AND RESEARCH
(Declared under section 3 of the UGC act 1956) Avadi, Chennai-600 054, Tamilnadu, India.

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24 years
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Teaching Excellence

DEPARTMENT OF MECHANICAL ENGINEERING

ICF

Integral coach factory

Finishing work of railway, railway factory

ADDRESS

South colony ICF colony Chennai

Tamil nadu 600038

Yr: 3RD MECH

22:08:2017

REPORT ON INDUSTRIAL VISIT TO INTEGRAL COACH FACTORY

INTRODUCTION:

The students of **Mechanical Engineering 2rd, 3rd year** have undergone an industrial visit to **INTEGRAL COACH FACTORY (ICF), CHENNAI** on **22:08:2017**. A batch of **20** pupils accompanied by **1** faculty members visited the plant. The features in these plants are its purely covering the manufacturing technology which the 2rd, 3rd year students are having in their syllabus in the 3th, 4th, 5th and 6th semester. The students visited the finishing plant, Engine plant and Production Plant.

CONTENT:

In the shell we learnt more about the types of welding which is more useful and convenient and the types of metals which are commonly used in the process of building the outer part of the body of the train. In shell plant the process of tempering the soft iron into the required type for the purpose of making the wheels, chassis, platform, and the outer body parts such as the side windows, roofs, dividers of each cabin. The other part which is the grinding, cutting shaping of raw metals into the most important parts of the compartment or bogie was learnt. The sheet metal is cutter in pieces and welded to form the skeleton of the compartment. The wheels are casted into spherical shape and polished they are the fixed with the platforms and the suspension springs are fixed. Later the skeleton of the body is welded and polished the take away the excess flux in it. Inner roll cage are fixed and welded the roof are fixed. The raw compartment is taken for painting process and layer of paints and chemicals are used in order to reduce the rate of rusting.



In the furnishing plant we learnt that the compartments which were build are brought into there after the painting process is done for the interior finishing works such as fixing the floors, electrical wiring, sanitary fixing, sleeper, lights, fans, etc. the fixing process are done in one after another first the fixing of floor by screwing it with the compressed wood. After this process the dividers are fixed using the same compressed woods after this the electrical work is carried out. The roof is sealed with the sponges made of resin in order to protect from the heat. The flooring is again done with PVC ventile which is water resistant so that water won't damage the wood flooring. An aluminum plate is fixed at the entrance so that the luggage doesn't damage the floor. The lights and fans are fixed. The sleepers are too fixed and the safety gadgets are simultaneously fixed. The glass windows, shutter is too fixed. The water tanks and the sanitary parts are too fixed and the total compartment is taken for the installation of battery for the supply and the compartment is totally inspected by the senior engineers before the compartment is launched for the public usage. And finally visited the regional rail museum.

(2) RAILWAY

Railway transport is a mean of transferring of passenger and goods on wheeled vehicles running on rails, alsoknown as tracks Contrast to road transport, where vehicles run on a prepared flat surface, rail vehicles (rolling stocks) are directionally guided by tracks on which they run



(3)ENGINE

An engine or motor is a machine designed to convert one form of energy into mechanical energy. Heat engines burn a fuel to create heat, which is then used to create a force.

(4) TYPE OF RAIL ENGINE

Electrical engine

Diesel engine

(5) TYPE OF TRACK LINE

There are 2 types of track

1) Broad Gauge

a) Distance 1676 mm

■ 5 ft 6 inch

2) Narrow Gauge

b) Distance 1000 mm

-3 ft 3 3/8 inch



(6) TYPE OF COACH

There are two types of coach

- Canaveral coach
- LHB coach

- 1A- AC first tier
- 2A -AC two tier



- FC – first class
- 3A – AC three tier
- 3E – AC three tier (economy)
- EC – executive chair car
- CC- AC chair car
- SL – sleeper class
- 2s – second seated
- UR/GEN – unreserved/general

(8) TYPE OF BEATH CLASS

There are five type breath class

- LB- lower berth
- MB- middle berth
- UB –upper berth
- SLB – side lower berth
- SUB –side upper berth

(9) WHAT ARE USE OF JOING ON THE COCACH

The railway used join process is universal joining luck

(10) TRAIN WHEEL DIAMETER

1092 mm

(11) ENGINE LOAD CAPACITY

One engine load capacity is the 23-27 coach per engine

(12) COACH LIGHT IDENTIFY

The coach light identify on the put number like this L1 & L2

(13) COACH FAN IDENTIFY

The coach fan identify on the put the number like this F1 & F2

(14) WHAT ARE USE BREAK OF RAILWAY

A railway air brake is railway a break power breaking system with compressed air as cylinder air power break .it is called the railway engine break

(15) TYPE OF DIESEL ENGINE

- 6 Cylinder Engine
- 8 Cylinder Engine

- 12 Cylinder Engine
- 16 Cylinder Engine
- 20 Cylinder Engine

(A) 6 CYLINDER ENGINE



TECHNICAL INFORMATION

- | | |
|---------------------------|-------------------------|
| • <i>Installed power</i> | <i>1350 HP</i> |
| • <i>Axle load</i> | <i>21T</i> |
| • <i>Gauge</i> | <i>1676 mm</i> |
| • Wheel arrangement | co –co |
| • Wheel diameter | 1092 mm |
| • Height | 4127 mm |
| • Overall length` | 16150 mm |
| • Width | 3016 mm |
| • Weight | 126T |
| • Maximum reactive effort | 34.02T |
| • Maximum speed | 65 kmph |
| • Fuel tank capacity | 5000 liter |
| • Locomotive control | micro processor control |
| • Brake system | air break |



(B) 8 CYLINDER ENGINE

- Axle load 18800 kg
- Height 4185 mm
- Cylinder size 228 mm * 226 mm
- Input voltage 140 AC 3phase
- Normal power 1032 KWs
- Output voltage 1800 v dc
- Torque 90
- Speed 700 RPM
- Voltage 110 DC
- Maximum power 600 KPa
- Max temp 120' c

(C) 12 CYLINDER ENGINE

This indigenously developed low cast 2300 HP locomotive is equipped with 12 cylinder ALCO engine

Technical information

- Installed power 2300 HP
- Axle load 20T
- Wheel arrangement co – co
- Wheel diameter 1019 mm
- Height 4112 mm
- Width 2992 mm
- Overall length 18630 mm
- Weight 120T
- Maxi speed 100 kmph
- Fuel tank capacity 5000 liter
- Locomotive control microprocessor control

(D) 16 CYLINDER ENGINE

BG passenger tactic co-co diesel electric motive equipped with 16 cylinder 4500 HP engine with IGBT based ac truncation control system & hotel load feature

TECHNICAL INFORMATION

- Installed power 4500HP
- Axle load 20.5T
- Wheel arrangement co –co
- Wheel diameter 1092 mm
- Height 4201 mm



- Width 3200 mm
- Overall length 21244 mm
- Weight 123T
- Max reactive effort 400 KN
- Maximum speed 130 KMPH
- Fuel tank capacity 5000 liter
- Locomotive control loco computer control
- Break system computer control

(E) 20 CYLINDER ENGINE

BG freight traffic co-co diesel electric locomotive equipped with 20 cylinder 5500 HP engine with IGBT based AC-AC traction control system

TECHNICAL INFORMATION

- Installed power 5500 HP
- Axle load 22.3T
- Gauge 1676 mm
- Wheel arrangement co-co
- Wheel diameter 1092 mm
- Height 4381 mm
- Width 3170 mm
- Overall length 22260 mm
- Weight 133.8T
- Max reactive effort 56T
- Max dynamic break 27T
- Max speed 90 KMPH
- Fuel tank capacity 7500 liter
- Locomotive control EM200
- Computer loco control computer
- Break system computer control

(16) WHAT TRAIN ARE THE ACCIDENTAL RELIEF

High speed accident relief train with 3 car formation this unit is safe propelled. Which means that a locomotive is not required to move it

Hydraulic transmission (void transmission model T211R3) Under slung NTA 14R Cummins engine 430HP November 2009 a trail rake was out regular production from march 2013

RAKE FORMATION



1 st coach	2 nd coach	3 rd
Diesel power car 1	trailer car	diesel power car 2
Accident relief	accident relief	accident relief
Suspensors von	medical van	tool van
ARSV	ARMV	ARTV

(17) TYPE OF TOILET

- SIMPLE TOILET
- BIO TOILET

(A) SIMPLE TOILET

The simple toilets are the all dust is direct going track line .it is a simple toilet

(B) BIO TOILET

Bio toilet system is jointly developed by Indian railway and defense research and development orgies system is evolved to avoid direct manual scavenger for sanitation at railway platform effective capacity at consist at several internal chambers with PVC mat secured on walls and outer chamber for chlorination .each tank are changed with 100 liter of bio digester /culture provided by DRDE Gwalior bio digester /culture is an anaerobic bacteria in liquid form resembles like muddy water . Bacteria decomposes the human waste into liquid and very little amount of math one bacteria is more effective. Where the presence of water is very less

(18) ALUMINUM WATER TANK

All mainline non AC coach are having are aluminum water tank mounted over the lavatory area. The tank capacity is 455 liters and provides water for toilet /wash basins. water can be filled through side connections

(19) TYPE OF SEAT

- Sleeper class
- First ac
- AC2 tier sleeper
- 3AC 3 tier AC
- 2S Second seating
- CC AC chair car
- UN/GEN

(20) COACH LENGTH

Length 23.54 m = 23540 mm

Width 3.24m =3240 mm



(21) CHARCHING PROCESS

The double battery parallel block 24 V DC train lighting system was in vogue on the Indian railway .this transformer steps provide on the under frame along with a battery charger

(22) HOW DO SET CHARGING DYNOMO

The charging dynamo are set JIG JAG process .per coaches four dynamo are set at different type JIG JAG are set

(23) VOLTAGE SUPPLY

The dynamo are given the current are DC supply of 110 volt DC supply power are the 4.5 KW of given current .the DC voltage are convert are AC current of 110 AC supply on . Three phase supply. 3 phase in AC output supply in railway

(24) TYPE OF SUPPLY PHASE

- THREE PHASE
- TWO PHASE

(25) TYPE OF MATRIAL USE IN RAILWAY

- Steel
- Iron
- Plastic
- Tube pipe
- Wire
- Wood aluminum

(26) HOW MANY TOILET OF PER COACHES

The per coaches of toilet are 4 toilet. The coaches' end both side 2-2 toilet .coach on 2 left side and 2 right side

(27) HOW MANY BASIN OF PER COACH

They are the two basin of per coaches of coaches end side near. by toilet

(28) PANTY CARD

The panty card the like this railway canine to available the same food item

- Tea
- Coffee
- Rail nail
- Meal
- **STANDRARD BREEK FAST**



- a bread butter & cutlet
- B idly
- C upma&voda
- D pongal
- **NON VEGETRIAN BREAKFAST**
Breakage bread &omelet
- Veg biryani
- Non Vega biryani

(29) NUMBER OF SEAT OF PER COACHES

- Lower birth =18
- Side lower birth =9
- Middle birth =18
- Upper birth =18
- Side upper birth =9

TOTAL SEAT = 72

(30) HOW MANY THE WHEEL ARE THE PER COACHES

The 8 wheel the per coaches , the 4 wheel of the one place 2 wheel left & 2 wheel right same condition for next 4 wheels

(31) THE ENGINE CONTROL SYSTEM

The engine control system are computer control system both engine DIESEL & ELECTRIC engine

(32) HOW MANY DOOR OF PER COACHES

The per coaches of the door of 4 door .two door right side and two door left side . coaches end side

(33) EMERGENCY WINDOWS

The emergency windows are the available in per coaches. Number of emergency windows 4 ya 6 of per coach

(34) WHAT ARE TRAIN PULLING CHAIN

It is possible for a driver to override the alarm chain pull. This is done where it is known that mason's resort to pulling the emergency chain safely to get the train to stop of a point convenient for them.

(35) COACHES MANUFACTURING PROCESS

- STAGE 1- Preparatory
- STAGE 2 – flooring



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- STAGE 3 - wiring
- STAGE 4 – PVC pasting
- STAGE 5 – parading
- STAGE 6 – (a) parading 1
(b) parading 2
- STAGE 7 – molding
- STAGE 8 – fitting
- STAGE 9 – seat & black parts
- STAGE 10- pitting & inspection



CONCLUSION:

The students had a great exposure to the practical aspects in visiting the integral coach factory. Most of the students have fully utilized the opportunity which

Submitted by

NAME – SHALENDRA KUMAR

BRANCH MECHANICAL (3rd year)

ROLL NO. 39

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