

Machineries, Equipment Commissioning, C.N.G. Dispensing Facility and Buy-Off Sheets.

*A Project Report Submitted in Partial Fulfillment of the
Requirements for the Award of the Degree of*

BACHELOR OF SCIENCE IN PLANT OPERATION & MAINTENANCE

By

SACHIN JAISWAL
R170205021

Under the Esteemed Guidance of

Mr. Rituraj Mishra
(Dy. H.R. MANAGER,
Mahindra & Mahindra Ltd.
Haridwar

Mr. Anuj Kohli
Asst. Manager (Mfg. Engineering)
Mahindra & Mahindra Ltd.
Haridwar



COLLEGE OF ENGINEERING
UNIVERSITY OF PETROLEUM & ENERGY STUDIES,
DEHRADUN.
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Preface

Industrial Training during studies helps the students to expose themselves to the industrial environment, which cannot be simulated in the classroom. It helps students to make them aware of the rapid developments being made in the industry, as the needs of the industry are changing due to rapid change in technology, management practices, competitive quality & productivity etc U.P.E.S has really made a sincere attempt by detailing their students for industrial training.

On job training has helped me to appreciate the theoretical knowledge gained by me in the class room. It has taught me the importance of teamwork, punctuality & the sense of responsibility. It has helped me to understand the psychology of the workers, their habits, attitude & their approach to the problems.

Apart from that it has given me good exposure to the current technological developments relevant to my subject of studies.

I avail this opportunity to thank UNIVERSITY OF PETROLEUM & ENERGY STUDIES for detailing me for this industrial training, the coordinator for his guidance & the MAHINDRA & MAHINDRA Ltd. for imparting me the practical knowledge in the industrial field.

SACHIN JAISWAL



Acknowledgement

Behind every study there stands myriad of people whose help and contribution make it successful.

It has been a remarkable experience of satisfaction and pleasure for me to work out my project under the supervision of the Asst. Manager, **Mr. Anuj Kohli**. I am really thankful to him for his valuable guidance and co-operation during the project work.

I had also benefited from discussions and would also take the opportunity to thank the persons of the company for their valuable support and assistance whenever and wherever needed. A cordial and encouraging environment made it very easier for me to complete the project.

So this acknowledgement is a humble attempt to earnestly thank him and all those who were directly or indirectly involved in preparation of this project.



December 01, 2007.

To Whom It May Concern:

This is to certify that Mr. Sachin Jaiswal , S/o. Mr. Rajesh Kumar Jaiswal, B.Sc. (Plant Operation & Maintenance) of University of Petroleum and Energy Studies, Dehradun has successfully completed Vocational Training from June 01, 2007 to December 01, 2007.

He has worked on following project:

❖ ***Machineries, Equipments Commissioning, CNG Dispensing Facility and Buy Off Sheets***

Under guidance of Project guide ***Mr. Anuj Kohli, Asst. Manager – Manufacturing Engineering***

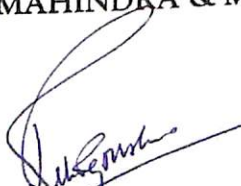
His Rating about Project ***is Excellent***

During this period we found him Sincere, Enthusiastic, & Hardworking.

We wish him all the best for his future assignments.

Thanking you,

For MAHINDRA & MAHINDRA LIMITED



RITURAJ MISHRA
DY. MANAGER – TRAINING.
HR DEPARTMENT



Declaration

This project has been undertaken during the summer break as a summer trainee, after the completion of the Fourth semester of B.Sc. (P.M.O.) under the guidance of **Mr. Anuj Kohli**. Further I would like to declare that this project is my original work and has been prepared solely for academic purpose. This project can be presented in any seminar or submitted elsewhere for the award of any degree or diploma.

Countersigned by

(*Anuj Kohli*)

Mr. Anuj Kohli

(Project guide)

SACHIN JAISWAL





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Introduction

Mahindra & Mahindra Limited

Type	Public
Founded	1945
Headquarters	
Key people	Keshub Mahindra (Chairman), Anand G.Mahindra (Vice-Chairman & Managing Director)
Industry	Automotive and Tractor
Products	Utility vehicles Commercial vehicles Tractors
Revenue	1596.90 M (2004)
Employees	11,600
Website	http://www.mahindra.com/

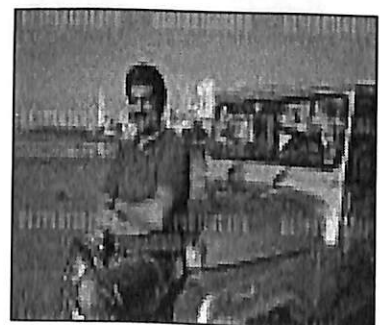


Mission Statement

“We don't have a mission statement. This is what makes us want to get up and come to work in the morning.”-----*Mr. Anand G Mahindra*

Core Values- The Thing That Drives Us...

1. Good corporate citizenship
2. Professionalism
3. Customer first
4. Quality focus
5. Dignity of the individual





Key Products And Key People Of Mahindra & Mahindra Ltd.





About The Company

The two major sectors under Mahindra & Mahindra banner are –

- **The Automotive Sector** which manufactures utility vehicles, light commercial vehicles and three wheelers
- **The Tractor (Farm Equipment) Sector** makes agricultural tractors and implements that are used in conjunction with tractors, and has also ventured into manufacturing of industrial engines

M&M employs around 11,600 people and has eight manufacturing facilities spread over 500,000 square meters. It has 49 sales offices that are supported by a network of over 780 dealers across India.

Models

- Mahindra **Bolero**
- Mahindra **Bolero Camper**
- Mahindra **Scorpio**
- Mahindra-Renault **Logan** (in cooperation with Renault)
- Mahindra-Champion and ALFA (Automotive sector, Haridwar)

Core Business Activities

- Automotive
- Farm Equipment
- Mahindra Systems and Technologies (Systech)
- Trade & Financial Service
- Information Technology
- Infrastructure Development

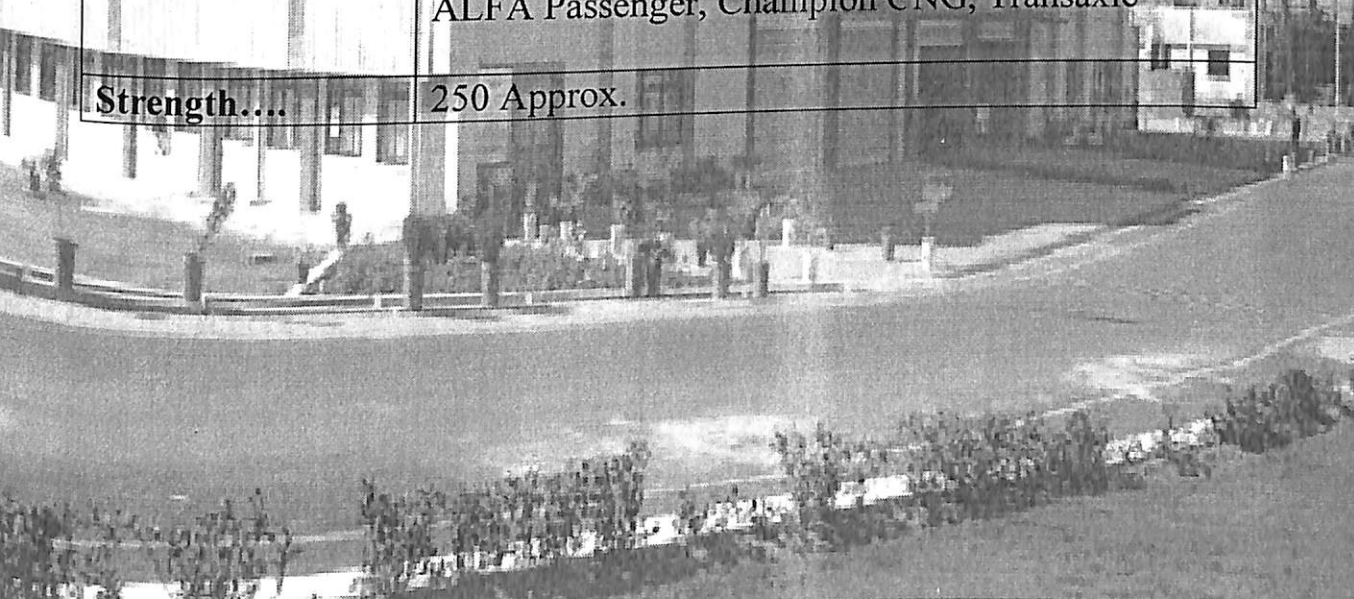
Community Initiatives

- Mahindra United World College of India
- Mahindra United, a football club based in Mumbai, Maharashtra
- Mahindra Foundation
- K. C. Mahindra Education Trust: Nanhi Kali



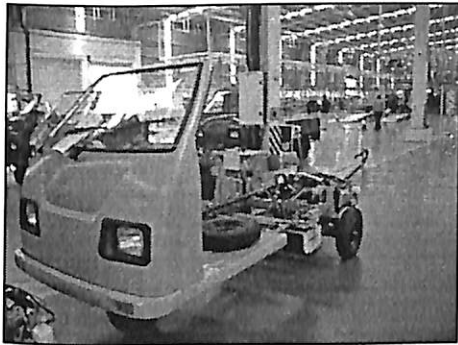
Mahindra And Mahindra Ltd. Haridwar Plant (Automotive Sector)

Location	Integrated Industrial Estate, SIDCUL
Why Haridwar?	<ul style="list-style-type: none">• 100% excise duty exemption for a period of 10 years• 100% income tax exemption for a period of 5 years• Capital income subsidy @ 15%• Significant support and emphasis to industry by Uttaranchal government.
Specialization in.	Automotive Sector
Final Products.	Champion C&C, Champion Passenger, ALFA LC, ALFA Passenger, Champion CNG, Transaxle
Strength....	250 Approx.





Finished products of Mahindra & Mahindra Ltd. Haridwar plant:



ALFA →



Champion C&C



Champion Roll Out

ALFA LC



Champion Passenger



ALFA Passenger





Plant of Mahindra & Mahindra at Haridwar manufactures various types of product.

These products are:

1. Alfa Champion (LC & Passenger)
2. Champion (LC, Passenger & C.N.G.)

Description of Champion Alfa Vehicle:

The outstanding feature of Mahindra Champion Alfa 3-Wheelers are rear engine, rear wheel drive, 4-speed constant mesh gearbox, rear wheel transmission through independent drive shafts, rear suspension with rubber spring and a sturdy leading link type front suspension.

It is powered by Greaves GL400 BS-II ENGINE & fuel is fed by feed pump. Continuous bleeding of the system is effected by feed pump and bleeding pipe. Thus smooth running is ensured by elimination of foam/air. Rope starting facility is also provided in case the battery is discharge



Technical Specification

PERFORMANCES	VALUE
Engine	Single cylinder,4 stroke diesel engine ,direct injection
Bore & Stroke	86 X 68 mm
Displacement	395 cc
Compression Ratio	18 :1
Maximum Power	5.51 KW @3600 rpm
Torque	16.7 Nm at 2200-2800 rpm
Specific Fuel Consumption	220 gms per HP per Hour
Weight Of Engine (Dry)	45 Kgs
Fuel	High speed diesel
Fuel Injection Equipment	Fuel Mico make Q type F002
Injection Pressure	250 kg / cm sqr
Sump (Engine Oil) Capacity	1.5 Liters
Clutch System	Wet Multi disc,5 plate
Cooling System	Forced air cooler
Transmission	4 Speed, constant mesh gear box
Differential	Combined with gear box
Max Speed	43 kms/hr
Fuel Tank Capacity	10.5 liter
Max. Gross Vehicle Weight	1060 kgs
Pay Load	600 kgs



Speedometer	Cable driven
Unladen Weight	460 kgs
Max Length	3015 mm
Max Width	1460 MM
Max Height	1700 mm
Wheel Base	2005 mm
Wheel Track	1260 mm
Ground Clearance	175 mm
Turning Circle Diameter	7000 mm
Max Climbing	16%
Cargo Bed Dimension	1530 X 1400 mm
Turn Signal Flasher	12 V DC 44 W
Horn	12 V DC 12.5 A
Cargo Bed Height	PICK UP: 715 mm
Chassis	Stamped and welded chassis with main central beam, cross member & two longitudinal beam
Suspension Front	Rocking arm forced to front axle
Suspension Rear	Steel sheet welded suspension arm
Brakes Service	Internally expanding self adjusting brake
Electrical System	12 V DC
Charging System	12 V 50 AH
Speedometer	Flywheel mounted alternator 14A-12V with electronic voltage regulator
Fuel Gauge	E-1/2 F indication, reserve area painted



Introduction To Manufacturing

- Arrange for the process design, process sheets/flow charts & control plans.
- Continuous quality & process improvements.
- Enable the implementation of ECNs / improvements in the components/process.
- Plan & execute any special projects assigned as required.
- Set & monitor the MOPs of the section.
- Discipline & housekeeping of the section.
- Arrange for the proper documentation / updation of the existing documents.
- Recommend the daily rated manpower deployment for all the depts. as per the Monthly Production Schedule.
- Arrange for the design & procurement of the material / storage & handling equipment for new models.
- Continuous productivity improvements like method improvements, line balancing, work content reduction, elimination of NVAs, etc.
- Preparation of Detail Process Sheets, Flow Charts & Control Plans.
- Assistance to the Vendors for establishing production & Quality whenever required.
- Procurement of the Required Tooling / Equipment Installation & Proving for the new Components/models/ECN's.
- Make Available the Detail drawings for the Tooling in Soft & Hard.
- Prepare & maintain the drawings in AutoCAD for Layouts, Material storage & Handling equipment's.
- Prepare Detailed Shop Lay-outs to suit Higher Level of Production.
- Use the Standardized Elements in the Design & Reduce Variability.

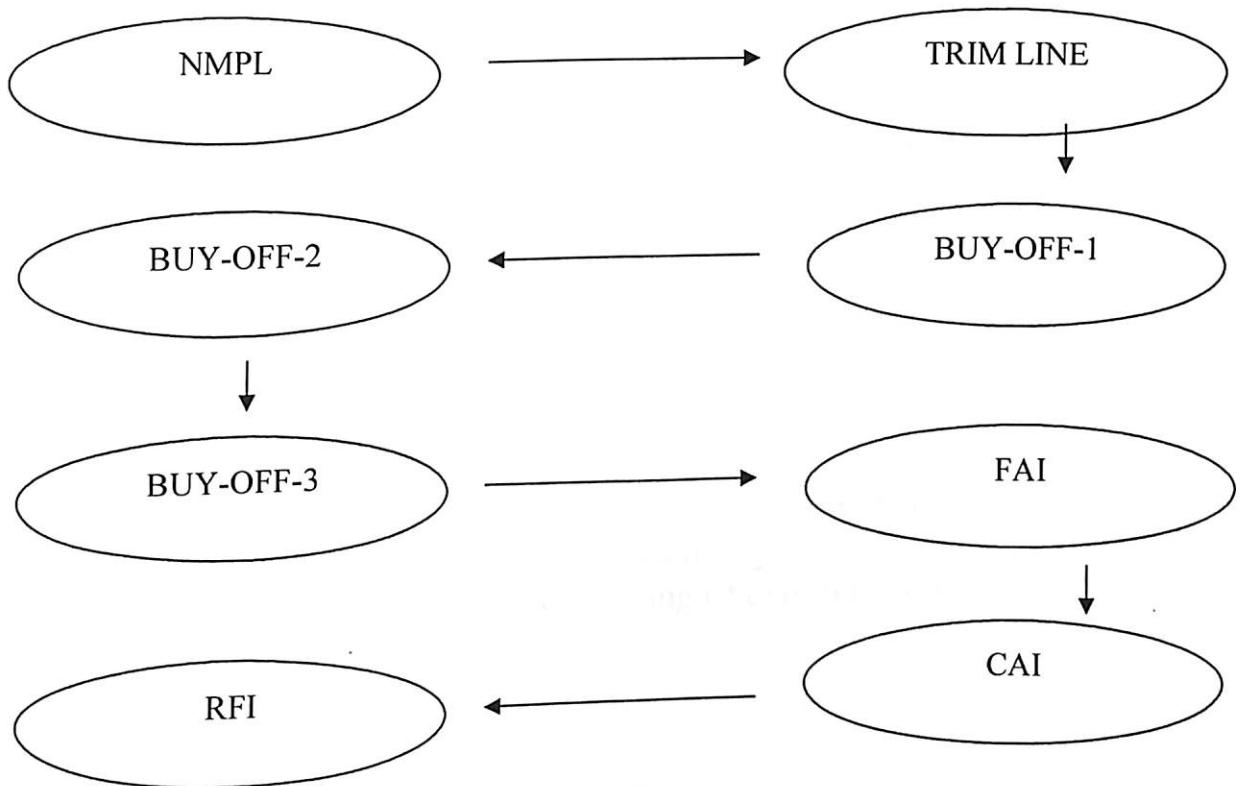


Functions Of Mfg. Department

- **Man Power Planning**
- **Productivity Calculations**
- **New Product Setting**
- **Capital Equipment Selection**
- **Expansion/Budgeting**
- **Fabrication**
- **Kaizen**
- **Advanced Product Quality Planning**
- **Dynamic Control Planning**
- **Tool Requirement/Purchasing**



Flow Chart Of Alfa Shed:





Machines Description

Given below is the description of some machines used in Alfa shed at Mahindra & Mahindra Ltd.:-

I. Automatic Conveyor

1. **Make** : - Webb India Pvt. Ltd.

2. **Specification** : -

A) 2 lifts

B) 52 carriers

C) Product Handled : - 3 wheelers

D) Weight of Body : - 1000 kg

E) Total weight of Carrier : - 800 kg

F) Carrier banking length : - 4405 mm

G) **It is pneumatic & electrical running conveyor.**

i. Motor & chain running is done by electricity.

ii. Opening & closing of hooks, tightening of clamp is done by pneumatic pressure.

H) **Speed**

i. 12 mpm for high speed conveyor.

ii. 0.4 to 2 mpm for Assy slow speed conveyor.

I) **Travel**

i. 800 mm for high speed conveyor.

ii. 2900 mm for slow speed conveyor.



4. Operation : - To carry and transfer the vehicle in the line.

5. Accessories : -

- A) Roller.
- B) Chain.
- C) Pneumatic cylinders.
- D) Carriers.
- E) Two lifts.
- F) Mono rail.
- G) Stopper (Anti run-away and Anti back-away).
- H) Buzzer.
- I) Sensor.
- J) Electric Motor



II. Twin Chain Slat Conveyor

- 1. Make** : - Vinar System Pvt. Ltd.
- 2. Specification** : -
- A) Length of Conveyor : - 61415mm
- B) Speed of Conveyor : - 0.4mpm to 2.0mpm (speed variation by frequency inverter).
- C) No. of work station : - 12.
- D) Weight/Station : - 1000kg.
- E) Material Conveyed : - Three Wheeler.
- F) Geared Motor** : -
- i. Model No. : - R107R77DV100M4-BMG/HF
- ii. Power : - 3kw/ 3phase.
- iii. Torque : - 4300Nm
- iv. Output RPM : - 3.3
- v. Make : - Sew
- vi. : -
- G) Transmission Roller Chain** : - 1.25" P [Duplex]
(With one no. of full connecting link & one no. of half connecting link).
- H) Sprocket** : - 250mm pitch x 8 teeth.
(Drive & Take up end)
- I) Conveyor Chain** : - 250mm pitch with flanged roller
- J) Lubricator** : - Air Mist type lubricator.
- 4. Operation** : - After unloading it transfer the vehicle.



5. Accessories :-

- A) Motor
- B) Panel
- C) Slat
- D) PLC (Programmable Logic Control)
- E) Contactor (For Controlling)
- F) Relay
- G) VFD (Variable Frequency Drive)
- H) MCB (Miniature Circuit Breaker)
- I) MCCB (Modulated Case Circuit Breaker)



III. Hydraulic Scissor Lift Table

1. **Make** : - M/S Webb India Pvt. Ltd.

2. **Specification** : -

Total no. of lifts : - 5

A) Capacity : - 1000kg.

B) Platform or Table size : - 1700mm x 800mm.

C) Lift Height : - **1500mm.**

D) Lowered Height : - 500mm.

E) Raised Height : - 1750mm.

F) Raising Time : - 15-62 sec.

G) Lowering Time : - 15sec.

H) Hydraulic Pressure : -

Load	Working Pressure
0kg	50Kg/cm ²
1000kg	110Kg/cm ²

I) Power : - 3hp/3phase/2.2kw/415v.

4. **Operation** : - To lift engine (2 lifts), to lift suspension arm (2 lifts) & load lift hydraulic table.

5. **Accessories** : -

A) High pressure hose assembly.

B) Velocity valve (3/8" BSP).

C) Pressure compensated control valve.

D) Oil level indicator.

E) Oil reservoir.

F) Suction strainer.

G) Breather.

H) Return line filter.



- I) C.I. coupling.
- J) Direction control valve.
- K) Relief control valve.
- L) Relief valve.
- M) Flow control valve.
- N) Pressure gauge.
- O) Lifting cylinder.
- P) Gear pump.
- Q) Motor.
- R) Non return valve (3/8" BSP).



C.N.G Gas Cylinders

High Pressure Gas Cylinders whether obtained indigenously or imported are manufactured to high standards of quantity conforming to specifications accepted by the statutory authority, tested and certified by an independent inspecting agency.

No manufacturer can take any responsibility for the subsequent life of the cylinder during course of its filling, handling, transport, use etc. Hence it is evident that the life of the cylinder is entirely in the hands of the Filler & User alike.

If properly taken care of, a cylinder can give any length of service and thus result in greater profits.

All cylinders should be examined for their complete marking at the neck end to ascertain inter-alia the specifications, Chemical symbol of the Gas service, last date of hydrostatic pressure test, and symbol of the test station. If due for test, the cylinder should be segregated. All observations should be recorded in the history card/data card of the cylinder.

Cylinders should be stored on the filling platform free of water, dirt or any other combustible material. Grease or oily matter is especially injurious in case of oxygen cylinders as it may lead to explosion.

Do not place cylinders where they might become part of an electric circuit. Where cylinders are used near or in conjunction with electric welding, precaution should be taken against accidental grounding of compressed gas cylinders and allowing them to be burnt by electric welding etc.



PROCEDURE FOR CNG DISPENSING



Procedure For Connecting Dispenser Hose To Cascade

1. First check there no leakage from cascade.
2. Fix dispensing hose with cascade through quick release coupling.
3. Check whether all the connections are properly fixed or not.
4. All valves of the circuits should be closed.
5. Keep your 'mobile switch off'.



Procedure For Disconnecting Dispenser Hose To Cascade

1. Close all bank valves at cascade.
2. Open vent valve of high pressure bank & release gas in air.
3. Close all cylinders.
4. Remove quick release coupling & disconnect hose from cascade.



Procedure For Gas Dispensing In Vehicle.

1. Ensure vent valve at high pressure bank is closed.
2. Open high pressure control valve at cascade
3. Remove dowel pin of cylinder & fix dispensing nozzle in vehicle.
4. Open the valve of vehicle cylinder.
5. Ensure vent at the dispensing valve is closed.
6. Open control valve at dispensing circuit.
7. After a desired pressure is achieved in the cylinder at vehicle, close control valve of cylinder.
8. Close cylinder valve at vehicle.
9. Open vent to release gas from intermediate circuit.
10. Remove nozzle from vehicle.
11. Insert dowel pin completely.



SAFETY PRECAUTIONS PREPARED **FOR CNG DISPENSING AREA**



Safety And Emissions Standards And Regulations

The use of CNG as a vehicle fuel in India dates to the beginning of the 1990's. Widespread use of CNG in Europe began about 50 years earlier in Italy, and some years later in the US. Today, CNG as a fuel for vehicle application is spread out on a commercial base all over the world, and as a result there exist numerous CNG safety regulations and standards applicable in various countries or regions.

National regulations cannot always be transferred from one country to another, especially if cultural conditions and usage differ greatly between the countries involved. International standards such as ISO standards are established by working groups or committees from many countries, and members of such groups are invited to comment on proposals before they are finalized. In the case of the ISO Standards related to CNG, extensive testing was also carried out before the standards were established and made official. These standards are based in large part on the ANSI/NGV standards developed for the US and Canada, and incorporate much experience obtained from the widespread use of CNG buses in the U.S.

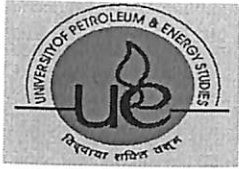
Therefore, the use of the already established ISO standards is recommended also in India.



“Safety Precautions”

DO’S

1. ‘Switch off mobile’ before entering.
2. Keep your mobile switch off till gas dispensing.
3. Keep your vehicle ‘engine off’ & ‘remove engine key’.
4. Check condition of o-ring on filling nozzle is damaged or not.
5. Check if any leakage in hose or dispensing circuit.



“Safety Precautions”

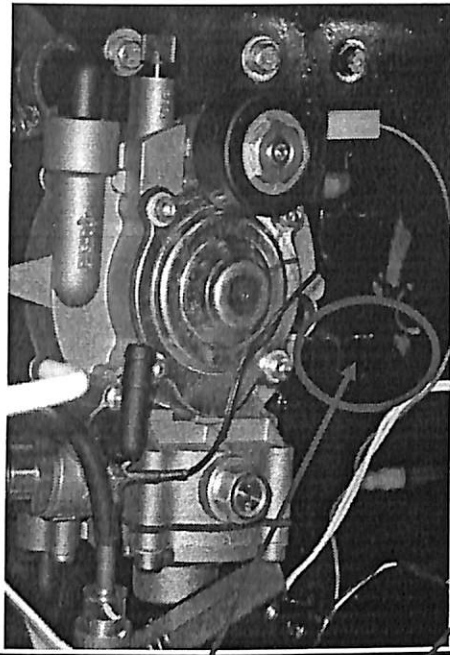
DON'T

1. 'Do not smoke'.
2. Do not open dispensing valve if vent valve is open.
3. Do not remove nozzle without opening vent valve.
4. Do not operate engine till all valves closed.

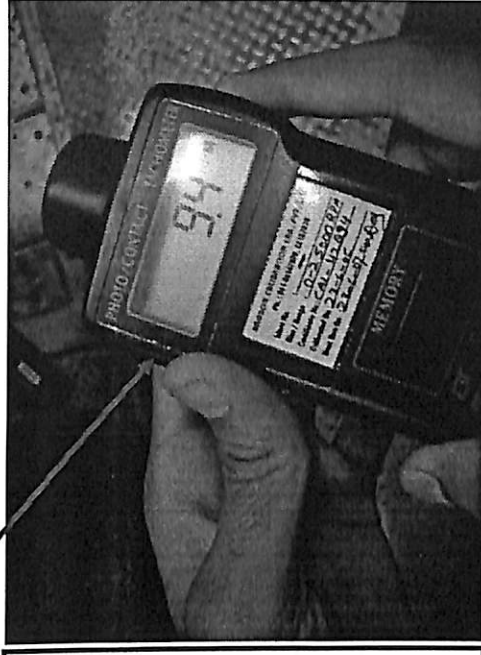


PROCEDURE FOR SETTING RPM IN CNG MODE

1. AFTER FILLING CNG WE PUT STICKER ON CYLINDER.
2. ON PETROL MODE SET 3700 RPM AT FULL ACCLERATOR.
3. CHECK THE RPM WITH THE HELP OF TECHO METER .

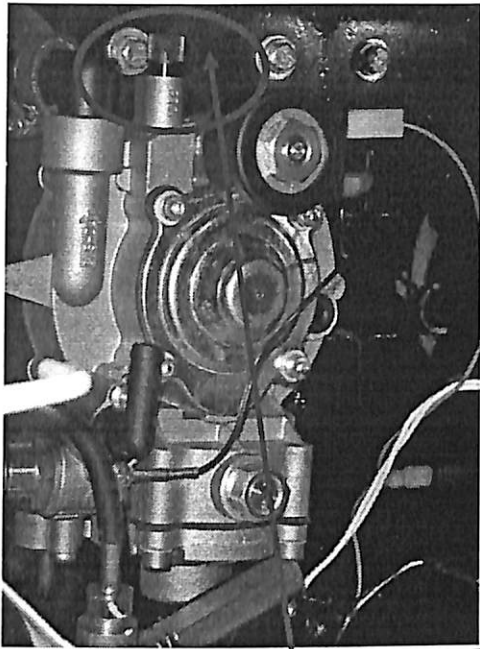


4. TAKE THE SELECTOR SWITCH IN CNG GAS MODE.



5. THAN WE SET MINIMUM RPM THAT IS 900-960.

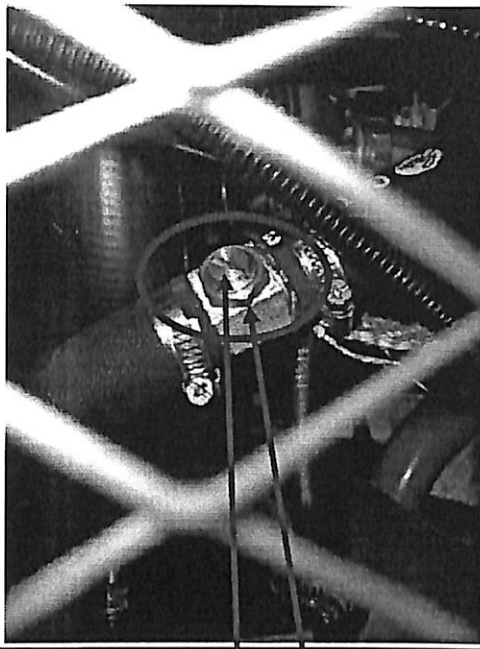
6. SET THE MINIMUM RPM BY PRESSURE REGULATOR SETTING SCREW.



7. NOW WE HAVE TO SET MAXIMUM RPM THAT IS 3700.

8. FOR MAXIMUM RPM PULL THE POWER SCREW BACKWARD TO 6 THREADS.

9. AT THIS POINT TIGHT THE NUT OF POWER SCREW SO THAT IT DOES NOT LOOSE.





Buy-Off

Buy off is a line in charge who inspect the overall vehicle visually & according to check sheet point. If any assy. found wrong, then give feedback immediately to associate of his mistake & do rework in cycle time.

Work done by buy-off, is:-

1. Filling of travel card (it is a card which moves along with vehicle & associate after completing his work, fill this card).
2. Give the feedback to quality control if there is part problem.
3. If line is stop then watch the problem & solve it and fill the line stoppage format.
5. Correct the FBO after CAI/FAI feedback & give feedback to FAI, CAI associate.

There are three Buy-Off in Alfa shed: BO-1, BO-2 & BO-3. In bo-1 stage 2, 4, 6 are ideal.



BUY- OFF SHEET FORMAT



Project Name :

Facility & Equipment Buy-off Report
For
Performance Acceptance & Buy-off

Report No

Equipment Name

Facility, Equipment Sign Off

The Sign off has to take place within 90 days from Job # 1

Site Team Leader

Zone Leader

Remarks : _____

**Mahindra & Mahindra
Automotive Sector**



Facility & Equipment Buy-off

Mahindra

List of Attachments

Following are the attachments to this Equipment Buy-off Report.

Sr.	Attachment	Yes	No	NA
1	General Information Sheet			
2	Facility & Equipment Sign Off Sheet			
3	Problem Description & Corrective action report			
4	Statutory Regulations Compliance Sheet			
5	Operation Training' Attendance Sheets			
6	'Maintenance Training' Attendance Sheets			
7	Equipment Setting - Documentation			
8	Process Capability Study Record			
9	Acceptance Criteria Record			
10				
11				

Please attach any other Shop OR Equipment Specific Record that is generated during Sign Off

**Mahindra & Mahindra
Automotive Sector**



Facility & Equipment Buy-off

General Information Sheet

Sr.		
1	Location	
2	Department	
3	Item Description	
4	Supplier Details	
5	Name of Supplier	
6	Address	
7	Phone No.	
8	ISD Code	
9	STD Code	
10	Phone No.	
	FAX No.	
	ISD Code	
	STD Code	
	Phone No.	
11	E-Mail ID	
12	M&M Purchase order No.	
13	M&M Purchase order Date	
14	M&M Asset No.	
15	Equipment ID.	
16	Date of Delivery	
17	Date of Commissioning	
18	Design Capacity	
19		

**Mahindra & Mahindra
Automotive Sector**



**Facility & Equipment Buy-off
Sign Off Sheet**

Important Note:

1. Your Signature Confirms, Acceptance / Rejection of Facility , Equipment under consideration in this Facility & Equipment Report.
2. The relevant Site Team Leader & Zone Leader will decide the people involved in the sign off.

Sr. Signatory	Name	Accepted	Not Accepted	Remarks	Signature	Date
1)	Safety Department					
2)	Project Office					
3)	Product Design					
4)	Manufacturing Engg.					
5)	Quality Assurance					
6)	Tool Engineering					
7)	Utility					
8)	Logistics					
9)	Maintenance					
10)	Equipment Supplier					
11)	Cell Leader					
12)						

Mahindra & Mahindra Automotive Sector



Facility & Equipment Buy-off

Problem Description and Corrective Action Report (PDCAR)

Sr.	Date	Equipment Name	Equip. No.	Problem Description	Responsibility	Target Date	Corrective Action	Close Date
1								
2								
3								
4								
5								
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7								
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12								
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15								
16								
17								
18								
19								
20								

**Mahindra & Mahindra
Automotive Sector**



Facility & Equipment Buy-off

Mahindra

Statutory Regulations Compliance Sheet

Sr.	Statutory Regulation	Compliance Yes/ No	Remarks
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

Note :

1. For the above mentioned points, please attach photocopies of appropriate

Certificates OR Licences.

The originals of the Certificates OR licences shall be preserved properly by the Site Team Leaders.

List Of Certificates / Licences Attached to This Report (Only Photocopies)

Sr.	Description	License. No.	Validity Period(From To) & Dates
1			
2			
3			
4			

Safety officer Site Team Leader

Signature

Name

Date

Training Attendance Sheet



Date:

Time From : To :

Course Name :

Instructor :

Sr.	Name	T. No.	Department	Sign
1				
2				
3				
4				
5				
6				
7				
8				
9				
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11				
12				
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23				
24				
25				

Instructor (Signature)



Scope Of Capital Store

Capital store in Mahindra & Mahindra has its own advantage on production. Since this store comes under mfg. department hence its housekeeping depends on this department only. As I was in Mfg. department its housekeeping activity had been given to me and I work to the best of my potential for housekeeping of store. I have made detailed layout of the capital store according to the 5S rule. According to me the scope for capital store must be:-

- **CLEAN WORKPLACE.**
- **APPROPRIATE WORKPLACE.**
- **EASY TO USE WORKPLACE.**
- **VISUALISED WORKPLACE.**



What Are The 5 S

- Seiri - Sorting
- Seiton - Systematic Arrangement
- Seiso - Cleaning
- Seiketsu - Standardization
- Shitsuke - Training & Discipline

1. Seiri – Sorting :-

Meaning: - Distinguish between necessary and unnecessary items and eliminate the unnecessary items.

Activity: - Establish criteria for eliminating unwanted items either by disposing them or by relocating them.

Success Indicator: - Area saved or percentage of space available.

2. Seiton - Systematic Arrangement :-

Meaning: - To determine types of storage and layout that will ensure easy accessibility for everyone.

Activity: -

- i. Functional storage.
- ii. Creating place for everything and putting everything in its place.

Success Indicator: -

- i. Time saved in searching.
- ii. Time saved in material handling.



3. Seiso – Cleaning: -

Meaning: - To clean up and getting rid of dirt and unclean items.

- Activity:** - Keep workplace spotlessly clean.
- Inspection while cleaning.
- Finding minor problems with cleaning inspection.

Success - Reduction in machine down time.

Indicator - Reduction in no. of accidents.

4. Seiketsu – Standardization: -

Meaning: - Setting up Standards / Norms for a Neat & Clean workplace and details of how to maintain the Norms (Procedure).

- Activity:** - - Innovative visual management.
- Colour coding.
- Early detection of problem and early action.

Success Indicator: - Increase in 5S indicator

5. Shitsuke – Training & Discipline: -

To maintain DISCIPLINE, we need to practice and repeat until it becomes a way of life.

Discipline means making a steady habit of properly maintaining correct procedure. Time and effort involved in establishing proper arrangement and orderliness will be in vain if we do not have discipline to maintain it.



Kaizen

Kaizen: - Japanese term that means continuous improvement, taken from words 'Kai' means continuous and 'Zen' means improvement.

OR

Kaizen means "improvement". Kaizen strategy calls for never-ending efforts for improvement involving everyone in the organization – managers and workers alike.

OR

Kaizen is a tool for improvement and helps to improve our processes. The characteristic “Kai” means “To Change”, “To Modify or “To Convert” .The characteristics of Zen mean “Right”, or "Good".

INPUT + KAIZEN ACTION → OUTPUT

It is strong tool to support the cause of doing it and also reflects the involvement and Morale of the individuals/participants.



Need For Kaizen

- To reduce the cost by improving productivity.
- To improve the quality of the product.
- To reduce the cost to compensate for the increased cost of inputs
- To improve the Delivery of the product and reduce the lead time.
- To improve the Morale
- To reduce the chances of accident.
- Ultimately cost should be reduced.
- Kaizen leads to high productivity, quality & good environment conditions, low cost & on time delivery.
- Kaizen is a culture of sustained continuous improvement focusing on eliminating waste in all system & processes of an organization.



Basic Kaizen Tools

- **Target Progress Report**
- **Standardized Work Sheet**
- **Time Observation Sheet**
- **Cycle Time / Takt Time Bar Chart**
- **Yamazumi (Stack) Chart**
- **Standardized Work Combination Sheet**
- **Capacity Sheet**
- **Kaizen Proposal Sheet**
- **Kaizen Newspaper**



Description Of Kaizen Process

- ☒ Calculate Takt Time
- ☒ Identify problems.
- ☒ Set targets and enter on Target Progress Report
- ☒ Plan & initiate Kaizen Workshop.

- ☒ Observe site
- ☒ Identify Process
- ☒ Prepare Standardized Work Sheet

- ☒ Pair up 2 for each process.
- ☒ One times w/ stopwatch, other jots down times.
- ☒ Find best times.
- ☒ Verify if Cycle Time meets Take Time.

- ☒ If equipment seems to lack in capacity, use Capacity Sheet to define problems.
- ☒ Fill out Standardized Work Combination Sheet with best times.

- ☒ Note long times on Combination Sheet, there are opportunities for Kaizen.
- ☒ Continue to observe site, note problems on Kaizen Newspaper

- ☒ Try out ideas for kaizen immediately, verify results.
- ☒ Prepare Kaizen Proposal Sheets for effective kaizen ideas.

- ☒ Update Kaizen newspaper.
- ☒ Update Target Progress Report.

☒ **KAIZEN EVERY DAY**



Steps For Preparation Of Kaizen

1. Generation of kaizen

- Clear cut understanding of the present process.
- Ability to break down Method into Elemental break up.
- Analyzing the present situation and relating it to 3M.
 - Muda (waste)
 - Muri (strain)
 - Mura (variation)

Kaizens can also be generated by comparison of two same/different Processes having same characteristics.

2. Presentation of The Kaizen

3. Formats

- FORMATS are the standardized way to organize and present information
- FORMATS present the information from many different sources in a structured and standardized way.
- FORMATS facilitate the indexing, searching and retrieving of information received from many different sources.



4. Recording:-

Recording is the presentation of the data which is generated to support the cause for simple understanding. Recording is Done to convert data into information which helps to increase knowledge

Important points for Recording

- There should be a standardized format
- There should be a Kaizen number allotted to the kaizen sheet
- The presentation should be simple and self explanatory
- Before and after situation comparison and Benefits should be the explained



KAIZEN SHEET FORMAT



KAIZEN SHEET

Date:-

Section:-

Sr. No.	NAME	E. Code
1		
2		
3		
4		
5		

TITLE:-

Photo/Diag.

Photo/Diag.

Before

After

PROBLEM

PROBLEM SOLVED

THEME

Prod. Improvement

5 S Improvement

Safety

Quality

Cost

Others

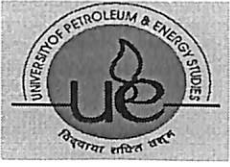


Learn From Project

It was a great pleasure to have my industrial training in such a reputed industry. I got to how the work is done in the industry, how the different department Work together.

Since I was working in manufacturing department and know more about manufacturing process, procedure and department. I got to know the importance of time, how all people work together for the welfare of the company & in learning so I got to know the importance & working of engineer in a company.

I know about the interior part of vehicle more practically and about the assembly of different vehicle such as assembly of gear box. I know about main line operation, different equipments, C.N.G dispensing facility, Kaizens and BUY-OFF sheets.



Exposure With Industry

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