Chapter-1. Introduction
1.1 Introduction of Skoda

By 1990 the Czech management of Skoda was looking for a strong foreign partner. Volkswagen AG (VAG) was chosen because of its reputation for strength, quality and reliability.

It is the largest car manufacturer in Europe providing an average of more than five million cars a year giving it a 12% share of the world car market.

Volkswagen AG comprises the Volkswagen, Audi, Skoda, SEAT and Volkswagen Commercial Vehicles.

Each brand has its own specific character and is independent in the market. Skoda UK sells Skoda cars through its network of independent franchised dealers.

In Top Gear's 2007 customer satisfaction survey, 56,000 viewers gave their opinions on 152 models and voted Skoda the 'number 1 car maker'. Skoda's Octavia model has also won the 2008 Auto Express Driver Power 'Best Car'.

Variants of vehicles:
- Octavia
- Laura
- Superb
- Fabia
- Rapid
- Yeti
1.2 Introduction of Torque Automotive Pvt. Ltd.

Torque Group has been operating in the automobile business with world’s leading premium brands across the state of Gujarat.

The Torque Group Gujarat strategy encompasses significant investment in branding, marketing, exclusive dealerships and after sales service for the upcoming years.
1.3 Company profile:

RAJKOT:

Sales and Service

NAME- TORQUE AUTOMOTIVE PVT. LTD.

<table>
<thead>
<tr>
<th>Address</th>
<th>Plot no. 64, Nr. Kishan Petrol Pump, Kangshiyali, Gondal High-way, Rajkot-364004.</th>
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<tr>
<td>Sales</td>
<td>Jitendra Tank (<a href="mailto:jitendra.tank@torqueauto.in">jitendra.tank@torqueauto.in</a>)</td>
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<tr>
<td>Service</td>
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</table>

Table 1 Details Of Torque Auto

1.4 Department Heads:

Satheesh Lazar – Service Manager he manage workshop and Accident bay.
Pradeep Prajapati – Asst.Service Manager he manage CRE and all Servicing staff.
Hardik Vaishnavi – Floor Supervisor he order to technician and Complete the car service.
Service Advisor – Chetan Bhalod, Rajni Radadiya, Laxmidas Mavariya, Jignesh Satapara.
They are advise to customer require.
Varghese Lazar – Parts manager he is manage store room.
Raxit Goswami – Warranty In charge he manage warranty parts.
George Johnson – Accident floor supervisor he manage accidence.
Manoj Rathod – Painter, his paint accident car and other damage Car.
Chapter no: 2 Industry Layout

- Actual industry Layout details

**Showroom:** Display the new car in front view.

**Service bay:** Servicing car in this place.

**Store room:** Store servicing parts and car parts.

**Paint shop:** Paint the damage car and car’s parts.

**Washing:** Clean car Interior, car washing and polish

**Warranty:** Change warranty parts in car.

**Service Manager:** Manage Servicing Staff.

**Engine room:** Engine repair and change engine parts

Figure 1 Torque Auto
2.1 Actual Layout

- Modify industry layout details

Figure 2 Actual Layout
Showroom: Display the new car in front view.

Service bay: Servicing car in this place.

Store room: Store servicing parts and car parts.

Paint shop: Paint the damage car and car’s parts.

Washing: Clean car interior, car washing and polish.

Warranty: Change warranty parts in car.

Service Manager: Manage servicing staff.

Engine room: Engine repair and change engine parts.

Body shop: To remove dents and bulges.
2.2 Modify modern layout:

Figure 3 Modify Layout
Chapter-3 Equipments, Instrument and Machine used in Industry

3.1 Major equipments:

3.1.1 Tyre Remover:

Specification:

Hydraulic tyre remover for cars. These can be either floor mounted for permanent fixing in workshop or are available as portable models also for roadside tyre and wheel service. Fig shows Skoda car tyre remover.

Specific Use: Tyre remove and to fit new megwheel

3.1.2 Battery Charger:

Specification:

When a Battery is discharged and is not capable of delivery any current, it may be recharge. This is done by supplying it with a flow some external source, such as a generator, which forces current through the battery in a reverse direction. Thus, the plates are restored to their original composition and the battery becomes recharged. It is than ready for use. A battery charade is is used for this purpose as shown in (fig).

Specific Use: Battery Recharge
3.1.4 Wheel Balancing equipment:

**Specification:**

Wheel balancing for both on and off the car wheel balancing are available in workshop. It enables simultaneous indication of both static and dynamic unbalance. One simply has mount the wheel on the high speed mounting plates, dial the wheel width and diameter, push the start button and digital redoubt indicates the value and position for weights required on both inner and outer planes.

**Specific use:** To Balance the vibration of vehicle

3.1.5 Washing Equipment:

Regular chassis washing of both cars and commercial vehicles to remove grease, oil, mud and other corrosive deposits is most essential. This type of cleaning is a true representative of preventive maintenance. This is easily done by a spray of water with a solvent at high pressure.

![Wheel Balancing](image1)

**Figure 6 Wheel Balancing**

![Washing](image2)

**Figure 7 Washing**
3.1.4 Lift:

**Specification:**

In a Skoda workshop lift becomes necessary to facilitate the servicing work. It may be matically operated, but more common these days are the electrically operated ones. The lift raises the vehicle high enough to carry out the work under it. There are various safety features which prevent the lift from coming down in case of power failure or leakage of seal in case of oil-operated lifts. This lift is lifting up electrically and down hydraulically. Show in fig.

**Specific use:** To Lift the car for service

3.1.6 Lifting jacks:

To work under the car or to change wheels, it is necessary to lift the car. This lifting jack is used which may be mechanically or hydraulically operated. Two types lifting jack is used in Skoda workshop mechanically and hydraulically operated jack.
3.1.7 Axel Stand:

![Axle Stand](image)

**Figure 10 Axle Stand**

**Specification:**

It is always necessary to make sure before starting working under the car that it is not supported on the jack alone, because that could be dangerous if the jack gives way any time. Placing bricks below the axle is also not very safe. It is always better to use axle stands for this purpose. Fig.

**Specific use:** remove the axle of car.

3.1.8 Lubricating Equipment:

The two commonly used pieces of lubricating equipment are the oil gun and grease gun, out of which the oil gun has been show in fig. High pressure greasing equipment work with compressed air and can handle any grade of grease.

![Oil Gun](image)

**Figure 11 Oil Gun**
3.2 Types of Instrument:

All Instruments are set of workshop servicing tools of wroth company.
Approximate cost: 4 lakh.

3.2.1 Chisels:

Specification:

Chisel is one of the most important tools of the accident workshop. It is used for cutting and chipping the work piece when it is cold. Chisels are made of high carbon steel or tool steel.

3.2.2 Files:

Specification:

File is one of the most important tools of the fitting shop. It is used for filing the metal surface. Files are made of high carbon steel and tungsten steel by forging.

3.2.3 Punch:

Specification:

A punch is a circular rod having one end pointed and the other end flat. Its body is knurled. It is used to mark point on the work piece for further operation like drilling, filing, cutting, chipping.

3.2.4 Vices:

Any job being performed manually requires proper holding. They are normally held by certain devices and one of these is called a vice. Most of the manual operation such as filling, sawing, cutting and many machine operations such as shaping.
3.2.5 Hammers:

**Specification:**

The hammer is man’s primitive tool. In the earliest time, stone was used to tight a wooden piece and for striking. Different types of hammers and it’s used. Two type hammers are used in workshop plastic hammer and ball peen hammer show in fig.

![Figure 15 Hammers](image)

3.2.6 Pliers:

**Specification:**

A plier is a hand tool used for holding and gripping objects at places where the use of hands is unsafe or inconvenient. It is also often as a wrench to hold and turn, but this is not a safe practice and should be avoided. Generally, there are two types of pliers in common use: Combination pliers and Long nose pliers.

![Figure 16 Pliers](image)

3.2.7 Screwdrivers:

**Specification:**

The screwdriver is one of the most commonly use tools in the workshop. It is used to loosen and tighten screws which have slots in their heads. Different types and size of screwdriver is available in instrument store.

![Figure 17 Screw Driver](image)
3.2.8 Wrenches:

Specification:

With the greater application of machinery, the variety and sizes of wrenches in daily use have also increased. Different type of wrenches is used in workshop.

3.2.9 Open-end Wrenches:

The open-end wrench is used where there is sufficient space for driving it. The nut may be turned little farther, enabling the workman to get a fresh start on the nut. Different sizes of open-end wrenches are shows in fig.

3.2.10 Driver Socket wrench set:

Specification:

These wrenches have detachable parts such as the head, the socket and the ratchet. This is very useful where it is difficult to work with open-end wrenches. Wrenches have handles fitted with a ratchet which enables the worker to drive the shaft quickly and save time as it are not necessary to remove the head of the wrench from the nut and bolts.
3.2.11 Adjustable wrench:

**Specification:**

The main advantage of this wrench over an open end wrench is that the jaws can be opened within limit according to the size of the wrench. The jaws are adjustable and fit the cavity to the shape of the open end wrench.

3.2.12 T-socket wrenches:

**Specification:**

This is made in the shape of the ‘T’. The hole suitable to the nut is made in the head. The wrench is suitable for applying a great force.

3.2.13 Ring-end wrenches:

**Specification:**

The wrench head has twelve notches in the hole. The point of the nut may be gripped by six notches in case of a hexagonal nut and four notches in the case of square nut. It is also known as ring spanner two types spanner ring-end spanners and ring-fix spanners.
3.2.14 Set of Star Allen-Key:

Specification:

This is made from a star bar and is bent to drive a socket or an Allen head-screw. Shown in fig.

Figure 23 Star Allen Key

3.2.15 Set of Hexagonal Allen-Key:

Specification:

This is made from a hexagonal bar and is to drive a socket or an Allen head-screw.

Figure 24 Hexagonal Allen Key

3.2.16 Constants: 10-10mm Spine bit

Specification:

These tools are used in removing piston head open piston head’s bolts.

Different types and size: M5, M6, M8, M10, M12 (30mmL) M5, M6, M8, M10, M12 (75mmL)

1 Bit holder ½” DRX 10mm
3.2.17 9-Star socket bit:

**Specification:**

These sockets are used for 9-star type head bolts open and remove the car.

**Sizes:** T20, T25, T27, T30, T40, T45, T50, T55, T60 (55mmL)

3.2.18 8Pc Hex socket bit set:

**Specification:**

These sockets are used in body penal bolts, chassis bolts

**Sizes:** 5;6;7;8;10;12mm (55mmL) 14mm (65mmL), 17mm (70mmL).

Figure 25 Hex Socket Bit
3.3 Special Tools:

3.3.1 Set for Cleaning the Contact area:

The repairs in the area of the contact transfers for threaded connections of cable sets in the high power circuit and battery connection must be carried out with a set for cleaning the contact areas VAS 6410 (releasing and charging current, grounding conductors, battery terminals and poles).

3.3.2 Stripper with conductor cutter:

Stripper with conductor cutter for stripping and cutting off the conductors. A stripper of 6-7 mm is used for stepping the conductor ends.

3.3.3 Electric Hot-air fan with special nozzle:

After pressing in, the swaged socket fitting must be shrunk with a hot-air fan. Warm up the swaged socket fitting in the longitudinal direction from the inside out until the connection seals perfectly and the adhesive flows out.

When pressing, make sure that the other conductors, plastic parts or upholstery do not get damaged with the hot nozzle.

If the repaired conductors were previously bundled, they must be insulated again with a yellow insulating tape. If necessary, you must reattach the conductor with a cable clamp.

3.3.4 Piston Ring Compressors:

They have ruggedly built construction, made of spring steel with a compression tape, also made of the same material. There are two main types of ring compressor are use in workshop:

1. Non-ratcheting type
2. Ratcheting type.

In the first kind, a band is flared at the bottom to prevent the ring compressor from entering into the cylinder when the piston is pushed done.

3.4 List of Machine:

3.4.1 Wheel Alignment:
Wheel alignment sometimes referred to as breaking or tracking, is part of standard automobile maintenance that consists of adjusting the angles of the wheels so that they are set to the car maker’s specification. The purpose of these adjustments is to reduce tire wear, and to ensure that vehicle travel is straight and true (without "pulling" to one side). Alignment angles can also be altered beyond the maker's specifications to obtain a specific handling characteristic. Motorsport and off-road applications may call for angles to be adjusted well beyond "normal" for a variety of reasons.

All new vehicles leave the factory with their alignment checked and adjusted. Usually the technician paints the heads of the adjustment hardware to show it has been set, also to show if it has moved later on. It is advisable to do the alignment of the car after the first 5000 km, since all the suspension gets set. Failure to do this may result in the camber and toe specifications drifting outside the manufacturer's limit. This may lead to vehicle pulling and tire wear.

Approximate cost: 3 lakh

Specific use: Wheel Alignment

3.4.2 Spark plug testing and cleaning machine:

After continuous use a spark plug gets dirty, spoiled and full of carbon deposits. This necessitates its cleaning and also the testing of its working condition.

Spark Plug Cleaner and Tester is an instrument to completely clean and test an old used spark plug which is used in petrol, gasoline and kerosene engines. Spark Plug Cleaner is an instrument which is a necessity of a well equipped modern work workshop/garage to make a used spark plug to work as a brand new one show in fig.

**Specification:**

- Working Air Pressure : 5kg/cm² – 16kg/cm²
- For Cleaning the Plug : 5kg/cm² – 16kg/cm²
- For Electrical Testing of the Plug : 10 kg/cm² – 16kg/cm²
- Power Supply : Input Voltage 220V AC with earth Output Voltage 12kv – 19kv (HT voltage)
- Electronic Vibrator : 220V/12V.
3.4.3 Spray Painting Machine:

Spray painting is done by a spray gun. The spray of painting is sprinkled by compressed air. Gun is used with a compressor which is equipped with a pressure regulator for uniform spray and an air filter for supplying cleaner air to the spray gun.

3.5 Power Tools:

Power tools are operated by pneumatic, electric or hydraulic powers. Their use envisages quicker, effortless and efficient service.

3.5.1 Pneumatic Nut and Bolt Tighter (Air gun):

This is a portable machine whose working end can be changed to suit different sizes of bolts and nuts. This tool is operated by air pressure.

Specific use: It tightens and loosens the nuts and bolts in a short time.

3.5.2 Portable Drilling Machine:

It can be taken conveniently to any area of repair, since it is handy, compact and portable. These machine specifications are: Chuck size=6mm, power input=500watt, no load speed=2800rpm, weight=10kg.

Specific use: This is used to make holes wherever required.

3.5.3 Polisher and Sander:

The sanding is accomplished by means of emery paper or emery cloth of coarse grade while the fine grade is used for polishing. Has the specification mentioned as below. Paper size = 115.280mm, Orbits =5000rpm, Power input = 475watt, Weight=20kg.

Specific use: this machine used to rub the burrs from the surface of components, and then polish it to super finishing accuracy.

3.5.4 Portable Grinder:

Being sturdy and handy, it can be taken to any remote, restricted and less accessible areas for repairing.

Specific use: this is used to grind the rough surfaces, unwanted projections, protruding corners etc.
CHAPTER NO:4 Particulars Of Practical Experiences

4.1 Particular of practical Experiences

- In this chapter we will understood everything about my Training, Different Problems occurs in different cars, Servicing Procedure, etc.
- There are also some Notes in this chapter in which, that I learnt from books in Previous Semesters.
- In this chapter we will also understood the reason for changing the parts and reasons for servicing parts.

4.2 SERVICE PROCEDURE:

- When the Customer is came to Service Centre for car Service, a Service Advisor is there, who writes everything in the Job-Card about the car, customer’s problem, things that are in the car (DVD, CD, Pen drives) etc.
- The Service Advisor also gives the time to customer to pick the car after doing the service.
- First of all a Mechanic, who takes a car of that customer, is going to Test Drive on both the Smooth & off Roads.
- Then he can easily know what the problem is & why vehicle is Jerking, Vibrating, a different sounds coming from the Engine.
- After coming from test drive the Mechanic with her Helper check the Oil Levels, Check All lights, Check all doors & Glass are working properly or not, anything if there is leakage, etc.
- Then mechanic writes that anything that is leakage, light not working, parts to be changing, etc., that notes they give to the Service Advisor.
- That Service Advisor calls the Customer and asks for changing a part and new fitting.
- After a customer permission mechanic do their work to change a part or service etc.
- The following are the things that a mechanic checks in Test Drives:
  - Caliper Noise coming from the front wheels.
  - Gear shifting hard or not
Alignment is proper or not.

- Car is pulling one side or not.
- Vibration occurs or not.
- Steering is hard or not.
- Brake applies perfectly or not.
- Decrease in Pick-Up or not.
- More Exhaust or not.
- Clutch properly engage or not.

### 4.2.1 DONE IN WORKSHOP:

**WORK Engine Oil Changing:**

- Engine Oil keeps Engine clean by removing and suspending the carbon, dust & rust particles.
- Engine Oil should be replaced as per periodic maintenance schedule applicable for the car.
- There is a Gauge on top of the Engine or left side Of the Engine, which measures the level of oil.
- If there is more level of Oil above the maximum level then, there is a chance of leakage of oil filter.
- Low Engine Oil may result in engine overheating and rapid wear of Engine parts.
- Engine Oil should be change after every 15000 kms.
- Quantity: 4.5 Liters

**Oil Filter Changing:**

- Oil Filter should be change with the Engine Oil.
- The Oil Filter, filter the oil and take the dust & carbon particles from the Oil.
- The reason for changing the Oil Filter with the Engine Oil is because, there is some oil in the filter so, when we fill the new Engine Oil it becomes mixed with the old Engine Oil.
Remove the Oil Filter using Oil Filter Wrench or Oil Filter Socket.

Oil Filter should be change after every 15,000kms.

4.2.2 Gear Oil Changing:

- The function of Gear Oil is to reduce wear of different Gears present in Gear Box.
- The Gear Oil Should be change after every 40,000kms.
- For removal of old Gear Oil, open the drain plug located at top of the Gear Box or under the Gear Box.
- If Gear Oil change according to periodic maintenance apply on the car, the gears & selector gear shaft life’s improves.

4.2.3 Brake Oil Changing:

- The function of Brake Oil is to circulate the Oil into all wheels While Braking.
- The reason for changing the Brake Oil is because the Brakes are not working properly.
- There is not a time period of changing the Brake Oil.

4.2.4 Brake Pad Changing:

- The function of Brake Pad is to stop the tyre from rotation when we apply brake.
- There are two Brake Pad use in each Disc Brake.
The reason for changing the Brake pad is because the Pad or Shoes are becomes rough after some kms.

If Brake Pad change according to their periodic maintenance applies on the car, the Brake Piston life improves

4.2.5 Air Filter Changing:

- The function of Air Filter is to filter the air before entering into the Engine’s Cylinder.
- The Air Filter is located on top of the Engine & left or right side.
- Air Filter removes the dust and dirt from the air entering the engine.
- Air Filter provides clean air to engine and airflow Sensor & improves engine life.
- In each Service of car an Air Filter should be clean with high pressure of air, change the Filter when filter appears to be dirty even after cleaning.
- If Air Filter should be change according the periodic maintenance apply on the car, engine life & engine performance improves.

Figure 31 Air Filter
The function of AC Filter is to filter the air coming out from the atmosphere into the car.

- The reason for changing the AC Filter is because dust is frozen in it and AC Filter can’t clean with the air.
- If AC Filter should replace according to the periodic maintenance apply on the car, the flow of air coming into the car is increase.

4.2.6 Diesel Filter Changing:

- The function of Petrol Filter is to filter the Petrol before entering into engine’s cylinder.
- Petrol Filter is located near the Petrol Tank, near the Charcoal Canister.
- The reason for changing the Petrol Filter is dust & dirt particles are frozen into the filter.
- There is no service to clean the Filter either replaces.
- The Filter consists of two pipes, one for Inlet and one for Exhaust.
- If Petrol Filter changes after every 40,000kms then average of car improves.
4.2.7 Jumper Strut Changing:

- The function of Strut is to absorb the shocks when vehicle is running on off roads.
- The reason for changing the Strut is noise is coming when tyre rotates and it cannot absorb shocks properly.
- An Coil Spring is mounted on the Strut.
- When we driving a car we cannot here a noise but, when we adjust the car into lift, activate 1st Gear and press the Accelerator pedal & get near to the wheels, we here a noise coming from the Strut.
4.2.8 Fuel Pump Changing:

- The function of Fuel Pump is to provide fuel to the cylinder from the Fuel Tank.
- The engine is cranking but not starting.
- So we decide to change a Fuel Pump.
- The reason for changing the Fuel Pump is because the Petrol is not coming from the fuel pump.
- For changing this Fuel Pump, we have to remove the Fuel Tank.

![Image of Fuel Pump]

Figure 33 Fuel Pump
4.2.9 Starting Motor Changing:

- The function of Starting Motor is to start an engine with the help of Flywheel.
- When starting motor is at rest, the pinion gear is not engaged with the Flywheel.
- When the starting motor is switched on, the armature shaft begins to rotate which causes the pinion gear to rotate in front of the flywheel.
- The Flywheel also has outer teeth to mesh with the bendix or pinion gear.
- The engine is cranking but not starting.
- The type of Motor is Bendix-Drive.
- The problem is the Bendix or Pinion Gear is not meshing properly with the Flywheel.
- The teeth of bendix are broken.
4.2.10 Valve Clearance: (Tappet Setting)

- Tappet Setting means the gap of the inlet valve & exhaust valve.
- Valve clearance is gap between the cam & cam follower or between the top of the valve and Rocker Arm that pushes the valve to open.
- This should be done when vehicle’s pick-up decreases, decrease in average, etc.
- This should be done when engine is cool.
- This is done with the help of Thickness Gauge Tool.
- All cars have different valve clearance.
- Inlet Valve Clearance = 0.15mm
- Exhaust Valve Clearance = 0.15mm

Figure 35 Engine Head
4.3 Engine overhauls:

An engine overhaul is necessary once the engine is worn out i.e. high mileage, blowing blue smoke, rattling and rough.

There are different ways of overhauling an engine. Most workshops do what is called an in-chassis rebuild. This is where you don't remove the engine from the car, you just pull what you need to do the job off it and do a minor overhaul - replace the cylinder liners, pistons (if they need it), piston rings, replace the big end and crankshaft bearings, lap the valves in and replace the valve stem seals, strip and check the oil pump, replace the gaskets and seals Just what is needed to be done to bring the engine back to factory specification and performance

- Turbo engine:

Technical data

Engine code: AGU
Type: 4-cylinder inline engine/turbocharger
Displacement: 1781 cm³
Bore: 81 mm
Stroke: 86.4 mm
Compression ratio: 9.5
Rated output: 110 kW (150 HP) at 5700 rpm
Max. torque: 210 Nm at 1750 up to 4600 rpm
Engine management: Moronic M3.8.2 (M3.8.3 with cruise control system), electronically controlled sequential fuel injection and fully mapped ignition with cylinder- selective knock control

Technical highlights

5 valves for each cylinder (3 inlet valves, 2 exhaust valves)
Valve timing with 2 overhead camshafts
Exhaust camshaft driven with toothed belt by the crankshaft
Inlet camshaft driven with chain by the exhaust camshaft
Cast iron cylinder block
Aluminium alloy cylinder head
Two-mass flywheel
Vibration damper at crankshaft
Faults: turbo has been damaged.
Remedies: replaced turbo.

4.4 Gear Box Overhauls

**PROCEDURE OF DISASSEMBLE A GEAR BOX:**

![Image of Gearbox](image)

Figure 37 Gearbox

First of all we taken test drive of Car.
Then we decide to change the 1st & 2nd Gear Synchronizer Ring.
First of all we adjust the car into lift.
Then we open the front tyres & Drive Shafts.
Then we remove the Battery from the car.
Then start opening the connections or bolts of Gear Box.
We put the tyre under the Gear Box.
Then open the bolts of Mounting of Gear Box.
Result, the Gear box easily Disassemble.
Then we started opening the shafts of Gear Box.
Each Gear Box consists of four Synchronizer Ring for 1st 2nd 3rd 4th Gear.

The upper Shaft is called Counter Shaft, on which the 1st & 2nd Gear are Mounted.
The lower Shaft is called Lay Shaft, on which 3rd & 4th Gear are Mounted.
5th Gear is mounted on left side on top of the Gear Box.

**PROCEDURE OF SOLVING THE PROBLEM:**

- First of all we took the test drive.
The Gears are Shifting properly without noise.
But when we press the brake pedal the noise not occurs.
Then we decide to remove the Gear Box.

Adjust the car into lift.
Remove the front tyres and put under the Gear Box.
Disassemble of Drivre Shafts.
Then we started opening the connections or bolts of Gear Box.
And finally open the bolts of mountings.
Result Gear Box removes from the car.

The above image shows the Counter Shaft of SX4.
The 1st & 2nd Gear are mounted on this shaft.
The top of the left side of this shaft is Gear Bearing.
The problem was the teeth of this shaft is broken.
Then we change the Counter Shaft.
4.5 Major Vehicle Repair

4.5.1 Fuel System

- The fuel system feel engine the Gasoline/Diesel it needs to run if Anyone of Parts in the system breakdown engine will use more gas or may not run.
- Routine maintenance to the fuel system through fuel filter changes and injector power cleaning can also lead to Reduction in fuel consumption especially in older vehicle.
4.5.2 Exhaust system

- A car exhaust system removes harmful carcinogens from the engine and helps keep the motor running at peak efficiency if it is malfunctioning it affects the car performance and can even pose a health hazard as harmful toxins are released.
- A malfunctioning exhaust system can also be the cause of a failed emission test.

**Figure 41 Exhaust System**
4.5.3 **Clutch Plate & Pressure Plate Changing:**

- The function of Clutch Plate is to Engage & Disengage the Engine from Transmission, thus clutch is located between engine & Transmission.
- Pressure Plate consists of an Diaphragm Springs.
- When we press the Clutch Pedal the clutch is in Disengage position, in which the Pressure Plate consists of an Diaphragm Spring, helps to stop rotating the Clutch Plate.
- After some kms the clutch becomes hard and more effort is required to operate the clutch.
- Same after some kms the pressure plate becomes weak and Diaphragm Spring are also weak.
- The clutch is disengaged when starting a Engine, Shifting Gears, when stopping the vehicle & when idling the engine.
- For this we have to disassemble the Gear Box.

![Clutch Plate](image_url)

*Figure 42 Clutch Plate*
4.5.4 Crankshaft position sensor

- Crankshaft sensors used on fuel injected vehicles tell the computer via a voltage signal, the location of the crankshaft at the no.1 cylinder as well as the engine rpm.
- The computer uses the signal to adjust the ignition timing and injectors. If the crankshaft sensor malfunctions the vehicle will not start, because the engine loses its timing signal.
- On some vehicle the crankshaft sensor works alone, but more commonly it works in conjunction with a camshaft sensor.
4.6 Faults and Remedies

4.6.1 Vehicle starting problem

<table>
<thead>
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<th>Remedies</th>
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<tr>
<td>Battery</td>
<td>Recharge battery</td>
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<tr>
<td>Fuel low No ignition</td>
<td>Refill fuel</td>
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<tr>
<td>No ignition</td>
<td>Check injector</td>
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<tr>
<td>Car wont start in rainy day</td>
<td>Check electronic ignition</td>
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Table 2 Vehicles Starting Problem

4.6.2 Vehicle vibration

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<td>Remake Engine</td>
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<tr>
<td>Connecting Rod band</td>
<td>Replace</td>
</tr>
<tr>
<td>Flywheel damage</td>
<td>Replace</td>
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<tr>
<td>Piston cracked</td>
<td>Replace</td>
</tr>
</tbody>
</table>

Table 3 Vehicle Vibration

4.6.3 Steering vibration

<table>
<thead>
<tr>
<th>Faults</th>
<th>Remedies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wheel weight damage</td>
<td>Replace wheel balancing weight</td>
</tr>
<tr>
<td>Track rod bolts loose</td>
<td>Wheel alignment tight bolt</td>
</tr>
<tr>
<td>Tyre pressure</td>
<td>Fill pressure</td>
</tr>
<tr>
<td>Axle boot</td>
<td>Replace</td>
</tr>
</tbody>
</table>

Table 4 Steering Vibration
4.6.4 Steering hard

<table>
<thead>
<tr>
<th>Faults</th>
<th>Remedies</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Tracking rod damaged</td>
<td>Replace</td>
<td></td>
</tr>
<tr>
<td>Wheel pressure low</td>
<td>Refill</td>
<td></td>
</tr>
<tr>
<td>Axle boot damaged</td>
<td>Replace</td>
<td></td>
</tr>
</tbody>
</table>

Table 5 Steering Hard

4.6.5 A.C compressors not working

<table>
<thead>
<tr>
<th>Faults</th>
<th>Remedies</th>
</tr>
</thead>
<tbody>
<tr>
<td>A.C valve damage</td>
<td>Test the pressure reading from the valves</td>
</tr>
<tr>
<td>A.C compressor oil level low</td>
<td>Replace A.C compressor oil</td>
</tr>
</tbody>
</table>

Table 6 A.C Compressors

4.6.6 A.C not working

<table>
<thead>
<tr>
<th>Faults</th>
<th>Remedies</th>
</tr>
</thead>
<tbody>
<tr>
<td>A.C gas</td>
<td>Refill A.C gas</td>
</tr>
<tr>
<td>A.C compressor</td>
<td>Check A.C Compressor Valve</td>
</tr>
</tbody>
</table>

Table 7 A.C Not Work

4.6.7 Brake not working

<table>
<thead>
<tr>
<th>Faults</th>
<th>Remedies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brake pads damage</td>
<td>Replace brake pads</td>
</tr>
<tr>
<td>Brake disc damage</td>
<td>Replace brake disc</td>
</tr>
<tr>
<td>Brake oil low</td>
<td>Refill brake oil</td>
</tr>
</tbody>
</table>

Table 8 Brake
4.6.8 Lights & Horn not working

<table>
<thead>
<tr>
<th>Faults</th>
<th>Remedies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Battery low</td>
<td>Recharge</td>
</tr>
<tr>
<td>Fuse clip damage</td>
<td>Install new fuse clip</td>
</tr>
<tr>
<td>Wiring damage</td>
<td>Check wiring</td>
</tr>
<tr>
<td>Horn clip broken</td>
<td>Replace</td>
</tr>
</tbody>
</table>

Table 9 Lights & Horn

4.6.9 Door noise

<table>
<thead>
<tr>
<th>Faults</th>
<th>Remedies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Door locking noise</td>
<td>Spray on locks of door by Rust clean</td>
</tr>
<tr>
<td>Door rubber plastic damage</td>
<td>Door setting by Rubber plastic care spray</td>
</tr>
<tr>
<td>Door opening noise</td>
<td>Spray on connector of door by Rust clean</td>
</tr>
<tr>
<td>Door handle noise</td>
<td>Spray inside the handle by Rust clean</td>
</tr>
</tbody>
</table>

Table 10 Door Noise
4.7 Maintenance and preventive maintenance of vehicles

- Vehicle Interior
- Vehicle Exterior
- Vehicle From Below
- Engine Compartment
- Final Check

4.7.1 Vehicle interior

- Vehicle system test: Carry out test.
- Service Interval Display: Resetting.
- Interior, Luggage and Glove Compartment lights, Cigarette Lighter, Sockets warning lamps.
- Dust and pollen Filter: Clean housing and renew filter element.
- Windscreen wipe system: Check function spray jet setting and for damage, adjust if necessary.
- Windscreen wipe/wash system: check function, spray jet setting and for damage, adjust if necessary.
4.7.2 Vehicle Exterior

- Rear Lights check function: Brake lights, Tail lights, Reversing Lights, Rear Fog Lights, Number plate lights, Turn signal.
- Front Lights check function: Side lights, dipped beam, main beam, fog lights, turn signal.
- Wiper Blades: Check for damage and park position, adjust if necessary.
- Interior and exterior body: Carrying out visual check for corrosion when doors and lids are open.
- Wind screen: carryout visual check for damage.
- Function of lock cylinder: check
4.7.3 Vehicle from Below

- Engine oil: Drain or extract renew oil filter.
- Brake system: Carry out visual check for leaks and damage.
- Front and rear brake pads linings: Check Thickness.
- Engine and components in engine compartment: Visual check for leaks and damage.
- Gearbox, Final drive and drive shaft bellows: visual check for leaks and damage.
- ABS sensor cable: Visual check of damage and correct position.
- Gearbox, final drive and drive shaft bellows: visual check for leaks and damage.
- Swivel joints: visual check of swivel joint boots for leaks and damage.
4.7.4 Tyres

- RR wheel: check condition and wear pattern of tyres; enter tread depth.
- FL wheel: check condition and wear pattern of tyres; enter tread depth.
- RL wheel: check condition and wear pattern of tyres; enter tread depth.
- FR wheel: check condition and wear pattern of tyres; enter tread depth.
- Tyre pressure of all the wheels check.

Figure 47 Tyres
4.7.5 Engine Compartment

- Windscreen wash system: Check fluid level and frost protection replenish fluid.
- Engine and Components in engine compartment carry out visual check for leaks and damages.
- Cooling System: Check frost protection and coolant level antifreeze specification-25° enter actual value. (Measured value).
- Poly V belt: Check condition.
- Air filter: clean housing.
4.7.6 Final Check

- Stick the label for next service.
- Final goes to Test Drive.
Chapter no: 5 Additional Data

5.1 Safety Features

5.1.1 Safety Features in Workshop:

- Too many people are injured while working in automotive workshops.
- The injury trend occurs across all types of vehicle repair, maintenance or installation work, and on all types of vehicles.
- In our organization there are some rules for safety, which would be followed by all mechanic & helper.
- The rules are made by Company itself.
- If this rules are not followed by anyone, then the Manager has right to suspend him.

- The following are the rules made by company itself:

  - Wear a uniform which is given by the Service Centre.
  - Wear a helmet because of any part or anything falls, that will not damage your head.
  - Wear a Shirt not a T-Shirt because any machine that is in working position and you entrapped in machine when wear a T-shirt you can’t easily free but, when you wear a shirt you can easily hack your Shirt.
  - Wear a Safety Shoes which is given by Company.
  - Clean that area where you have worked, which stops you to sleep on that.
5.1.2 Safety features in car

- In addition to the two front and side airbags
- The Škoda Superb now additionally features a
- Head airbag on the left and right.

5.1.3 ISOFIX System

- ISOFIX is a name for a standard plug-type
- Connection for child seats.
- Two metal lugs which operate in pliers
- Movement are attached in the bottom area of
- The rear of the child seat. These metal lugs are
- Pushed through between the surface of the
- Seat and the backrest and snap into bows
- Which have been bolted to the
- body.
- The ISOFIX system thus ensures
- that the child
- Seat is reliably anchored in the car.

5.2 Airbag System

- Driver and front passenger
- Side airbags
- Driver and front passenger airbags
- The new Škoda Superb is the first vehicle of the
- Skoda model range fitted with 9 airbags. The
- Airbag system includes driver and passenger airbags,
- Head airbags, side airbags (optional at the
- Rear) and a knee airbag on the driver's side.
5.2.1 Side Airbag

- The new Škoda Superb is the first vehicle of the
- Skoda model range fitted with 9 airbags. The
- Airbag system includes driver and passenger airbags,
- Head airbags, side airbags (optional at the rear) and a knee airbag on the driver's side.

5.2.2 Volume of the airbags:

- Front passenger airbag 120 ltr.
- Front side airbag 13 ltr.
- Rear side airbag 9 ltr.
- Head airbag 36.5 ltr.
- Driver side knee airbag 18 ltr.
5.2.3 Restraint systems

- Seat belts
  - All the seats of the Škoda Superb II are equipped with 3 point seat belts.
  - Both front seat belts are fitted with belt tensioners

  - According to standard. The rear outer seats only
  - Come with seat belt tensioners in combination
  - With the rear side airbags.
  - The seat belt tensioners installed in the new Škoda Superb II and in the model Škoda Octavia.
  - Coding of the rear seat belt locks

The rear seat belts have coded belt locks.
- It is therefore not possible to insert the belt tongue into a wrong lock, which could influence the restraining function of the belts.

5.3 Vehicle Safety Body

5.3.1 Safety legislation

- The OCTAVIA not only surpasses all present safety standards but already satisfies intended Legislation which exists only as a recommendation or draft.

5.3.2 OCTAVIA Safety Body

- Deformation zones
  - Defined crumple zones at the front and rear
  - Which deform gently ensure the lowest possible Deceleration without any extreme peak
  - values in the level of stresses to which occupants are subjected when wearing their
seat belts. The side members crumple with defined buckling during an impact.

5.3.4 Safety cell
- A rigid passenger (safety) cell ensures that the car occupants are provided with a survival space which does not deform.

- Pillars integrated into the roof frame and lower sill, special impact members (side protection) in the doors and additional stiffening at the window waist rails of the doors ensure safety even in the event of side collisions.

Flush-bonded windows
- Windscreen and rear window are flush-bonded to the body which increases the dynamic stability of the body - an important factor in the event of a rollover

5.4 The New Side Protection.

- The measures listed below have been incorporated to offer the occupant side protection in the event of a side impact:
  - wide sheet sections below the window line stiffen the doors
  - reinforcing tubes in the middle area of the door are capable of absorbing particularly high forces by virtue of their cross section
  - tubular reinforcement in the side sills
  - foam-filled side impact absorbing elements in the doors for the pelvis and rib area
  - which move the occupants away from the hard outer parts.
In addition to the design measures relating to the strength and information characteristics of the body, further influencing factors in respect of passive safety ("All measures which are capable of preventing or minimizing the consequences of accidents") have been implemented in the OCTAVIA.

- Safety steering column – telescopes in the event of a crash, providing additional large unrestricted area from the cross panel to the universal joint shaft of the steering.
- Steering wheel – adjustable fore and aft and for height
- No relevant intrusion into the interior in the event of a crash; if the airbag is triggered, the protection which it offers is not impaired.
- Airbag – Driver airbag with volume of 65 litres
  Passenger airbag with volume of 90 litres
- Control unit on centre tunnel, as on the FELICIA.
- Activated in the event of a collision at a speed of more than 20.5 km/h.
- Three-point seat belt – with height adjustment and seat belt tensioner on front seats (with optional airbag)
- Head restraints – front restraints adjustable for height and angle rear restraints adjustable for height
- Seats – with high level of lateral stiffness
  with impact-absorbing plate in the backrest of the front seats to protect the driver’s and front passenger’s backs
  from possible injury from the rear passenger’s knees in the event of an accident.
- Luggage compartment – with bulkhead as a protection for the occupants
- Subframe – with specified buckling point
The OCTAVIA fully complies with all safety standards relating to such components.

5.5 Reconditioning of Parts

- A reconditioning of parts is done because to reduce the actual cost.
- Reconditioning means not to change parts but, servicing of that parts and repairing.
- In our organization sometimes we, can’t repair a part but change that part.

The following are the things that done by me in reconditioning of parts.

5.5.1 Brake Pad:-

- When the customer problem, is there is decrease in braking performance.
- We change the brake oil, even brake is not working properly.
- Then we decide to change a Brake Pads.
- Sometimes customers says don’t change the Brake Pads, then we rub the polish paper on Brake Pads.
- And there is increase in brake performance.
- It also reduces the cost.

5.5.2 Spark Plug:

- When the vehicle more vibrates even after changing the air filter, throttle Body cleaning, etc.
- Then we decided to replace all the Spark Plugs.
- But, sometimes customers says don’t change spark plugs.
- Then we clean all spark plugs with the help of Polish paper.
- It reduces the cost.

5.5.3 Steering Assembly:

- When we taken a test drive & confirm that the steering is hard, more effort is required to turn & steering is not coming back after turning.
- The steering assembly should be change.
- But sometimes customers says don’t change it, it is very costly.
- Then we service that steering assembly.
- In servicing of steering assembly nothing special is required, just to fill the oil & grease into the assembly with the help of Bench Vise.
- It is easy way to reduce the cost.
5.6 Cost estimate of Major repairs:

- Oil filter = 560.00Rs
- Oil Filter = 450.00Rs
- New Diesel Filter = 1600.00Rs
- Fog Lamp = 10000.00Rs
- Throttle Body = 14000.00Rs
- Blower Motor = 5000.00Rs
- Brake Disc = 1200.00Rs
- Rear Wheel Bearing = 3000.00Rs
- Brake Pad = 600.00Rs
- Clutch Plate = 3500.00Rs
- Pressure Plate = 4000.00Rs
- Front Stabilizer = 3000.00Rs
- Air Filter = 550.00Rs
- AC Filter = 450.00Rs
- Strut Mount = 560.00Rs
- Cylinder Head Gasket = 800.00Rs
- Intake Manifold = 1000.00Rs
- Antenna Rod = 3000.00Rs
- Oil Gauge = 300.00Rs
- Rear Axle = 16000.00Rs
- Viper Kit = 800.00Rs
- Drive Shaft = 10000.00Rs
- Synchronizer Ring = 6400.00Rs
- Turbocharger = 16000.00Rs
- Crankshaft = 12000.00Rs
- Cylinder head = 16000.00Rs
- Piston = 3500.00Rs
- Piston Pin = 1700.00Rs
- Connecting Rod = 4000.00Rs
- Diesel Injector = 13000.00Rs
- Water Pump = 10000.00Rs
- Catalic Converter = 14000.00Rs
- Oil Drain = 300.00Rs
- Viper Blade = 700.00Rs
- Side Mirror = 5000.00Rs
- Radiator = 10000.00Rs
Report on INDUSTRIAL TRAINING at TORQUE AUTOMOTIVES

- Door Handle = 3000.00Rs
- Crankshaft Bearing = 2000.00Rs
- Ignition Coil = 1500.00Rs
- Distributor = 5000.00Rs
- Electronic Control Module = 23000.00Rs
- Jumper Strut = 2300.00Rs
- Tyre Tubeless = 7000.00Rs
- Wheel Rim = 6000.00Rs
- Fuel Tank = 10000.00Rs
- Simple Silencer = 10000.00Rs
- Door = 12000.00Rs
- Door Fender = 6000.00Rs
- Front Windshield = 10000.00Rs
- Door Latch = 3000.00Rs
- Head Light = 6000.00Rs
- Tail Light = 3000.00Rs
- Radiator Fan = 8000.00Rs
- Intercooler = 15000.00Rs
- Differential = 13000.00Rs
- Gear Box = 80000.00Rs
- Intake Manifold = 9000.00Rs
- Valve = 2000.00Rs
- Exhaust Manifold = 9000.00Rs
- Ac Belt = 1300.00Rs
- Timing Chain = 2500.00Rs
- Master Cylinder = 17000.00Rs
- EGR (Exhaust Gas Recirculation) = 8000.00Rs
- Starting Motor = 13000.00Rs
- Seat = 9000.00Rs
- Dashboard = 16000.00Rs
- Seat Belt = 5000.00Rs
- Air Bag = 1,50,000.00Rs
- Power Window Set = 15000.00Rs
- Carburetor = 9000.00Rs
- Hand Brake = 3000.00Rs
- Thermostat Valve = 2500.00Rs
- UJ (Universal Joint) = 3000.00Rs
- Steering Assembly = 40000.00Rs
Chapter no: 6 Special challenging Experience

6.1 Camshaft Broken

- The car is came to workshop for Changing a Timing Chain because of little noise came from right side of engine.
- First of all we taken a test drive.
- The noise is coming from the right side of engine; we decided to change a Timing Chain.
- The reason for broken a Cam-Shaft is because a Timing Chain not properly fitted.
- The reason for Cam-Shaft Broken is because Timing Chain not fitted properly & car doesn't started in first time, then also tried 3 to 4 times and result is heavy noise occurs & Cam-Shaft Broken.

Figure 56 Camshaft
6.2 Engine Jerking

- First of all we taken test drive in different speeds in different roads.
- We feel the jerking coming from engine.
- Then we lifted-up the car and check the under body of engine & transmission but, all found Ok.
- Engine oil & Coolant checked.
- Then we check the lights shown on dashboard which are also perfect.

- The diesel is also coming to the filter, it returns also to the High Pressure Pump.
- The fuel is also goes to the Common Rail.
- The diesel is also reached to the Injectors.
- We replace the ECM but, the problem was not solved.
- We replace the Filter Assembly but, then also problem was not solved.
- Then we replace the Common Rail with Pressure Regulator Sensor, but still nothing found to be perfect.
- Then we service the EGR Valve, but still the problem remains same.
- The 2nd cylinder injector was frozen.
- Then we remove the Fuel tank & check the fuel quality.
- The quality of fuel is not good, so the Injector was frozen.
- And the problem was due to poor fuel quality.
- Then we remove all the injectors & give to clean
6.3 Starting Problem

- First of all we taken test drive.
- In test drive we feel the jerking of engine and noise coming from the engine.
- We feel the car is running with low pick-up.
- Then we lifted-up the car & check underbody, but there is no damage found.
- We try with SDT to find out what the problem is but, SDT also displays no damage.
- Then we check the fuel coming properly or not but, the fuel is properly coming.

- We check the diesel filter inlet & Outlet pipes, they are also not damage.
- Then we check the injectors that are also working properly.
- After checking this all we change the Injectors but problem was not solved.
- Then we change the Common Rail with Pressure Regulator Sensor, but still nothing solved.
- Then we change the ECM, then also problem not solved.
- Then we assume that there is something damage in Engine.
- And we decided to remove the Cylinder Head.
- After removing the Cylinder Head, the gasket between the cylinder head & cylinder block was damage.
- The gasket of 1st & 2nd cylinder is damage, so both cylinder compression was mixing in each other and make them enabled to create proper power.
- Then we replace the gasket and problem was solved.
- We take a test drive & vehicle runs very smoothly without noise.
Chapter no: 7 My Liking & Disliking

➢ My liking of Workshop

- First of all I like to say that I really enjoy the training.
- A lot of knowledge I got from the Training Manager, Mechanic, Helpers, etc.
- The area in which my organization was situated is nice.
- There is enough space to do different services.
- The management of organization is very perfect.
- The cars are equally distributes to Mechanic.
- The service is done time to time.
- The customer gets her car time to time.
- The way to do different work in workshop is also nice.
- The Machines, Instruments & Equipments use in workshop are also of Standard Quality.
- The maintenance of Machines, Instruments & Equipments are also done time to time.
- A service advisor has talked with customers very nicely & politely.
- There is good Co-ordinates among mechanic.
- The leadership of Manager is also good.
- Training Manager is giving good training to everyone.
- I loved the way of test drive in different roads.
- The tools use in workshop is of Standard quality.
- The mechanic & helpers help me a lot in expanding my knowledge.

➢ Disliking of Workshop

- Sometimes the service is not done properly.
- After servicing the car, the Mechanic is not cleaning the space, where he done the service.
References & Bibliography

- **Books:**
  - Self Study Program
  - R. B. Gupta, Automobile Engineering, Satya Prakash
  - Skoda-auto.com