

INTERNSHIP REPORT

BACHELOR OF TECHNOLOGY
in
MECHANICAL IN AUTOMOTIVE ENGINEERING
BY
BHANU
(SUMMER INTERN)



Under Supervision of
Mr. ALOK KUMAR SIR (GENERAL MANAGER)

Mr. NITIN JAIN SIR (SENIOR MANAGER)

ESCORTS KUBOTA INIDA PVT. LTD,
FARIDABAD HARYANA

(Duration: 8th JULY 2025 to 8th AUGUST 2025)

ACKNOWLEDGEMENT

Firstly I would like to thank **MR. ALOK KUMAR SIR** (GENERAL MANAGER) (QAD ENGINE-CS), of **ESCORTS KUBOTA INDIA PVT. LTD.** for giving me the opportunity to do an internship within the organization.

I also would like all the people that worked along with me **ESCORTS KUBOTA INDIA PVT. LTD.** with their patience and openness they created an enjoyable working environment.

It is indeed with a great sense of pleasure and immense sense of gratitude that I acknowledge the help of these individuals.

I would like to thank **MR ALOK KUMAR SIR,**
MR. NITIN JAIN SIR, **MR. DHEERAJ RANA SIR** and **MR.DEVESH PANDAY SIR**
MR. NITIN SIR and **MR. SHIVAM SIR** for teaching me throughout my internship.

I am extremely great full to my department staff members and friends who helped me in successful completion of this internship.

MR. ALOK KUMAR SIR
(GENERAL MANAGER)

MR. NITIN JAIN SIR
(SENIOR MANAGER)

BHANU
(INTERN)

ABOUT ESCORTS KUBOTA

Escorts Kubota Limited, formerly **Escorts Limited**, is an Indian multinational [conglomerate](#) that operates in the sectors of [agricultural machinery](#), construction machinery, material handling, and railway equipment. Its headquarters are located in [Faridabad, Haryana](#). The company was launched in 1944 and has marketing operations in more than 40 countries. Escorts manufactures [tractors](#), automotive components, railway equipment, and construction and material handling equipment.

Escorts Kubota Limited's management team includes [Nikhil Nanda](#) as the Chairman and Managing Director and Seizi Fukuoka as Deputy Managing Director.

Escorts Agri Machinery was launched in 1960. The company manufactures [tractors](#) under the brand names Farmtrac, Powertrac, and Steeltrac. The first Escorts tractors were produced in 1961 based on [Ursus](#) license. In 1969, a partnership with [Ford](#) was set up to produce licensed Ford tractors for India. Escorts has a plant in [Mrągowo, Poland](#), that was purchased from [Pol-Mot](#) in 2000, and four plants in India. There was an assembly plant in [Tarboro, North Carolina](#), that was purchased from Long Agri, but the North American subsidiary went into [receivership](#) in 2008.

Escorts Kubota Limited – Construction Equipment manufactures and markets construction and material handling equipment like Safe Cranes, Hydra Cranes, backhoe loaders & compactors. Formerly, Escorts Construction Equipment Limited, their manufacturing and assembly facility is located in [Faridabad, Haryana](#).

WEEKLY OVERVIEW OF INTERNSHIP ACTIVITIES

1st WEEK	DATE	DAY	NAME OF THE TOPIC/MODULE COMPLETED
	08/07/25	TUESDAY	PLANT LAYOUT
	09/07/25	WEDNESDAY	FT ENGINE ASSEMBLY LINE
	10/07/25	THURSDAY	FT ENGINE ASSEMBLY LINE
	11/07/25	FRIDAY	PT+FT ENGINE ASSEMBLY LINE
	14/07/25	MONDAY	MQA OBSERVATION

3rd WEEK	DATE	DAY	NAME OF THE TOPIC/MODULE COMPLETED
	22/07/25	TUESDAY	FT TRANSMISSION ASSEMBLY LINE
	23/07/25	WEDNESDAY	FT TRANSMISSION ASSEMBLY LINE
	24/07/25	THURSDAY	FT TRANSMISSION ASSEMBLY LINE
	25/07/25	FRIDAY	MQA OBSERVATION
	28/07/25	MONDAY	MQA OBSERVATION

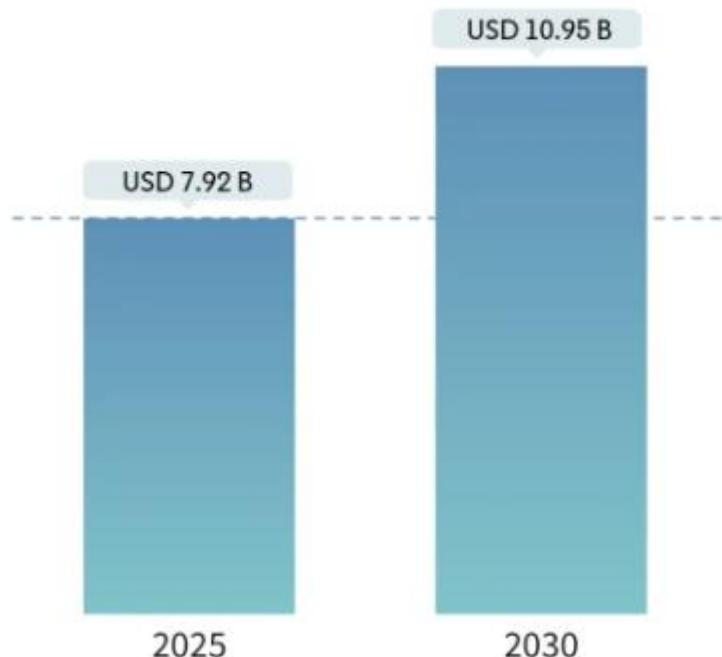
2nd WEEK	DATE	DAY	NAME OF THE TOPIC/MODULE COMPLETED
	15/07/25	TUESDAY	FT REAR AXEL ASSEMBLY LINE
	16/07/25	WEDNESDAY	FT REAR AXEL ASSEMBLY LINE
	17/07/25	THURSDAY	FT REAR AXEL ASSEMBLY LINE
	18/07/25	FRIDAY	MQA OBSERVATION
	21/07/25	MONDAY	MQA OBSERVATION

4th WEEK	DATE	DAY	NAME OF THE TOPIC/MODULE COMPLETED
	29/07/25	TUESDAY	FT MAIN ASSEMBLY LINE
	30/07/25	WEDNESDAY	FT MAIN ASSEMBLY LINE
	31/07/25	THURSDAY	FT MAIN ASSEMBLY LINE
	1/07/25	FRIDAY	PDI
	4/07/25	MONDAY	PDI

India Agricultural Tractor Market

Market Size in USD Billion

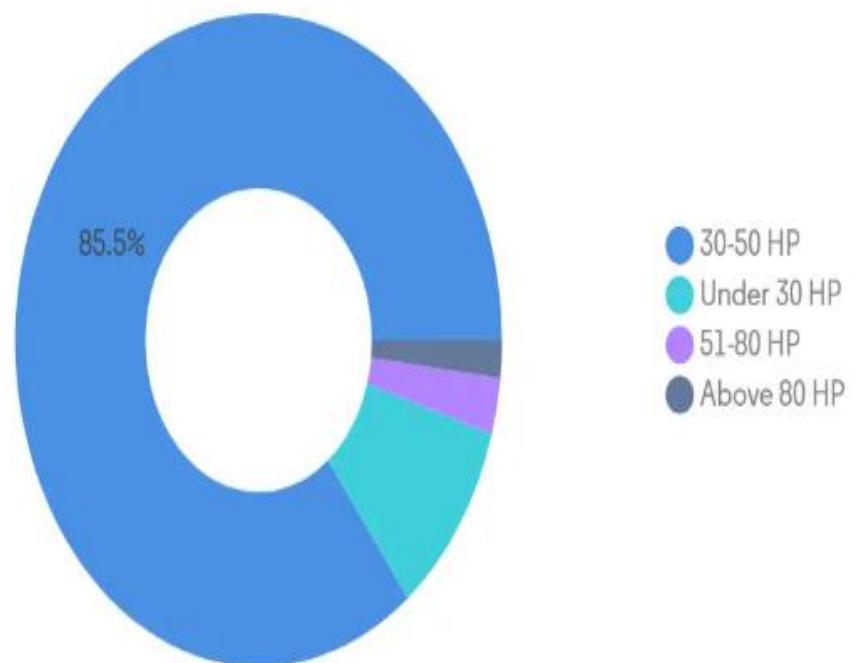
CAGR 6.70%



Source : Mordor Intelligence



India Agricultural Tractors Market: Market Share by Engine Power Segment (2024)

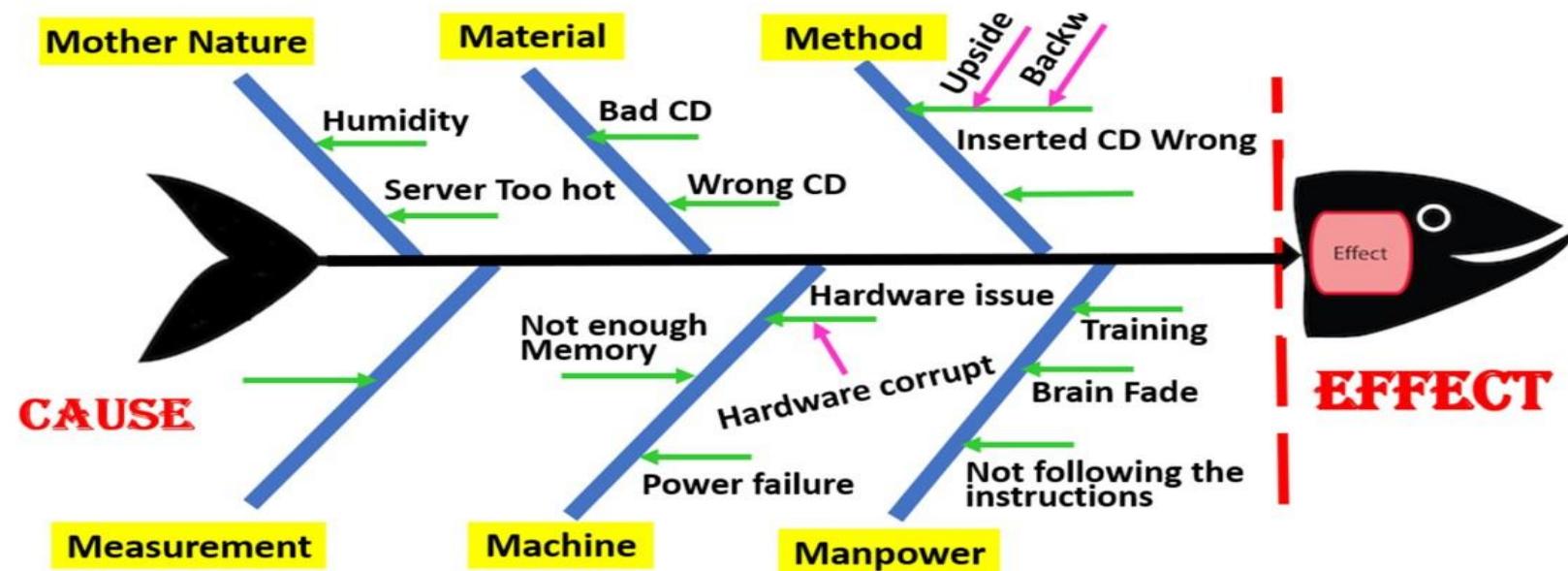


- 30-50 HP
- Under 30 HP
- 51-80 HP
- Above 80 HP

FISH BONE DIAGRAM

A Fishbone Diagram, also known as an Ishikawa Diagram or Cause-and-Effect Diagram, is a visual tool used to systematically identify and analyze the root causes of a specific problem.

Fishbone Diagram



SOME QUALITY TOOLS



WHAT IS POKE YOKE

Poka-Yoke (ポカヨケ) is a **Japanese term** that means "mistake-proofing" or "error prevention." It is a lean manufacturing technique used to prevent human errors from occurring in a process or to make them immediately obvious.

Poka Yoke = Mistake-Proofing

Poka yoke strategies eliminate human error from your processes so that defects never get to customers, meaning that your processes are more productive and profitable.



Benefits of Poka-Yoke



KAIZAN

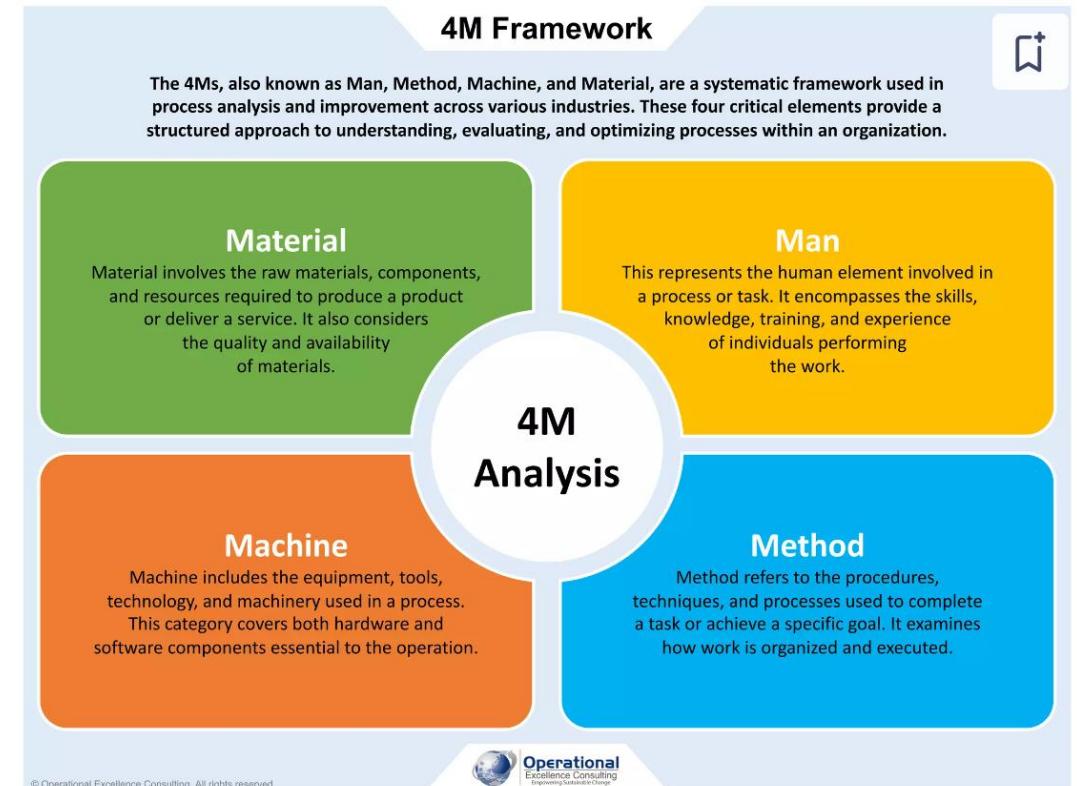
Kaizen (改善) is a Japanese term meaning "continuous improvement". It refers to a **philosophy and practice** that focuses on **small, consistent changes** to improve **processes, efficiency, quality, and productivity** over time.



4M TOOL

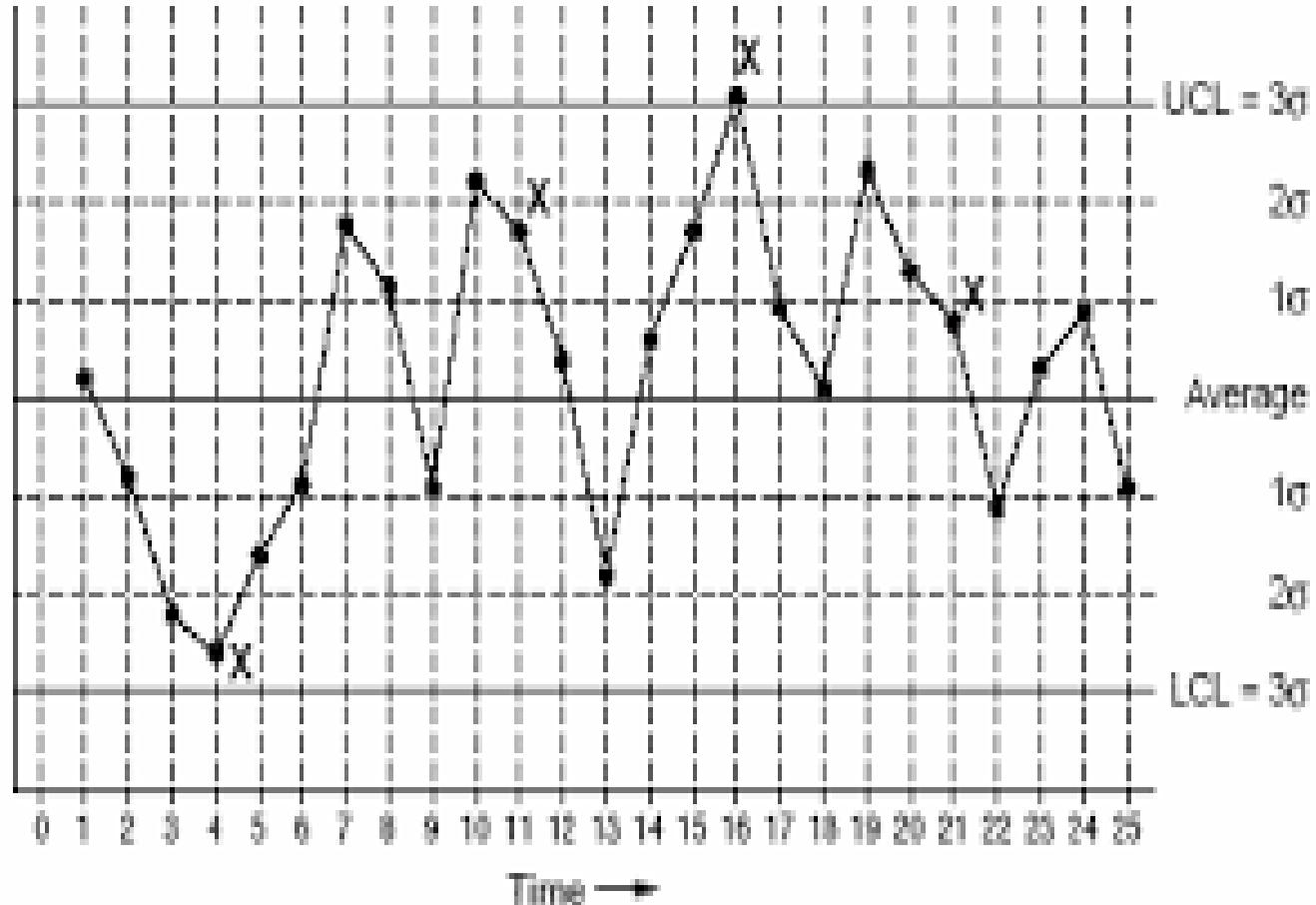
4M Checklist

MATERIAL	METHOD
Production volume is as expected	<input type="checkbox"/>
Inventory levels are correct	<input type="checkbox"/>
The brand name is being considered	<input type="checkbox"/>
The storage is adequate	<input type="checkbox"/>
MACHINE	MAN
Was the inspection executed	<input type="checkbox"/>
Are the hazardous components taged out	<input type="checkbox"/>
Is the lubrication as planned	<input type="checkbox"/>
The order of the process is well programmed	<input type="checkbox"/>
Follows the standards	<input type="checkbox"/>
Was trained for the task	<input type="checkbox"/>
Aware of its environment	<input type="checkbox"/>
Efficiency compliant with standards	<input type="checkbox"/>



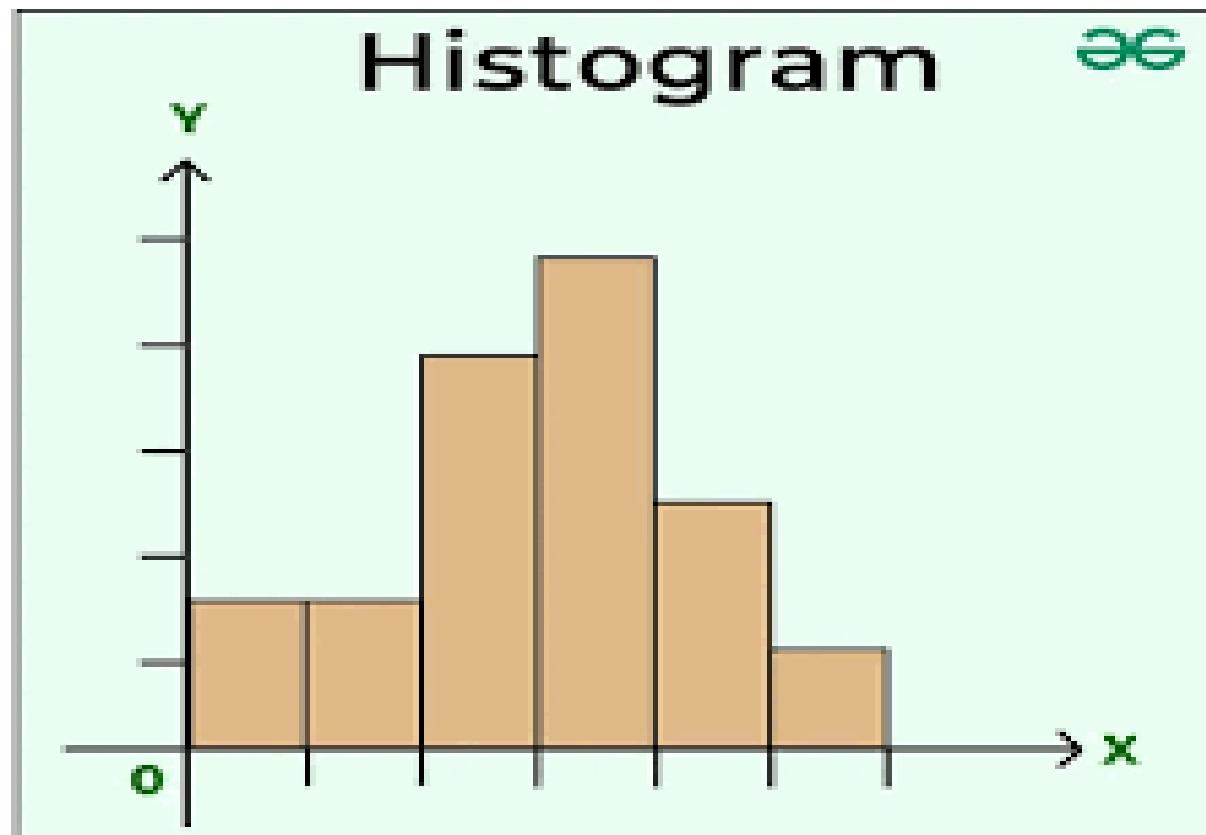
•CONTROL CHART

The control chart is a graph used to study how a process changes over time. Data are plotted in time order. A control chart always has a central line for the average, an upper line for the upper control limit, and a lower line for the lower control limit. These lines are determined from historical data.



❖ HISTOGRAM

A histogram is used to check the shape of the data distribution. Used to check whether the process changes from one period to another. Used to determine whether the output is different when it involves two or more processes. Used to analyse whether the given process meets the customer requirements.



INTRODUCTION

- Tractor engines are the heart of agricultural machinery, designed to provide the power necessary for various farming tasks. They convert fuel into mechanical energy, enabling tractors to perform operations such as plowing, tilling, and hauling. Their reliability and efficiency are paramount for farmers, impacting overall productivity and operational costs.



FT-PT TRACTOR ALL MODELS

THE WORLD OF FARMTRAC
Product Line Up 2025

FARMTRAC आज जीवन की जीवन



EATON SERIES COMPACT IN SIZE, BIG ON IMPACT

- 26 ATOM** 19.39 kW Cat (26 HP Cat) 4WD
Engine : 3 Cylinder, 1.7 L, 80 Nm Transmission : Inboard SC, 9+3-S5 Hydraulic : 750 kg, ADSC
- 30 ATOM** 22.37 kW Cat (30 HP Cat) 4WD
Engine : 3 Cylinder, 1.7 L, 80.5 Nm Transmission : Inboard SC, 9+3-S5 Hydraulic : 1000 kg, ADSC
- 35 ATOM** 26.04 kW Cat (35 HP Cat) 4WD
Engine : 3 Cylinder, 1.76 L, 100 Nm Transmission : Inboard SC, 9+3-S5 Hydraulic : 1000 kg, ADSC
- 30 PROCHARD** 22.37 kW Cat (30 HP Cat) 4WD 6-4WD
Engine : 2 Cylinder, 1.84 L, 92.7 Nm Transmission : Mid Reduction SC, 8+2-C5

New

PROCHARD SERIES THE ORCHARD SPECIALIST

CHAMPION SERIES CHAMPION OF EVERY FIELD

- 35 CHAMPION** 26.09 kW Cat (35 HP Cat) 2WD
Engine : 3 Cylinder, 2.34 L, 140 Nm Transmission : SR, DC, 8+2-C5 Hydraulic : 1500 kg
- 39 CHAMPION** 29.01 kW Cat (39 HP Cat) 2WD
Engine : 3 Cylinder, 2.34 L, 162 Nm Transmission : SR, DC, 8+2-C5
- 41 CHAMPION** 30.57 kW Cat (41 HP Cat) 2WD
Engine : 3 Cylinder, 2.34 L, 165 Nm Transmission : SR, DC, 8+2-C5
- 42 CHAMPION** 32.01 kW Cat (44 HP Cat) 2WD
Engine : 3 Cylinder, 2.49 L, 176 Nm Transmission : SR, DC, 8+2-C5
- 45 CHAMPION** 33.55 kW Cat (45 HP Cat) 2WD
Engine : 3 Cylinder, 2.49 L, 177 Nm Transmission : SR, DC, 8+2-C5

Classic SERIES A LEGACY OF POWER

- 45 CLASSIC** 33.55 kW Cat (45 HP Cat) 2WD
Engine : 3 Cylinder, 1.84 L, 153 Nm Transmission : SR, DC, 8+2-C5 Hydraulic : 1000 kg
- 45 CLASSIC** 37.28 kW Cat (50 HP Cat) 2WD
Engine : 3 Cylinder, 2.34 L, 190.5 Nm Transmission : SR, DC, 8+2-C5 Hydraulic : 1000 kg
- 60 CLASSIC** 37.28 kW Cat (50 HP Cat) 2WD SC
Engine : 3 Cylinder, 2.34 L, 193 Nm Transmission : SR, DC, 8+2-C5
- 60 CLASSIC** 37.28 kW Cat (50 HP Cat) 2WD DC
Engine : 3 Cylinder, 2.34 L, 193 Nm Transmission : SR, DC, 8+2-C5

PROMAXX SERIES THE VERSATILE TRACTOR FOR ALL YOUR NEEDS

- 39 PROMAXX** 29.01 kW Cat (39 HP Cat) 2WD
Engine : 3 Cylinder, 2.34 L, 162 Nm Transmission : SR, DC, 8+2-C5
- 42 PROMAXX** 37.11 kW Cat (42 HP Cat) 2WD 6-4WD
Engine : 3 Cylinder, 2.49 L, 176 Nm Transmission : EP, 8+2-S5, 2WD, DC, 4WD, ADSC
- 45 PROMAXX** 33.55 kW Cat (45 HP Cat) 2WD 6-4WD
Engine : 3 Cylinder, 2.76 L, 193 Nm Transmission : EP, 8+2-S5, 2WD, DC, 4WD, ADSC
- 47 PROMAXX** 35.04 kW Cat (47 HP Cat) 2WD 6-4WD
Engine : 3 Cylinder, 2.76 L, 198.5 Nm Transmission : EP, 8+2-S5, 2WD, DC, 4WD, ADSC

POWERMAXX SERIES UNMATCHED POWER, PERFORMANCE & PRODUCTIVITY

- 45 POWERMAXX** 37.28 kW Cat (50 HP Cat) 2WD
Engine : 3 Cylinder, 3.44 L, 200 Nm Transmission : EP, DC, 8+2-C5
- 50 POWERMAXX** 38.77 kW Cat (52 HP Cat) 2WD
Engine : 3 Cylinder, 3.44 L, 220 Nm Transmission : EP, DC, 8+2-C5
- 60 POWERMAXX** 40.01 kW Cat (55 HP Cat) 2WD
Engine : 3 Cylinder, 3.51 L, 240 Nm Transmission : EP, DC, 8+2-C5
- 6055 POWERMAXX** 44.73 kW Cat (60 HP Cat) 2WD
Engine : 4 Cylinder, 3.79 L, 250 Nm Transmission : EP, DC, 8+2-C5

THE WORLD OF POWERTRAC
देश का # 1 किफायती ट्रैक्टर

G SERIES COMPACT FIT, PERFORMANCE SUPERHIT

- 40 26.09 kW Cat (30 HP Cat)**
Engine : 3 Cylinder, 1.84 L, 140 Nm Transmission : Inboard SC, 9+3-S5, 4WD Lift Capacity : 750 kg
- 40 26.09 kW Cat (30 HP Cat)**
Engine : 3 Cylinder, 1.84 L, 140 Nm Transmission : Inboard SC, 9+3-S5, 4WD Lift Capacity : 750 kg

Diesel Saver Series THE REAL HAULAGE MASTER

- 434 PLUS DIESEL SAVER 27.1 kW Cat (30 HP Cat)**
Engine : 3 Cylinder, 2.34 L, 162 Nm Transmission : SR, DC, 8+2-C5, 2WD Lift Capacity : 1000 kg
- 439 PLUS DIESEL SAVER 29.1 kW Cat (30 HP Cat)**
Engine : 3 Cylinder, 2.34 L, 162 Nm Transmission : SR, DC, 8+2-C5, 2WD Lift Capacity : 1000 kg
- 439 PLUS DIESEL SAVER 30.6 kW Cat (30 HP Cat)**
Engine : 3 Cylinder, 2.34 L, 162 Nm Transmission : SR, DC, 8+2-C5, 2WD Lift Capacity : 1000 kg
- 439 PLUS DIESEL SAVER 30.6 kW Cat (30 HP Cat)**
Engine : 3 Cylinder, 2.34 L, 162 Nm Transmission : SR, DC, 8+2-C5, 2WD Lift Capacity : 1000 kg

DIESEL SAVER RDX Series NEVER COMPROMISE IN PERFORMANCE

- 434 RDX DIESEL SAVER 26.1 kW Cat (35 HP Cat)**
Engine : 3 Cylinder, 2.34 L, 162 Nm Transmission : SR, DC, 8+2-C5, 2WD Lift Capacity : 1000 kg
- 439 RDX DIESEL SAVER 28.1 kW Cat (35 HP Cat)**
Engine : 3 Cylinder, 2.34 L, 162 Nm Transmission : SR, DC, 8+2-C5, 2WD Lift Capacity : 1000 kg
- 439 RDX DIESEL SAVER 30.6 kW Cat (35 HP Cat)**
Engine : 3 Cylinder, 2.34 L, 162 Nm Transmission : SR, DC, 8+2-C5, 2WD Lift Capacity : 1000 kg

STAR Series THE STAR OF EFFICIENCY, THE SUPERSTAR OF POWER

- EURO 40 STAR 22.6 kW Cat (30 HP Cat)**
Engine : 3 Cylinder, 2.34 L, 162 Nm Transmission : SR, DC, 8+2-C5, 2WD Lift Capacity : 1000 kg
- EURO 41 STAR 30.6 kW Cat (40 HP Cat)**
Engine : 3 Cylinder, 2.34 L, 162 Nm Transmission : Inboard SC, 8+2-C5, 2WD Lift Capacity : 1000 kg
- EURO 45 STAR 35.6 kW Cat (45 HP Cat)**
Engine : 3 Cylinder, 2.49 L, 177 Nm Transmission : Inboard SC, 8+2-C5, 2WD Lift Capacity : 1000 kg
- EURO 46 PLUS STAR 35.6 kW Cat (45 HP Cat)**
Engine : 3 Cylinder, 2.49 L, 177 Nm Transmission : SR, DC, 8+2-C5, 2WD Lift Capacity : 1000 kg
- EURO 47 STAR 35.6 kW Cat (47 HP)**
Engine : 3 Cylinder, 2.76 L, 198.5 Nm Transmission : SR, DC, 8+2-C5, 2WD Lift Capacity : 1000/2000 kg
- EURO 50 STAR 37.3 kW Cat (50 HP Cat)**
Engine : 3 Cylinder, 2.76 L, 198.5 Nm Transmission : SR, DC, 8+2-C5, 2WD Lift Capacity : 2000 kg

POWERHOUSE Series GET POWER FROM EVERY DROP

- EURO 40 PLUS POWERHOUSE 35.6 kW Cat (47 HP Cat)**
Engine : 3 Cylinder, 2.76 L, 198.5 Nm Transmission : Inboard SC, 8+2-C5, 2WD Lift Capacity : 1000 kg
- EURO 42 PLUS POWERHOUSE 37.3 kW Cat (50 HP Cat)**
Engine : 3 Cylinder, 2.93 L, 205.5 Nm Transmission : SR, DC, 8+2-C5, 2WD Lift Capacity : 1000 kg
- EURO 42 PLUS POWERHOUSE 37.3 kW Cat (50 HP Cat)**
Engine : 3 Cylinder, 2.93 L, 205.5 Nm Transmission : SR, DC, 8+2-C5, 2WD Lift Capacity : 2000 kg

DIGITRAC Series THE STYLE TO FLAUNT, THE PERFORMANCE TO CONQUER

- 40 DIGITRAC 26.09 kW Cat (30 HP Cat)**
Engine : 3 Cylinder, 2.34 L, 162 Nm Transmission : Inboard SC, 8+2-C5, 2WD Lift Capacity : 1000 kg
- 40 DIGITRAC 26.09 kW Cat (30 HP Cat)**
Engine : 3 Cylinder, 2.34 L, 162 Nm Transmission : Inboard SC, 8+2-C5, 2WD Lift Capacity : 1000 kg

NEXT Series STEP UP WITH NEXT LEVEL OF PERFORMANCE

- 400 NEXT 30.6 kW Cat (40 HP Cat)**
Engine : 3 Cylinder, 2.34 L, 162 Nm Transmission : Inboard SC, 8+2-C5, 2WD Lift Capacity : 1000 kg
- 400 NEXT 30.6 kW Cat (40 HP Cat)**
Engine : 3 Cylinder, 2.34 L, 162 Nm Transmission : Inboard SC, 8+2-C5, 2WD Lift Capacity : 1000 kg
- 400 NEXT 30.6 kW Cat (40 HP Cat)**
Engine : 3 Cylinder, 2.34 L, 162 Nm Transmission : Inboard SC, 8+2-C5, 2WD Lift Capacity : 1000 kg
- 400 NEXT 30.6 kW Cat (40 HP Cat)**
Engine : 3 Cylinder, 2.34 L, 162 Nm Transmission : Inboard SC, 8+2-C5, 2WD Lift Capacity : 1000 kg

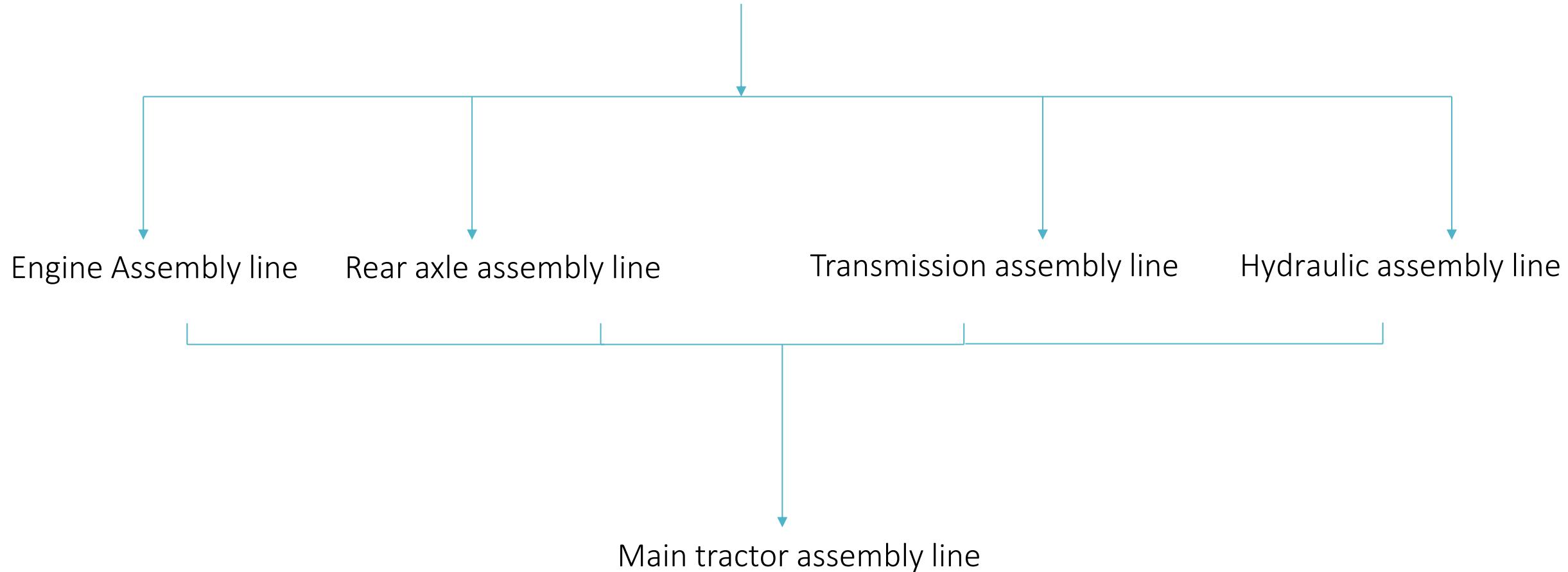
Kubota
Escorts Kubota Limited

Toll Free No. 1800 103 2010

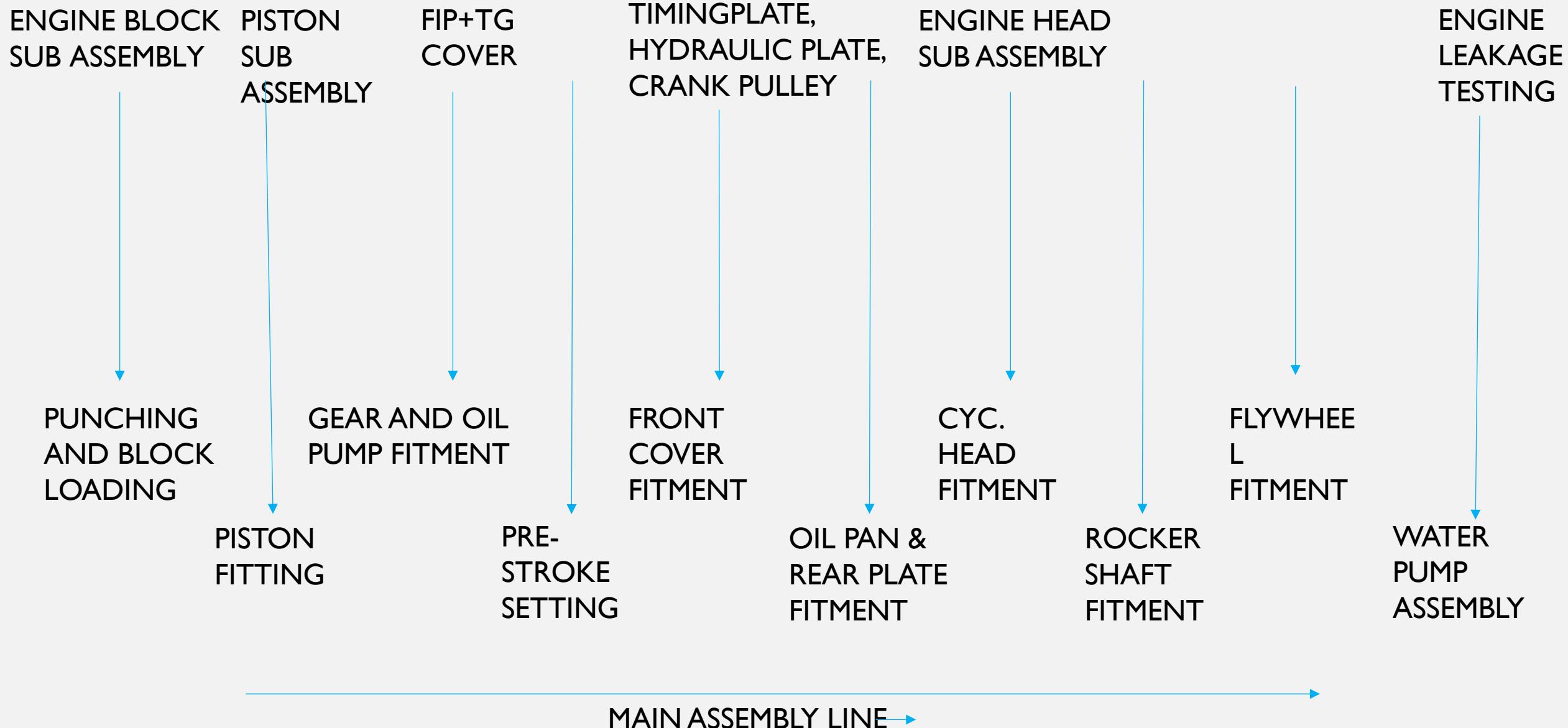
Abbreviations:
HP - Horsepower
SC - Single Clutch, SR - Half Clutch, DR - Double Clutch (Independent Clutch)
SD - Single Disc, HD - Half Disc, DC - Double Disc
HS - Mechanical Power Steering
HPS - Hydrostatic Power Steering

*EURO Series changed to STAR Series

Build Sequence



FT ENGINE ASSEMBLY LINE



FT ENGINE ASSEMBLY LINE

● Engine block sub-assembly

1. Loosen MBC mount from block
2. Fit tappet
3. Fit lower & upper bearings
4. Add lubrication oil and one thrust bearing
5. Put bearing on crankshaft
6. Insert dummy cam into cam block area
7. Add thread locker on cam cover
8. Tighten oil gallery bolts
9. Tighten seal carrier
10. Check/set end play using end play gauge (Range: 19–34)
11. Add LLP (connected with FIP)
12. Add liner (note: AVL model is without liner)

1. WASHING MACHINE-1

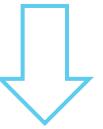
TEMPRATURE = 51° C

SOLUTION = HIGH CLEAN

COMPONENTS- ENGINE BLOCK, CON- ROD, CRANK SHAFT AND HEAD BLOCK WASHING.

2. FITTINGS

3. Punching & block loading



Engraving the engine no./ model no/ D- code/ unique code.

S. NO	MODEL	FIP NO	ENGINE D-CODE	F CODE
1	35 XP NEW D CODE	A08	D10342460AC	F10103770,F10103790,F10106020,F10107730,F10107820,F102740,F10102730,F10107810
2	38 HP DTVS DC	C012	D11521850AB	F10105600,F10105610
3	35 SMX	A08	D10587260AB	F10103810,F10107740,F10107830
4	34 HP	A69	D11641570AA	F10105620,F10108000,F10107990,F10108450
5	45 LP	918	D10407260	F10105780
6	6045 SOUTH AFRICA	918	D10693910	F20101750
7	45 VMX FACE LIFT	918	D10950210AA	F10102300,F10101660,F10102330
8	60 DB	891	D10407250	F10009830,F10104790
9	6050 BANGLA SMX NEW	891	D10844230	F20100250
10	60 DB PRO	891	D11001870AA	F10008820
11	65 1850 EXPORT	920	D10195990	
12	6050 MTO 2WD	920	D10320670	F10005630
13	6050 MTO 4WD	920	D10643250AB	F10008820,F10102330,F10005900
14	6050 BANGLA	920	D11393060AA	F10006860
15	60 SMX PS	920	D10407240	F10109850 F10009850
16	6050 COLD START	920	D10514950	
17	6050 MEXICO 4WD	920	D10513750AB	F10007040
18	6050 MEXICO 2WD	920	D10514950	F10007030
19	T-20 PRO	920	D10844580	F10102550
20	65 1850 PRO/BANGLA	920	D10320660AB	F20104020,F20103180
21	42 HP @2000 RPM	F31	D11875960AA	FF10107000,F10107940
22	45 PRO EPI DC	A30	D10607130	
23	45 SHIMOGA SC 2170,2200	F05	D10587220AB	F10107260,F10106800,F10105660,F10103310,F10105660
24	6045 BANGLADESH	F05	D10844340	F101002790
25	45 LOW CAST ENG SC	F05	D10792540AB	F10107900,F10108030,F10107890
26	45 LOW COST ENG DC	F05	D10792560AB	F10102180,F10107910,F10107860
27	45 SMART DC PS	F07	D10416340AC	F10100950,F10107770,F10103120
28	45 SMART SC PS	F07	D10416330AB	
29	70 CHILE	479	D10181490AB	F10003190
30	45 SMART SAVER SC	F30	D10913030AC	F10101700,F10102700

4. Piston fitting



Adding piston rings on pistons.

1.Oil ring 2. Mid ring 3. Top ring

Adding circlip on one side and install gazen pin (fish pin) with connecting rod and then close gazen pin with circlip..



5. Gear and oil pump fitment

First oil pump installation

Delivery pipe + oil adapter

TG cover with FIP installed

Cam gear, timing gear, idler gear
Fitment



6. Pre stroke set

FIP opened for setting timing
gear(3.45-3.55mm)

Timing of piston is also set with FIP

Instrument used for setting= dial
gauge



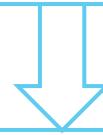
6. FRONT COVER FITMENT



Timing plate, crank pulley
and hydraulic plate are
installed



7. OIL PAN & REAR PLATE FITMENT



Oil sump and adopter plate
FITMENT

● ENGINE HEAD SUB-ASSEMBLY

1. Washing
2. Dowel fitment and intake and exhaust valve insert
3. Lower retainer + stem seal + spring + upper retainer compressed by machine
4. Cotter lock + stud fitment
5. Exhaust and intake pipes added using gasket in between



8. CYLINDER HEAD FITMENT

Gaskit + Engine head
installed

9. ROCKER SHAFT FITMENT

Push rod + rocker arm
installation on intake and
exhaust valves

Tappet setting

10. FLY WHEEL FITMENT

High Pressure pipes(HPP) installed through injectors to FIP to connect them mutually

11. ENGINE LEAKAGE TESTING

Air pressure is passed through the engine to test for leakage

Air pressure of
 $15\text{KPA}=0.15\text{bar}$
Cycle time=132s
Filling= 80s, balancing=30s
Detecting=20s, exhaust=2s

Water pump install

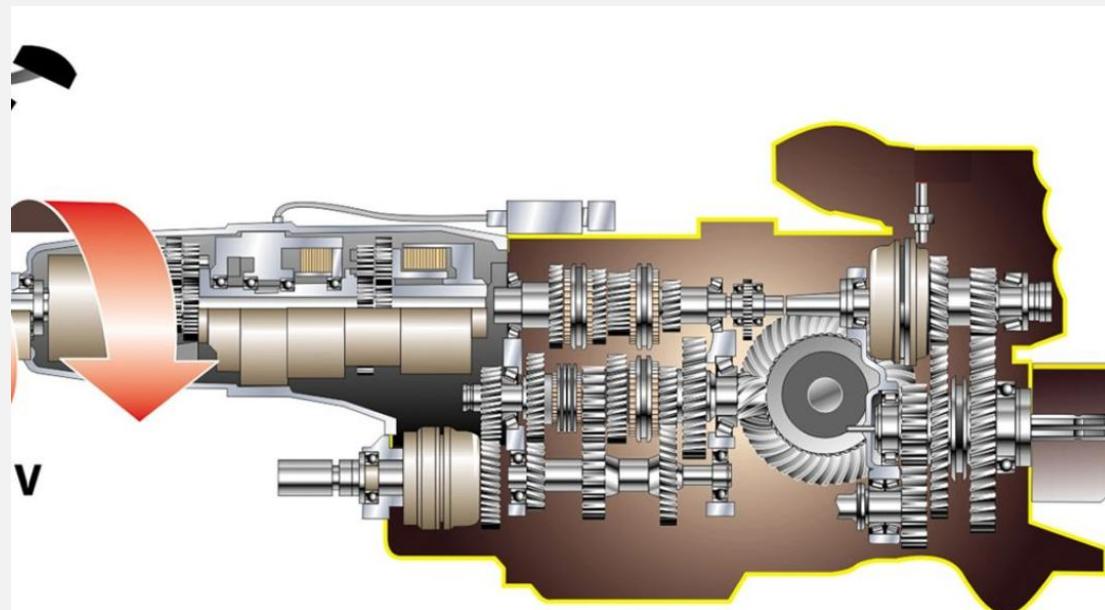
INTRODUCTION TO TRANSMISSION

Transmission is a **mechanical system** in vehicles (cars, bikes, tractors, etc.) that **transfers power** from the engine to the wheels. Its main job is to **adjust the engine's output** to the required **wheel speed and torque**.



Main Functions:

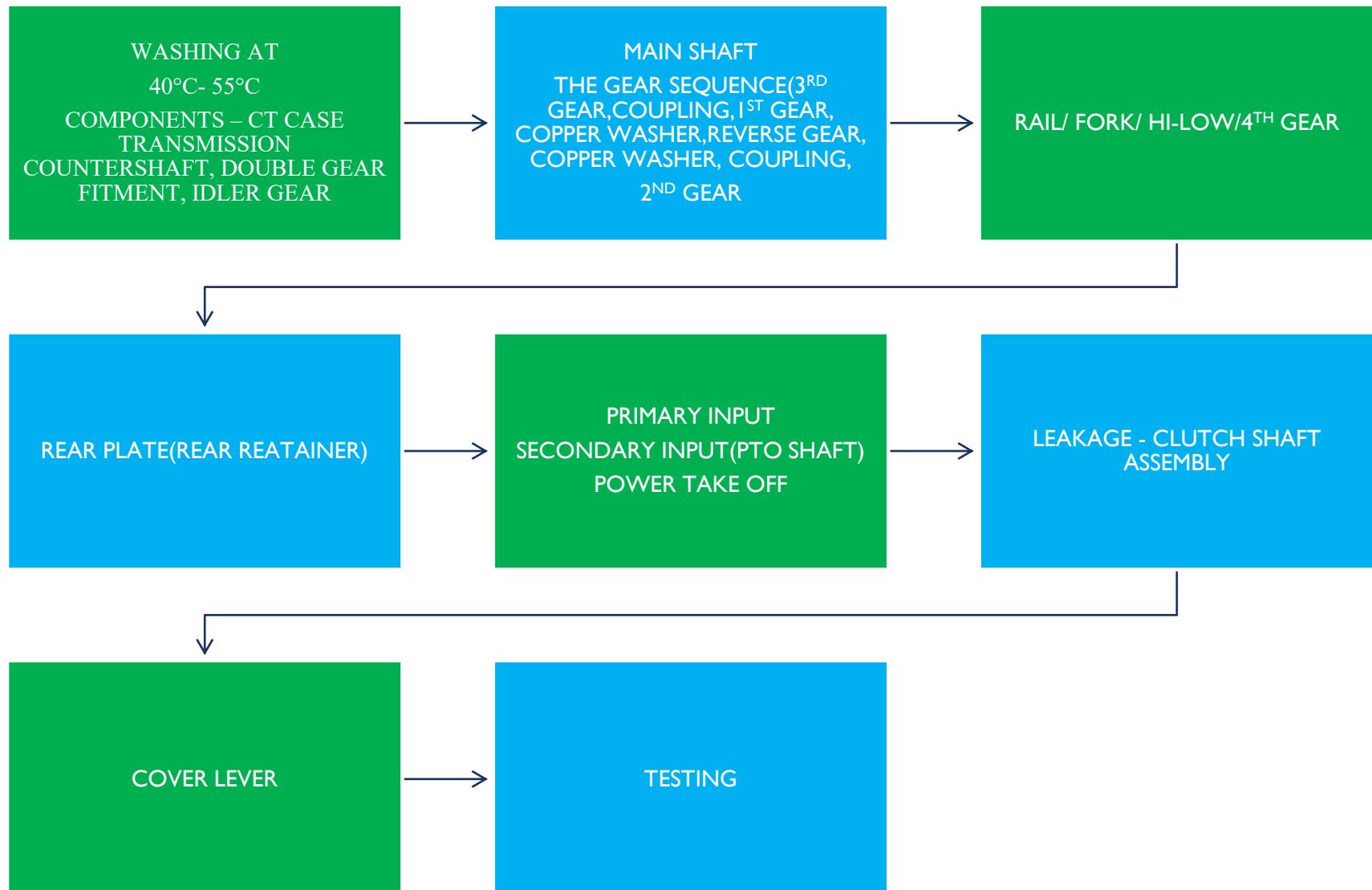
- 1.Change speed & torque:** Allows the vehicle to run fast or slow with proper power.
- 2.Enable reverse motion:** Helps the vehicle move backward.
- 3.Disconnect engine from wheels:** Allows the engine to run when the vehicle is stationary (neutral).
- 4.Transfer power efficiently:** Minimizes energy loss.



Types of Transmission in Tractors

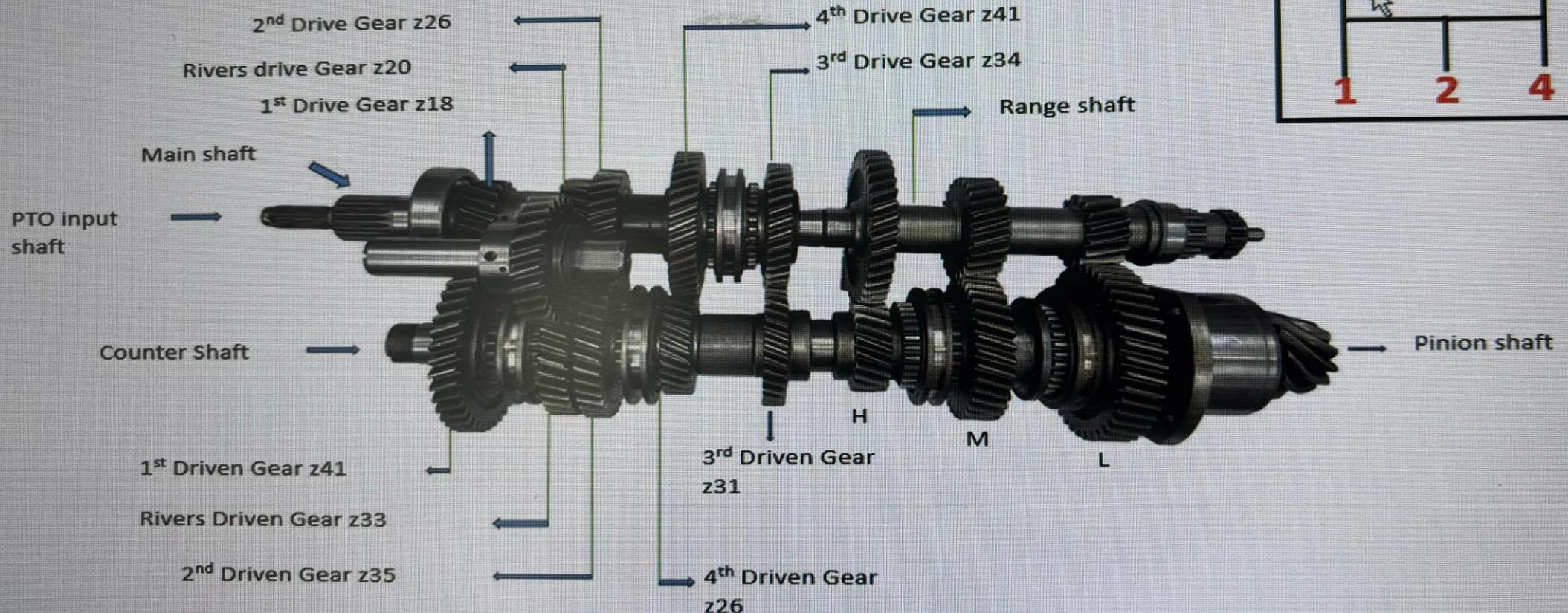
Type	Description	Key Features
1. Sliding Mesh Transmission	Oldest type, gears are manually slid into mesh	- Low cost - Noisy - Difficult gear shifting
2. Constant Mesh Transmission	All gears are constantly in mesh; engagement is done via dog clutches	- Smoother shifting - Less wear and tear - Used in many traditional tractors
3. Synchromesh Transmission	A refined version of constant mesh with synchronizers for smoother shifts	- Easy gear shifting - No grinding sound - Found in modern tractors

TRANSMISSION ASSEMBLY LINE



TRANSMISSION GEAR

FT 12+3 Promaxx- Transmission



REAR AXLE

Introduction

The **rear axle** is a crucial component in vehicles, particularly in **rear-wheel-drive** and **four-wheel-drive** systems. It is responsible for **transmitting power from the transmission to the rear wheels**, enabling vehicle movement.

Functions of the Rear Axle:

- 1. Transmits Torque** from the differential to the driving wheels.
- 2. Supports the weight** of the vehicle (with or without suspension).
- 3. Maintains wheel alignment** and position.
- 4. Provides final gear reduction** via differential before power reaches the wheels.

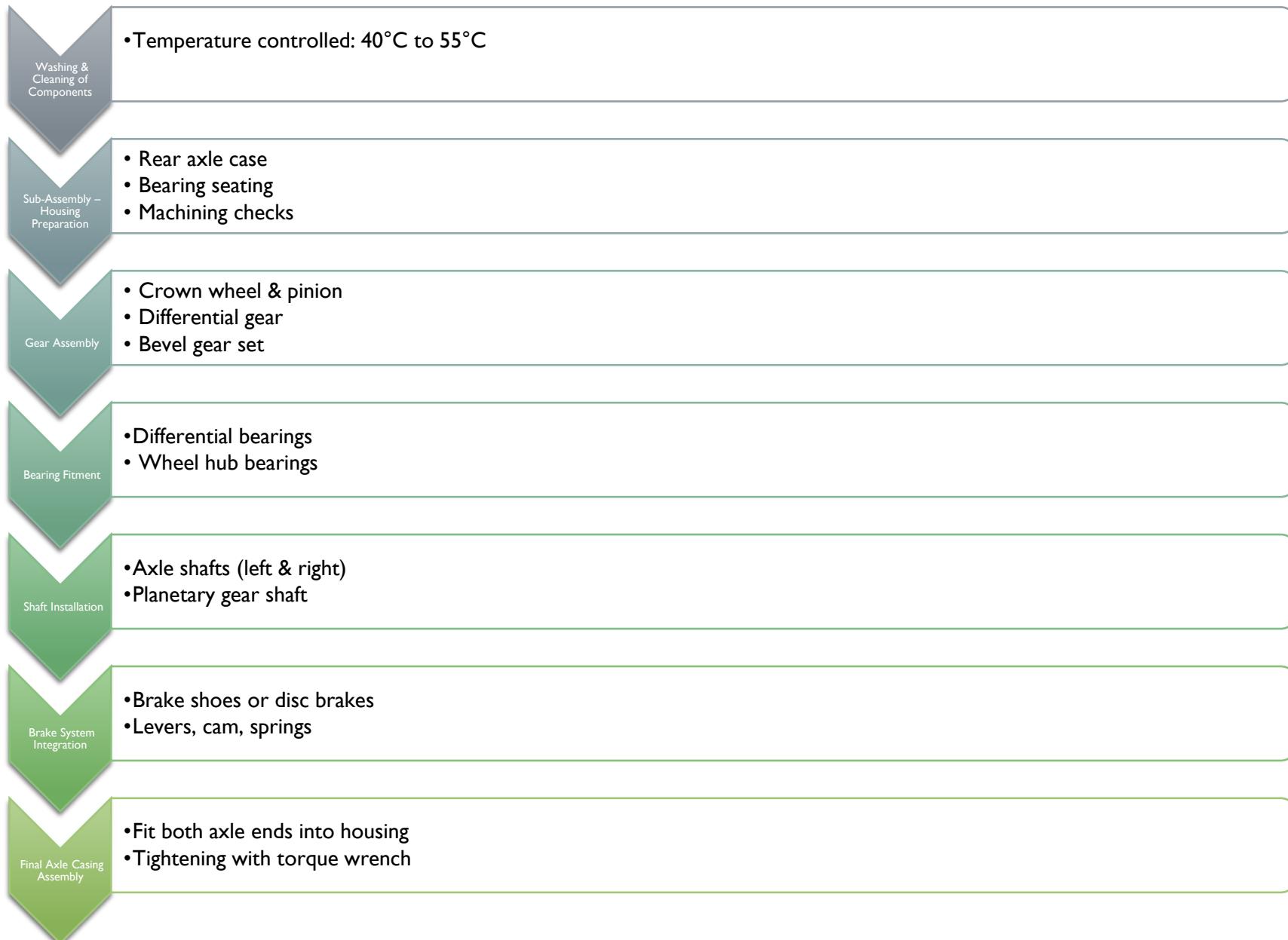


Main Components:

- Axle Shafts** (left & right)
- Differential** (gear mechanism)
- Casing** (housing for axle and gears)
- Bearings & Seals**



FLOW CHART OF REAR AXLE ASSEMBLY LINE



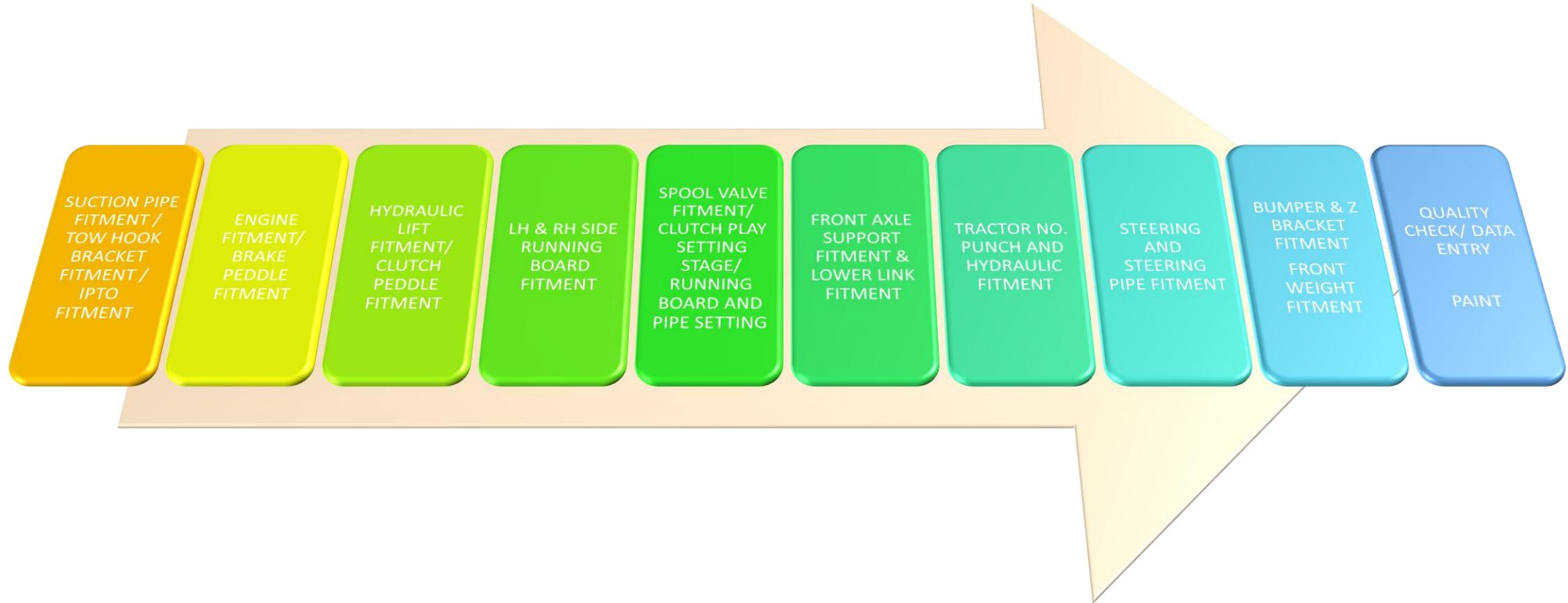
MAIN TRACTOR ASSEMBLY LINE

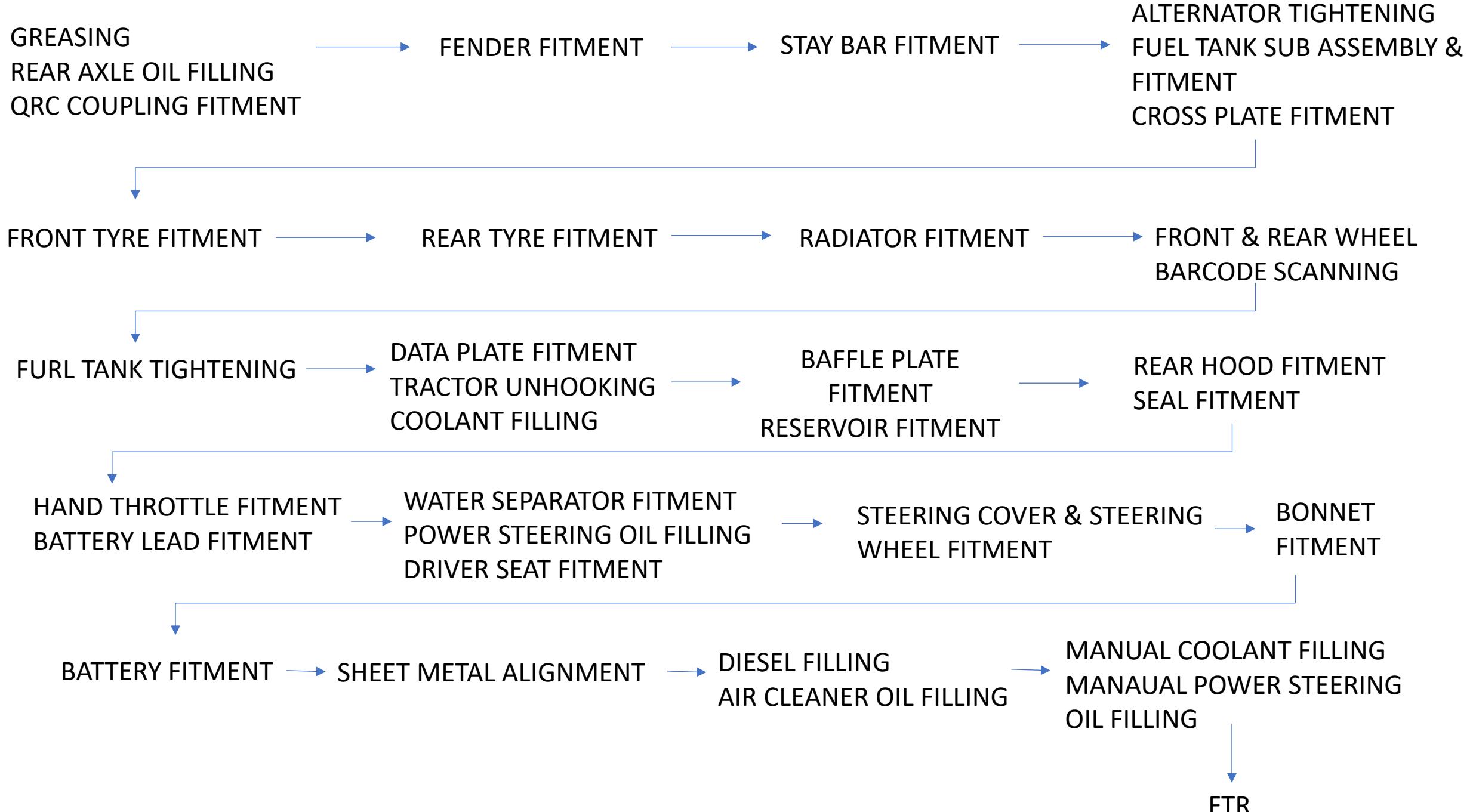
TRANSMISSION
& REAR AXLE
FITMENT

TESTING OF HI-
LOW/ GEAR
SHIFTING AND
PTO SHAFT
MOVEMENT

BACKENED
DOWN STAGE

BACKEND DOWN STAGE





MQA OBSERVATIONS:

PROBLEM WE ANALYSED:

1. COOLANT MIX WITH ENGINE OIL
2. ENGINE CYLINDER BLOCK BURST
3. ENGINE OVERHEATING
4. ENGINE EXCESSIVE OIL CONSUMPTION
5. LINER PROTRUSION, PISTON MELTING
6. ENGINE ABNORMAL SOUND
7. ENGINE WHITE SMOKE

COOLANT MIX WITH ENGINE OIL

- 
1. GASKIT BURNOUT
 2. OVER HEATING ON CYLINDER HEAD MOUNTING BOLTS
 3. CASTING DEFECT
 4. GALLERIES BLOCKED
 5. ANOTHER ENGINE OIL USED
 6. BOLT TORQUE NOT WITHIN THE SPEC.
 7. PISTON MELT
 8. LINER BORE

THANK YOU