

DAIMLER

Daimler India Commercial Vehicles Pvt. Ltd.

INPLANT TRAINING REPORT

(May 7,2019 to May 21,2019)

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ACKNOWLEDGEMENT

We would like to sincerely thank Mr.Prasanta Swain, Divisional Manager, Cab trim, Daimler India Commercial Vehicles, for providing me this opportunity.

We wish to thank Ms.S.Aruna, Human Resources Department, Daimler India Commercial Vehicles , for allowing me to do in-plant training.

We also wish to express our hearty thanks to all the officials of Daimler India Commercial Vehicles who encouraged and helped me throughout this training.

We also wish to thank Mr.DeepanKumar, Inplant training Co-ordinator for helping me throughout my inplant training period.

We consider myself fortunate that we got the opportunity to gain this valuable practical knowledge.

BONAFIDE CERTIFICATE

Certified that this work titled “**INPLANT TRAINING**” is the bonafide work of **PALANIAPPAN Y**
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CHAPTER 1

1.HISTORY

Daimler AG has been active in the commercial vehicle business in India for decades. In 1954, the first truck specifically for the Indian market was a Mercedes-Benz, after Daimler-Benz granted a license for automobile production to India-based Tata Group. A year prior, Daimler-Benz acquired an equity interest in Tata. In 1970, Daimler-Benz and Tata entered into a licensing agreement, providing a framework for further activities. In addition, Daimler has licensed various products to other Indian manufacturers (e.g. Force Traveller). In 2007, Daimler introduced its heavy-duty truck Mercedes-Benz Actros to the Indian market. This vehicle is used primarily in mining operations.



In order to produce light, medium, and heavy-duty trucks for the Indian market, Daimler Trucks entered a joint venture with the Indian automobile group Hero. After receiving official approval from the Indian government in March 2008, Daimler Hero Motor Corporation Ltd. was established. The economic situation from late 2008 to mid-2009 necessitated the re-positioning of Daimler Trucks' partnership with the Hero Group in India. As a result, Daimler AG and Hero Group announced on 15 April 2009 the dissolution of Daimler Hero Commercial Vehicles Ltd. in India. Afterward, Daimler created a new Indian subsidiary without Hero Group's involvement, named Daimler India Commercial Vehicles Pvt. Ltd.

2.EARLY YEARS

In 1994, Daimler entered the Indian market and set up Mercedes-Benz India with its headquarters in Pune. Mercedes-Benz India is also a subsidiary of Daimler AG and is responsible for the manufacture of passenger cars and bus chassis, along with the sales and service network.

In Bangalore, Daimler has set up its largest research and development located outside of Germany, the Mercedes-Benz Research & Development India Pvt. Ltd. In addition to conducting simulations of mechanical structures, the center develops software and uses CAE and CAD tools to design vehicle components. Daimler India Commercial Vehicles Pvt. Ltd. (DICV) is a 100% subsidiary of Daimler AG, Germany. Its aim is to design, manufacture and sell medium- and heavy-duty commercial vehicles that cater to the demand of Indian terrain and customers. These vehicles are known by the brand name "BharatBenz". 3 new trucks were launched on 26 September 2012. These include the 2523 R (a 25-tonne Heavy-duty Rigid truck), 2523 C (a 25-tonne Heavy-duty Tipper truck) and the 3123 R (a 31-tonne Heavy-duty Rigid truck).

With the launch of the first 3 Heavy-duty models in September 2012 (2523R, 2523C & 3123C) BharatBenz began its offering of a range of trucks. Subsequently, BharatBenz launched its range of Medium-duty Trucks in February 2013. It also launched its range of Made-in-India trucks for export markets under the FUSO brand in May 2013. Subsequently, in the year 2013, two more Heavy-duty trucks (2528 & 3128) were also launched. In February 2014, DICV launched 4 new BharatBenz models (3 Tractor and 1 Construction-Mining) at an exclusive event conducted for Media in Mumbai.

3.FACILITIES

The headquarters of Daimler India Commercial Vehicles is based in Chennai, the capital of the southern Indian state Tamil Nadu. The corporate office is situated at RMZ Millenia Business Park, Perungudi, a suburb of Chennai. While the Corporate Office performs the role of a headquarters, DICV has consolidated all functions viz., Research & Development, Human Resources, Finance & Controlling, Marketing, Sales & Aftersales, Product Planning, Operations, and Quality Management at its new plant at Oragadam near Chennai.



The production plant at Oragadam , near Chennai, spreads over 400 acres (160 hectares) was inaugurated on 18 April 2012 by the Honourable Chief Minister of the state of Tamil Nadu, Selvi J Jayalalithaa, in the presence of Dr. Dieter Zetsche - Chairman of the Board of Management of Daimler AG and Head Mercedes-Benz Passenger Cars, Mr. Andreas Renschler - Head of Daimler Trucks & Daimler Buses and top management, media, employees and other stakeholders. The plant hosts a full production facility including body shop, paint, and assembly as well as all logistics needed. Also located at Oragadam, DICV has its own 6 km test-track that simulates Indian conditions.

Before the launch of BharatBenz trucks in India in the year 2012, Daimler Trucks were available in India with the Mercedes-Benz Actros trucks which were earlier assembled at the Mercedes-Benz India plant at Chakan, Pune. The Mercedes-Benz Actros trucks are now assembled at DICV's Oragadam plant. DICV is responsible for all Marketing, Sales, and After-sales of the Mercedes-Benz Trucks, in India.

4.BRANDS

Daimler unveiled a new brand of trucks - BharatBenz - for the Indian market on 17 February 2011. The brand was intended to offer a range of trucks in the 6-49 ton range, with vehicles for applications such as haulage, tippers, and tractor trailers. In 2012 BharatBenz unveiled its first range of trucks to the media, potential customers and partners in a six-day event in Hyderabad. The BharatBenz range of trucks includes Light Duty Trucks (LDT) & Heavy Duty Trucks (HDT) in the 9, 12, 25, 31 and 49-tonne categories, featuring various usages and applications. The first 3 Heavy-duty trucks (2523 R, 2523 C, & 3123 R) were launched on 26 September 2012. On 20 February 2013, DICV launched its Light/Medium-duty range of trucks. These trucks are based on famous FUSO platforms.



The Mercedes-Benz Actros family of trucks is one of the most successful in the heavy-duty truck sector, selling over 600,000 units in more than 100 countries.

Daimler's Bus division launched its Mercedes-Benz inter-city luxury coaches in India in 2008. The initial entrance into India was achieved through DICV's sister-concern, Mercedes-Benz India Pvt. Ltd. However, with the establishment of DICV having become complete the obvious synergies in the area of Commercial Vehicles resulted in the transfer of Daimler Buses, India to DICV. The integration of Daimler Buses, India into DICV took place on 1 April 2013. In March 2014, DICV laid the foundation stone for its new bus plant at its Oragadam facility with an earmarked investment of 425 crores. The bus plant will design, develop and manufacture BharatBenz and Mercedes-Benz range of buses for the Indian market which is slated for launch in the second quarter of 2015.

As of now, DICV deals with three brands of Daimler - "BharatBenz", "Mercedes Benz" and "Fuso".

CHAPTER 2

5. PRODUCTION

The two types of trucks produced are:

5.1 HEAVY DUTY TRUCKS

Heavy-duty trucks weigh between 18-tonne to 40-tonne. There is no higher on-road classification.

Some Heavy-duty trucks are Concrete transport truck, Mobile crane, Dump truck, Log carrier, Garbage truck, Tractor unit and Tank truck

5.2 MEDIUM DUTY TRUCKS

Medium duty trucks weigh between 8-tonne to 18-tonne.

Some medium-duty trucks are Box truck, Van, Platform truck, Flatbed truck and Fire truck

6.DIFFERENT SHOPS IN VEHICLE PRODUCTION

i. CIW:

Cab In White, also known as body shop, is the shop where Cab first gets ready using sheet metals.

ii. PAINT SHOP

In this shop, the cab from CIW gets painted in desired colours using robots.

COLOURS:

- Golden Brown - National permit vehicles
- Active Yellow – Construction vehicles
- Artic White – Intercity vehicles
- Coral Orange
- Bright Red
- Portside Blue

iii. PTI

Power Train India, in this shop assembly of engine and gearbox takes place.

iv. VEHICLE ASSEMBLY

In this shop the assembly of trim parts takes place.

- a. Frame shop
- b. Cab Trim
- c. Chassis

- d. End of line (EOL)
- e. Fully Built Vehicle (FBV)

7.SHOP FLOOR MANAGEMENT (SFM)

The key performance indicators (KPI's) are known as SQDCM and are displayed in the SFM Board. They are:

7.1 SAFETY

The KPI's of Safety is

- Unsafe acts/unsafe conditions
- Minor accidents/First aid cases
- Major accidents
- Environmental incidents

7.2 QUALITY

The KPI's of Quality is

- The first time through (FTT)
- Defects per unit (DPU)
- Quality risks identified

7.3 DELIVERY

The KPI's of Delivery is

- Uptime (for material availability)
- Uptime (for equipment availability)
- Average capacity utilization
- Ontime delivery

7.4 COST

The KPI's of Cost is

- Hours per unit (HPU) direct
- HPU direct remain
- Indirect consumables
- Energy cost in power
- Energy cost in propane
- Ratio
- Facility cost
- Rejection

7.5 MORALE

The KPI's of morale is

- No. of internal transfers
- Participation in AOM
- The attrition rate of Managers and Engineers
- Mandays in training/employee

8. CATEGORIES OF SAFETY

The five categories of safety are

- i. Accident-free
- ii. Major accident
- iii. First aid
- iv. Near miss
- v. Property damage/fire

9. 5S

5S is a workplace organization method that uses a list of five words: "Sort", "Set In Order", "Shine", "Standardize" and "Sustain".

The list describes how to organize a work space for efficiency and effectiveness by identifying and storing the items used, maintaining the area and items, and sustaining the new order. The decision-making process usually comes from a dialogue about standardization, which builds understanding among employees of how they should do the work.

In some quarters, 5S has become 6S, the sixth element being safety.



- Sort (eliminate anything that is not truly needed in the work area)
- Set in Order (organize the remaining items)
- Shine (clean and inspect the work area)
- Standardize (create standards for performing the above three activities)
- Sustain (ensure the standards are regularly applied)

CHAPTER 3

10. CAB TRIM ASSEMBLY

10.1 HDT Production line

Observation on HDT production line

No of stations: 26

Tact time: 8.3min

The following are the important processes that are done in the HDT production line.

- ★ Cab drop
- ★ Pre-assembly
- ★ Roof Hatch
- ★ Damping install
- ★ Cab suspension front assembly install
- ★ Roof trim preassembly
- ★ Roof marker lamp install
- ★ Roof trim install
- ★ Seat belt install
- ★ Cockpit install

- ★ Wiper system install
- ★ AC system install
- ★ Door trim install
- ★ Side window install
- ★ Windshield install
- ★ Door seal install



- ★ Steering column install
- ★ Pedal box install
- ★ Instrument cluster panel install
- ★ Engine tunnel install
- ★ Floor cover install
- ★ Seat fixation
- ★ VIN plate install
- ★ Quality gate

10.2. MDT Production line

Observation on MDT production line

No of stations: 15

Tact time: 16.8 min

The important process in MDT line are:

- ★ Cab Drop
- ★ Pre-Assembly
- ★ Wiring harness install

- ★ Damping install
- ★ Clutch pedal install
- ★ Headlamp install
- ★ HVAC install
- ★ Cockpit Install
- ★ Door dress-up
- ★ Windshield install
- ★ Seat fixation
- ★ Quality gate



Checking the quality of the cab.

11. MAIN LINE (or) CHASSIS LINE

Observations on the Chassis line or the Main line,

No. of Station: 37

Tact time: 8.4min (HDT)

16.8min (MDT)

The important processes in the main line are

- ★ Frame loading
- ★ Engine mounting bracket install
- ★ Wish bone and air tank install
- ★ Leaf spring install
- ★ Tag axle and front axle install
- ★ Rear axle and pusher axle install
- ★ Propeller shaft install
- ★ Quality gate – 1
- ★ Air pipe install
- ★ Engine install
- ★ Air metal and pipe install
- ★ Radiator install

- ★ Rear cab suspension install
- ★ Cable strap cutting



- ★ Quality gate 2
- ★ Cabin install
- ★ Cabin tightening
- ★ FFT connectors
- ★ Entrance step and supporting tube install
- ★ Wheels install
- ★ Fuel tank install
- ★ Fluid filling
- ★ Diesel filling
- ★ Air leak test and bumper install
- ★ Wheels tightening
- ★ Front grill and deflector install
- ★ Flashing
- ★ Quality gate 3
- ★ Roll out
- ★ Repair and rework

12. SKILL EVALUATION

The four levels of skill evaluation are:

12.1. Q1 LEVEL

Able to execute task only under the supervision

- Basic understanding of SWI/JES
- Basic knowledge of safety

12.2. Q2 LEVEL

Work independently and within the cycle time

- To know the SWI/JES of the respective station
- Basic knowledge about process parameters

12.3. Q3 LEVEL

Shows sustenance set targets like production, quality, etc

- Further development of SWI/JES
- The adequate level of English communication
- Able to perform with less cycle time

12.4. Q4 LEVEL

Able to train others

- Ability to train other operators
- The ability of understanding and explaining in English

CHAPTER 4

13.END OF LINE

The following tests are done in the "End of Line" also known as EOL.

- Brake testing
- Smoke testing
- Wheel alignment
- Speedo tester
- Minor repair
- Shower testing

13.2 OBSERVATION ON LEAKAGES

- Roof leakage
- Side window leakage
- Rear window leakage
- Door trim panel leakage

CHAPTER 5

14. RED TABLE

In manufacturing, the rejection rate is the percentage of processed parts that are rejected, for a fixed period of time or a lot of pieces.

The processes involved in the Red Table are:

- ☞ Identify the whole part and tag with complete information
- ☞ Review the tag information and stamp on the tag
- ☞ Move the parts to the red table
- ☞ To raise the notification and to block the stock in SAP
- ☞ Red table meeting

CHAPTER 6 - MINI PROJECT

TIME STUDY

TIME STUDY

Time study may be defined as “the art of observing and recording the time required to do each detailed element of an industrial activity/operation.”

OBJECTIVES OF TIME STUDY

1. Target time for each job can be scientifically estimated. With this estimate realistic schedules and manpower requirements can be prepared.
2. Sound comparison of alternative methods is possible by comparing their basic times.
3. Useful wage incentive schemes can be formulated on the basis of target times.
4. It can lead to proper balancing of the work distribution.
5. It can help to analyse the activities for performing a job with the view to eliminate or reduce unnecessary or repetitive operations so that human effort can be minimized.
6. To standardise the efficient method of performing operations.
7. To standardise conditions for efficient performance.
8. To determine man and machines ratio for effective and efficient utilisation of both.

VALUE ADDED WORK

Value added work in a process are those in which you add something to a product or service for which the customer would be willing to pay.



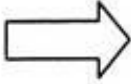

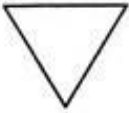
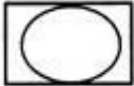
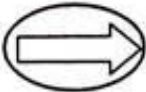
NON-VALUE ADDED WORK

Processes all include steps that do not add value, that is the customer is not paying, but are necessary to make the product or service happen.

WASTE WORK

In these steps' resources are expended, delays occur, and no value is added to the product or service. Customers are absolutely not willing to pay for these activities. These steps should be eliminated from the process.

MOTION STUDY SYMBOLS

Event/ Motion	Symbol	Explanation
Operation		Operation means an action. It is one of the steps in the procedure. Any operation for making, altering or changing the job is said to be an operation. Eg. Cutting and shaping the wood in the manufacture of furniture.
Inspection		It represents checking for quality and quantity of the items. Eg. Weight check or quantity check or hardness during drug preparations.
Transport		Movement or travel of workers or materials from one location to another. Eg. Steel rods being sent to machine shops from stores.
Delay or Temporary Storage		Delay means the process has stopped due to some reason. It is a temporary halt. Eg. Power failure or waiting for the lift.
Storage		It is the stage of a finished good or raw material waiting for an action. Eg. A finished product in a stock room.
Operation and Inspection		A product is being weighed when it is repacked. Eg. In an automatic process where a milk tin is weighed.
Operation cum Transportation		Products are made and ready for travel. Eg. Washing a product when it is being transported.

Basic Procedure for Time Study:

1. Select the job for study and define the objective of the study. This needs statement of the use of results, precision required and the desired level of confidence in the estimated time standards.
2. Analyse the operation to determine if the standard method and conditions exist and the worker is properly trained. The method study or training of operator should be completed before starting time study if need be.

3. Select the operator to be studied if more than one can perform the task.
4. Record the information about the standard method, operator, operation, product machine, quality required and working conditions.
5. Divide the operation into reasonably small elements.
6. Time the operator for each of the elements.
7. Collect and record (video) the data of required number of cycles by way of timing and rating the operator.
8. Separate the work into value added work (VA), non-value added work (NVA) and waste work.
9. Suggest ways to reduce the waste work and to improve efficiency.

Time Study for the processes

1. Windshield pre-assembly in HDT vehicles

S.NO	Process Description	Time Lapsed	#
1	Placing windshield on jig 1 from GLT	12 sec	NVA
2	Installing rubber beading	87 sec	VA
3	Applying Cleaner along edges	33 sec	NVA
4	Pasting Stickers	42 sec	VA
5	Placing windshield on jig 2	4 sec	Waste
6	Applying primer	23 sec	NVA
7	Placing windshield on the jig under the robot	6 sec	NVA
8	Robot applying Windshield glue	116 sec	VA
9	Placing it on jig 3 for transport	5 sec	NVA
10	Correcting with lint free cloth	19 sec	NVA

2.Heater, Blower, Air Duct and Heater Bracket pre-assembly

S.NO	Process Description	Time Lapsed	#
1	Picking the heater unit and locking it in the jig	12 sec	NVA
2	Picking the air duct from the rack and locking it in the jig	9 sec	NVA
3	Picking fasteners and gun to screw both together	6 sec	NVA
4	Screwing air duct and heater unit	15 sec	VA
5	Taking blower from the rack and placing it beside the attached unit in the jig	20 sec	NVA
6	Picking fasteners and gun to screw both together	4 sec	NVA
7	Screwing both together	10 sec	VA
8	Picking heater bracket from the rack	8 sec	NVA
9	Picking fasteners and gun to screw	5 sec	NVA
10	Screwing heater bracket with the attached unit	21 sec	VA
11	Fixing wires in the unit	37 sec	VA
12	Marking the tightened screws	9 sec	Waste

3. Heater, Blower, Air Duct and Heater Bracket assembly- MDT

S.NO	Process Description	Time Lapsed	#
1	Attaching the clamps to the cabin to hold the unit	51 sec	VA
2	Making space for the unit by moving the wires and tying it together	99 sec	NVA
3	Walking to get the unit from the pre-assembly station	29 sec	Waste
4	Placing the unit in the spot and screwing it	77 sec	VA
5	Making space for the clamp	9 sec	NVA
6	Walking to get the lamp from the kitting trolley	11 sec	Waste
7	Attaching the clamp to hold the unit	64 sec	VA
8	Checking whether the unit is tightly fit to the cab	8 sec	NVA

4. Fire Extinguisher in day cabin – MDT

S.NO	Process Description	Time Lapsed	#
1	Taking the parts from kitting trolley and tools	14 sec	NVA
2	Placing the jack and fire extinguisher bracket in the spot	8 sec	NVA
3	Screwing the bracket and jack	25 sec	VA
4	Walking to the tool trolley to take the gun to tighten the screws	11 sec	Waste
5	Tightening the screws	12 sec	NVA
6	Placing the fire extinguisher in the bracket and locking it	6 sec	VA

5. Fire Extinguisher sticker in rear window – MDT

S.NO	Process Description	Time Lapsed	#
1	Taking the sticker from the rack	4 sec	NVA
2	Checking the sticker for damage	3 sec	NVA
3	Removing gloves	3 sec	Waste
4	Taking the sticker off the paper	4 sec	NVA
5	Cleaning the glass for sticking	4 sec	Waste
6	Sticking the sticker	44 sec	VA

6.RFID Sticker in windshield

S.NO	Process Description	Time Lapsed	#
1	Taking the windshield from GLT and placing it in jig	7 sec	NVA
2	Walking to the place where sticker is to be stuck	2 sec	Waste
3	Marking the spot to stick the sticker	10 sec	NVA
4	Going to take the sticker and coming back	9 sec	Waste
5	Sticking the RFID sticker	11 sec	VA

7.AC control unit pre-assembly – MDT

S.NO	Process Description	Time Lapsed	#
1	Taking parts and placing it in jig	6 sec	NVA
2	Keeping gun in right position	4 sec	Waste
3	Placing the bracket to screw it with the unit	6 sec	VA
4	Screwing	38 sec	VA
5	Checking the unit	6 sec	Waste
6	Placing the unit back in kitting trolley	3 sec	NVA

8.Antenna Installation – MDT

S.NO	Process Description	Time Lapsed	#
1	Placing dummy plug to fill the gap	7 sec	NVA
2	Walking to take the antenna from kitting trolley	11 sec	Waste
3	Unpacking the antenna	9 sec	Waste
4	Putting the cover in the dustbin	2 sec	Waste
5	Coming back to the place where antenna is to be fixed	6 sec	Waste
6	Taking the gun	4 sec	NVA
7	Screwing the antenna stand	19 sec	VA
8	Putting the antenna wire through the stand	12 sec	NVA
9	Placing the antenna in the antenna stand and screwing it	27 sec	VA

9.Fire extinguisher installation – HDT

S.NO	Process Description	Time Lapsed	#
1	Picking bracket from kitting trolley	3 sec	NVA

2	Installing bracket in cab	18 sec	VA
3	Positioning the bracket for fitment of extinguisher	13 sec	NVA
4	Walking to get fire extinguisher	22 sec	Waste
5	Fixing fire extinguisher in bracket	15 sec	VA

10.Beacon Lamp installation in Indonesia vehicles – HDT

S.NO	Process Description	Time Lapsed	#
1	Collecting fasteners from chutter rack	28 sec	NVA
2	Taking Beacon lamp and placing it on trolley	32 sec	NVA
3	Walking to take ladder trolley and placing it near the cab	72 sec	Waste
4	Connecting power source to gun	18 sec	NVA
5	Climbing to top of the ladder	10 sec	NVA
6	Riveting	29 sec	VA
7	Getting down to pick beacon lamp and tools to fix and again climbing up	26 sec	Waste
8	Installing the Beacon lamp	295 sec	VA

11.Working lamp switch pre-assembly – HDT Construction

S.NO	Process Description	Time Lapsed	#
1	Fixing the 3 switches in the bracket	27 sec	VA
2	Fixing dummies in all the other ports	16 sec	NVA

12.Working lamp switch assembly – HDT

S.NO	Process Description	Time Lapsed	#
1	Picking the switch	4 sec	NVA
2	Fixing dummy bracket on one side	3 sec	VA
3	Connecting wires to the switches	16 sec	VA

4	Marking the connected wires	6 sec	Waste
5	Fixing the switch bracket to the cab	4 sec	VA

13.Audio System with bezel cover pre-assembly – HDT

S.NO	Process Description	Time Lapsed	#
1	Picking bezel covering and placing it on the jig	12 sec	NVA
2	Removing a slot for fixing audio system	12 sec	NVA
3	Placing the bezel cover on pre-assembly jig	8 sec	NVA
4	Walking to the chutter rack	8 sec	Waste
5	Unpacking the Audio system	84 sec	Waste
6	Walking back to the jig	5 sec	Waste
7	Fitting the Audio system in the bezel covering	146 sec	VA
8	Placing the Audio system with bezel covering on the rack	4 sec	NVA

14. Audio system with bezel system assembly – HDT

S.NO	Process Description	Time Lapsed	#
1	Picking audio system with bezel covering from rack	11 sec	NVA
2	Connecting wires to the audio system	13 sec	VA
3	Fixing the cover in the spot	5 sec	NVA
4	Taking fasteners and gun for screwing	4 sec	NVA
5	Screwing	72 sec	VA

15.Proximity mirror Install – HDT

S.NO	Process Description	Time Lapsed	#
1	Picking the proximity mirror from the stand	2 sec	NVA
2	Fixing the inside sealing on the mirror	13 sec	NVA
3	Placing the fasteners in the spot	13 sec	NVA
4	Taking the mirror to the cab	6 sec	Waste
5	Placing the mirror in the spot and freely tightening the screws	48 sec	NVA
6	Waiting for the door to be closed	18 sec	Waste
7	Tightening the fasteners	24 sec	VA
8	Checking the tightness of the mirror	2 sec	Waste

16.RPM, PTO and Override Switch install – MDT exports

S.NO	Process Description	Time Lapsed	#
1	Removing the dummy plugs from the bracket	9 sec	NVA
2	Fixing switches in the bracket	19 sec	VA
3	Checking the switches	4 sec	NVA
4	Fixing one dummy plug	4 sec	NVA
5	Walking to the place where the bracket is to be fixed	9 sec	Waste
6	Picking parking lamp switch from the kitting trolley and checking	36 sec	NVA
7	Found not working and moving it to the red table and getting a new switch	19 sec	Waste
8	Fixing new parking lamp switch in the bracket and checking	6 sec	NVA
9	Connecting the wires to the switches	38 sec	VA
10	Placing the bracket in the spot	42 sec	NVA
11	Taking gun and fasteners	3 sec	NVA
12	Screwing	24 sec	VA