



Cycle Time Reduction in Fuel Tank Leak Test Machine

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ABSTRACT: Vehicle assembly section is where, the essential parts are getting assembled together to form a final product. But it is not easy to do at a stipulated time as many factors affect its productivity. So major problem is vehicle production getting stop during production due to problem caused by the bottleneck machine. So detailed analysis was done on the machines and the problem can be solved by implementing cycle time reduction in fuel tank leak test machine. Cycle Time can be reduced by mounting sensor near to the clamp in fuel tank leak test machine. so that it will reduce human errors occurred during production and it will increase production rate of the vehicles

KEYWORDS: Vehicle assembly, Bottleneck machine, cycle time, .

I. INTRODUCTION

In vehicle assembly section individual parts of a vehicle is getting assembled together to form a final product. In assembly section have some sub-assembly section for assembly some small parts together. vehicle assembly consists two conveyors used for assembling each parts of vehicle one by one they are pre-line and main-line conveyors. In main-line there are only two sub-assembly they fuel tank leak test machine and panel feeding sub-assembly. Pre-line may consists of many stage in both left and right hand sides both side the assembly work going on continuous of production. In pre line various sub-assembly for assembling small parts for vehicle. The Assembly stage in right hand side start with brake fendor after stages are brake lamp, seat lock assembly etc. In left hand side frame with fork, arrestor nut, speedometer cable, handle bar etc. After finishing the assembling work stages in pre-line then it transfer to the main line through Kara Kurri.

Pre-line may consists of many stage in both left and right hand sides both side the assembly work going on continuous of production. In pre line various sub-assembly for assembling small parts for vehicle. The Assembly stage in right hand side start with brake fendor after stages are brake lamp, seat lock assembly etc. In left hand side frame with fork, arrestor nut, speedometer cable, handle bar etc. After finishing the assembling work stages in pre-line then it transfer to the main line through Kara Kurri.

Main-line consists assembling main parts of the vehicle, it is main part of vehicle assembly. Main line consists of various stage same as pre-line. Main line have stages of assembling work in both right and left handed sides. Stages in right side are Air filter,choke,fuel tank leak test machine, fuel tank cap etc. same as left side also have engine loading, torque check, front brake, cover magneto, electrical inspection. In main line may have Sub-assembly's which are fuel tank leak test machine, panel subassembly. There is assembling of electrical parts such as head light, indicator light and speedometer light and it is shifting to the main line through Kara Kurri. In main line may have pneumatic guns and sensors are placed in conveyors to stop and start work of gun at the particular if product crossed the stage the guns will not work till next product comes and gun work automatically after sensor get sensed. Guns are used for various work like tightening nuts, bolts etc. These are many equipment's which are used in vehicle assembly in both main and pre-line.

II. PROBLEM SELECTION AND OBSERVATION

Most probably major production loss are occur in the vehicle assembly section when comparing to the other section of plant. In vehicle assembly production loss occur due to problems caused during the assembly. Problem are causing by

the machine so it lead to machine break down and machine stopped then it will cause loss of production. Major problem are caused by the machine in they both main assembly's and sub-assembly. But in main line and pre line there is no large machines so if they causes a problem it can be easily can be rectified through spare machine for all machines in the main assembly's. Minor Problems are caused in mainline machine it cannot affect the production for long so there is no chance for break down and stopping production for long time. But in sub-assembly's they were many large size functioning they are basic parts getting assemble so if a small problem get raised then it will be cause for major break down and production get stopped .so most probably major problem are caused by the subassembly machine.

In vehicle assembly they are some sub-assembly situated in the both pre-line and main-line. Pre-line consists of sub-assembly are front fender, fork pressing machine, front wheel, frame numbering machine. Main-line may consists fuel tank leak test machine and panel Sub-assembly.

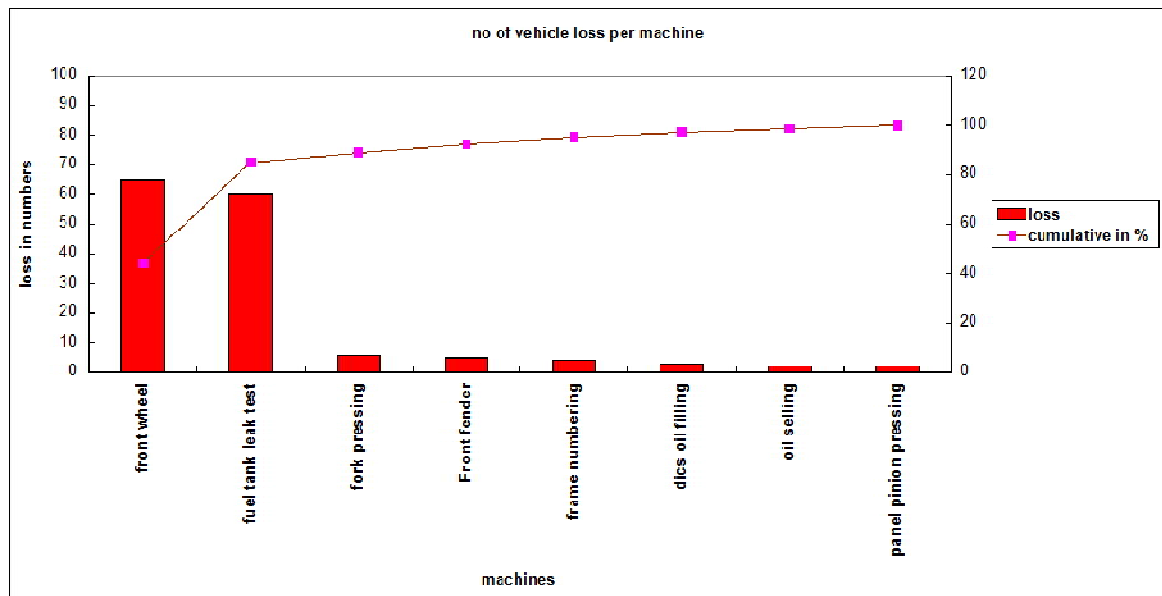


FIG 1 VEHICLE LOSS IN NUMBER PER MACHINE

From the above Paratoo chart shows percentage of vehicle loss per machine in the sub-assembly .If the problem is solved by implementing the correct solution loss per vehicle will get reduce. According to chart front wheel sub-assembly and fuel tank leak test machine are have high percentage of vehicle loss when comparing to the other machines. In front fender having cumulative percentage of 89% vehicle loss, Were fuel tank leak test machine 85% and front wheel subassembly have very low cumulative 44%.If we solve problem in the fuel tank leak test machine it will reduces 80% vehicle loss during production. It will leads to increase the production rate and to achieve zero problem.

III.ANALYSIS AND IMPLEMENTATION

The fuel tank leak test machine causing more human errors and take more cycle time. In fuel tank leak test machine is working under plc logic but in there was problem occurs in the operating the machine. Here when we going start an operation we must first press RESET button then we want to see whether system get reset or not and then press START button to the operation. It is taking more time to go next operation in stage vehicle assembly getting delay .If sometimes plc program getting changed and system collapsed due to mistake done by the man by having confusion in pressing button.It is causing human error which leads to serious problem and made production to stop. So it is one of main problem in these machine.

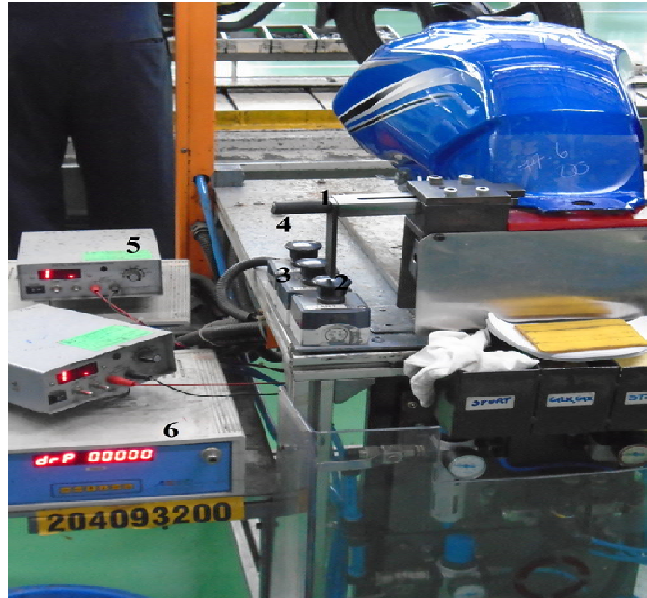


FIG 2 FUEL TANK LEAK TEST MACHINE

Cycle time can be reduced in fuel tank leak test machine through implementing a proximity sensor near to the clamp. At present machine is operated by first pressing reset button and after pressing start button start the test. But now by mounting sensor near to clamp after we placing the tank in the machine we just need move clamp lock it the sensor automatically the tank get locked and feedback will made the system automatically get reset and test will get start. It will decrease human error occurs during the test and decrease the human effort .It will reduce cycle time of work and more fuel tank get tested in minimum times and increase the production of vehicle. The Problem will be get reduced.

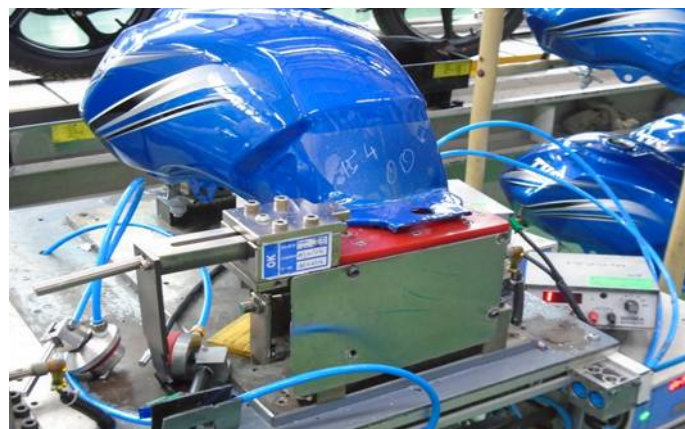


FIG 3 FUEL TANK LEAK TEST MACHINE AFTER IMPLEMENTATION

IV. STANDARDIZATION

The program for new operation is designed and sensor is mounted in the machine near to clamp. It is checked whether application of sensor is reducing the raise of problem and it is helping in increasing of production rate or not. After checking it resulted that cycle time is reduced in the machine by mounting the sensor. So now we standardize the

machine for two stages and load the new ladder logic program into plc. The new machine is used for production and old machine can be used as spare machine.

V. RESULT AND DISCUSSION

After the machine is standardized for the two stages and it is resulted in the increase of vehicle production and achieving zero problem it is shown in below graph fig 4.

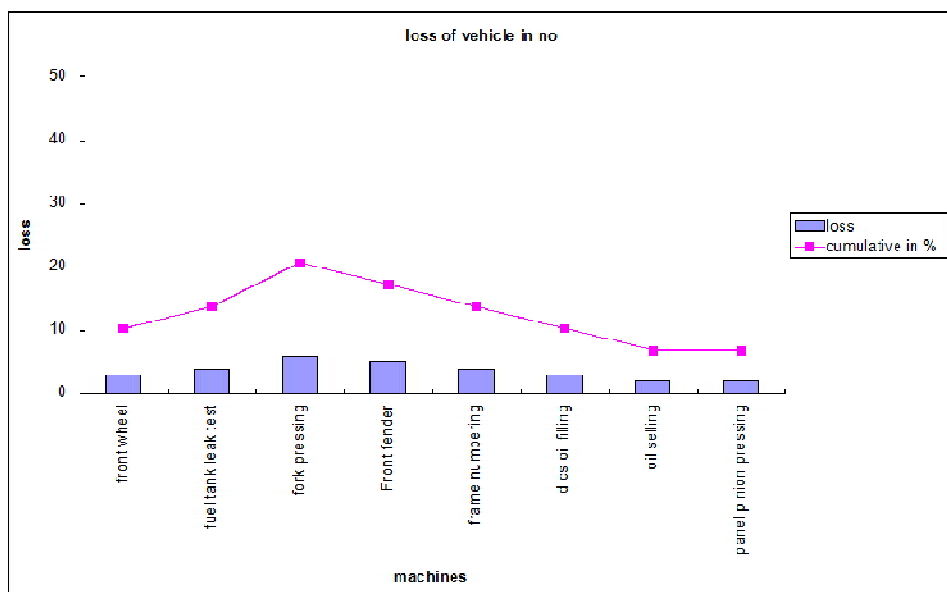


FIG 4 GRAPH SHOWS LOSS OF VEHICLE AFTER STANDARDIZED

Sensor is mounted in the clamp and circuit connection, ladder program is written into plc. Now checking and comparing both old and new machines working, production rate and errors occurring. The vehicle loss per machine after sensor is mounted in fuel tank leak test machine. The graph shows vehicle loss in the machines are get reduced after reducing Cycle time in fuel tank leak test machine and we can change other two stages machines.

VI. CONCLUSION

Fuel Tank Leak Test machine are bottle neck problem causing systems. If any problem causes in the systems it will leads to production stop. So cycle time reduction in Fuel Tank Leak Test machine was made it reduced the breakdown and stopping of production. The production rate is get increased and it is more helpful to increase more vehicle production.

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