Improvement in Delivery Fulfillment of Single Cylinder Pump Variants using Lean Concepts

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Abstract:

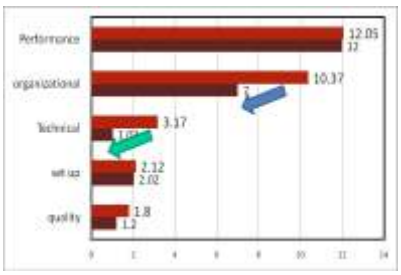
This project was carried out in an automotive industry, PF-33 Monoblock pump manufacturing line. The Diesel Fuel Injection Pumps which is having an external drive are called PF pumps. PF means "pump with foreign drive" i.e. the cam which drives the pump is a separate part and is not part of the pump. PF-33 Pump is used for farm equipment. The pump Element is made up of two parts Element Plunger and Element Barrel. The Plunger and barrel are match ground with a clearance of 2 to 4.5 µm. Later the elements are moved to pump assembly line where the remaining parts are assembled and then moved calibration where the delivery is measured at different rpm and finally to dry tightness, visual inspection and packing.

Here in PF pump there are around 13 different variants which needs to produced in a month and supplied to the customer based on different customer order quantity given for each variant. Since there was no proper information flow to assembly line and also to down stream process, all the variants are manufactured as and when the materials are available resulting in 96% delivery fulfillment.

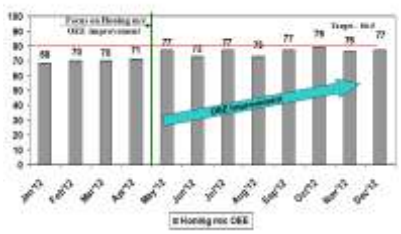
This project was mainly focused on improvement of type wise fulfillment of PF-33 pump by eliminating NVA, reducing technical losses in honing machine there by improving OEE of bottle neck machine i.e. Honing from 70% to 77%. And finally implementing leveling in PF-33 pump assembly with a leveling compliance of 58% along with Pull for up stream process has helped in meeting overall delivery fulfillment with type wise from 96% to 97.34%. By VSM we came to know where we are and where we need to be, Takt time chart reveled the bottle neck process and how to de-bottle neck the same, also it has reveled the need for OEE improvement in Honing machine, VSM helped us to visualize NVA and also need for leveling and consumption based pull system in upstream.

PF-33 Pump

Overall summary



Technical losses reduction



OEE from 70% to 77%

PF-33 Pump fulfillment