

Problem solving on the manufacturing floor

By: Mayukh Ghosh

What is the cost of quality? We make a bad part as a result of a defective sub component. We have wasted time and resources making a part that cannot be used. We will have to either rework to make it suitable to use or we may have to scrap and build/order a new one depending on the economics of the situation. This bad part was built using sub components which were supplied by external supplier who consumed resources to build this defective part. This is the domino effect of bad quality

Let me illustrate with an example

A simple metal fastener supply chain may look like this

Iron ore mined- transported to factory to be made into steel- Ore is converted to steel at factory and rolled into steel raw material- transported to fabrication customer – Fabrication performed on the raw material to convert to a fastener- transported to plater- Plating process performed -transported to hardener-hardening process performed-sent finished parts to distributor- Distributor sells fastener to end customer

If we have a bad fastener, we go back to the distributor who goes back to the manufacturer –stamper and plater ,Meanwhile we try to use up other stock hoping it is usable .This depletes inventory and this may cause trigger of another order and the whole cycle is repeated again. The direct cost of quality is losses to productivity, losses as a result of disservices to the customer. We also have the cost of the supply chain of sending back the bad parts and fighting with the supplier to get credit for the scrap. The supplier has to consume resources to refill the defective part and spend money on logistics. Waste! Waste! Waste!

But this is what happens everyday on the manufacturing floor.

What is happening is we catch bad parts either in the receiving inspection or worse on the line while trying to use it up. This also means that some defective parts are slipping through the crack and working their way into the product which is shipping out to the customer. Depending on the nature of the defect in the product the customer may discover the faulty part. If the manufacturer gets lucky the customer will not discover the defect and everything is good.

So the question is what can a manufacturer do to deliver a quality product? Let us first understand that we will keep getting defective parts. I would even dare say that less than 0.5% processes in the world are at a six sigma level which means 3.4 defects per million products the greater proportion of manufacturer are at a level where they do not like to be. I do not want to throw out a number as the number would be wrong .All I can say is that it will definitely be much less than a six sigma level. This means that as

manufacturer we will receive defective products so how do we make sure that we sort out the defective parts and make sure good parts go out to our customers.

One option is to have 100% receiving inspection, measure 100% of the dimensions, employ a lot of people and make a whole business just of receiving inspection. This however is not feasible and economical and thus we try to rely on stratified sampling.

What I am trying to get at is now that we have discovered defective parts now what?

- Figure out what is defective and what is the impact of these defects. (*How many parts? Will they cause productivity losses?*)
- Understand impact of defective parts (*Are all parts defective? Are these parts urgent will they shut a line down? Who is the supplier? What is the lead time with the supplier? Are there any parts that can be sorted well? What is the gap of the bad parts and good parts?*)
- Have an internal meeting and determine immediate plan of action with all concerned.
- Perform root cause analysis of cause of defects (*Why? Why? Why? Why? Why?*) *This activity will be performed with the supplier.*
- Let analysis drive short term and long term improvement plan.
- Record the defect, analysis, dollars saved and resolution in a database for historical records.

The step that we can do to minimize future repeat acts of the above instance is work with the supplier to make sure that the long term resolution is being sustained. This can be extremely difficult to do as we live in a world where we move from crisis to crisis and do not have time to eliminate some defects once and for all.

Although the above scenario is not ideal, this is what the current state looks like .An ideal future state would be to do all of the above and make sure that the defect does not repeat.