SOLVING PROBLEMS AND IMPROVING THE PRODUCTION FLUX USING QALITY MANAGEMENT SYSTEM

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Abstract. *The subject proposed was developed over two parts. In the first written work it was presented the initial situation within a production flow that is sensed in the appearance of defects and nonconformities in obtain the final products. In this second paper - respectively this - we will show the use of this method in a situation that requires elimination of a technological problem appeared in the production flux and in relieving its positive consequence.*

Keywords: *quality, improving flux, QRQC, production flux*

1. IDENTIFICATION OF ISSUES ARISING IN MANUFACTURING FLOW

After the start of production and delivery of the item box control to various customers, at some point began to appear some complaints from some of the clients.

These complaints concerned different faults detected only when clients who receive orders requested and were defective parts remitted to the manufacturer.

Producing company management had to find answers to these challenges.

Accordingly, top management was forced to get involved in identifying sources from defects reported by customers - on one hand - and on the other hand to quickly find solutions to problems encountered, to avoid repeating claims that produced economic losses.

A first conclusion was that the problems that arise in the production flow are materialized by obtaining spoilage parts.

Following further consideration of the manufacturing process flow control box landmark study, they were identified several problems.

These issues were considered to be corrected.

From spoilage pieces submitted by customers, were selected few and then exposed on some boards designated for this purpose.

Thus the rejects came to the attention of participants involved at that stage of the production process.

With this method, those problems would be better identified and found causes of failed outputs.

First, all issues have been divided into:

- ❑ general problems,
- ❑ visual problems and
- ❑ technological problems.

The causes of most problems ranging from general issues were identified as coming from cataphoresis step process -step 12 – and step dyeing process parts powder paint - step 13.

Fewer problems have been identified as causes of laser cutting stage - stage 2.

A common problem of the visual category was identified as the cause coarse grinding stage (9).

Thus, after the welding of the kit, it passes the trough grinding is achieved by means of an angle grinder for removal of the weld.

In this situation, if there is pressure higher than normal on the surface polished, disc angle grinder can leave some traces in the form of lines horizontally toward the edges of the piece.

Following this step, the grinding is the product which in turn is achieved using a grinder orbital phase in which these traces are very difficult to observe by the operator and they become obvious – significantly - only after the cataphoresis (12).

However, the most common complaint from customers refers to a technological problem category.

This problem is due to the step of mounting inserts (14), due to their non-compliant mounting.

The deficiencies that occur when mounting inserts occurs in two forms:

- ❑ Omitting by the operator to mounting one or more inserts.

It was found that of the two types of inserts that are used to mark studied usually omitted especially some of the mounting insertsM4 type, because they have a much smaller size and also be fixed in 3 rows of the upper surface.

- ❑ Improper adjustment of specific mounting handgun used to mount inserts.

As a result, there is a risk that the inserts do not resist their size and specific torque even to become loose before insertion of the fixing screw.

2. PERFORMING QRQC METHOD FOR DISPOSAL OF IDENTIFIED PROBLEMS AT LANDMARK STUDY AND APPLICATION THE SOLUTIONS

For proper implementation of the method QRQC in the case the item studied, in each of the various problems frequently occur will define one perimeter, an area QRQC. Within each delimited perimeter will introduce one equipped with a flipchart tripod that is fastened one QRQC form.

All these forms will facilitate better analysis and faster and more efficient solving of the problems encountered.

Each form has mentioned units or workshops QRQC involved, also has a reference, a serial number, a date of opening and participants are mentioned.

QRQC form - for any of the problems analyzed - is divided into two main sections.

Thus, in the top of form – called the problem details - are noted every detail about the problem existing in the form of specific questions to which answers are sought, namely:

- ❖ description of the problem:
  - ❑ what is the problem?
  - ❑ who detected the problem?
  - ❑ when the problem was detected?
  - ❑ how it was detected the problem?
  - ❑ how many cases are there?
  - ❑ why is it a problem?
- ❖ why happened this problem?
- ❖ why was not detected?

At the bottom of the form – called the Solutions to the problem - are mentioned information relating to various actions that will be taken to eliminate the future occurrence of the problem, the staff responsible for carrying out actions and deadlines for making, namely:

- ❖ securing actions:
  - ❑ who will be responsible
  - ❑ date provided
  - ❑ date of completion
- ❖ actions concerning reappearance:
  - ❑ who will be responsible
  - ❑ date provided
  - ❑ date of completion
- ❖ actions concerning non-detection:
  - ❑ who will be responsible
  - ❑ date provided
  - ❑ date of completion

Thus, for the problem related to the category of visual part appearance – specifically due to the occurrence of unwanted fingerprints, were implemented QRQC following steps:

a. It was chose a examination committee composed of the chief quality, production department head and head polishing workshop.

b. In the polishing zone which was established as problem solving, it was installed the flipchart QRQC form.

c. QRQC form completed by members of the committee include the following information:

- ❖ description of the problem:
  - ❑ what is the problem?
    - fingerprints from the polishing
  - ❑ who detected the problem?
    - client x
  - ❑ when the problem was detected?
    - to the client
  - ❑ how it was detected the problem
    - visual
  - ❑ how many cases are there?
    - 37
  - ❑ why is it a problem?
    - client does not accept pieces, restored
- ❖ why happened this problem?
  - polydisc action was too strong on surfaces, and orbital it failed on total surface finishing.
- ❖ why was not detected?
  - lack of self-control of the operator
- ❖ securing actions:
  - sorting of stock
  - ❑ who will be responsible**?**
    - chief quality
- ❖ actions concerning reappearance:
  - retraining operators on general rules polishing
  - ❑ who will be responsible
    - head polishing workshop
- ❖ actions concerning non-detection:
  - introduction of self-control 100% on this reference
  - ❑ who will be responsible
    - operator of the polishing operation

At the end of the meeting, the solutions found to end QRQC application to eliminate failed outputs caused by visual problem – fingerprints - were:
- retraining operators on general rules,
- retraining operators operating on polishing module,
- introduction of 100% self-control at this reference,
- at all the following supplies - depending on persistence of the problem – will introduce a 100% control.

But the most common problem was the relating to technology, respectively improper mounting of inserts M4. For this problem, the stages in the application QRQC were:

a. It has been chosen a committee composed of the chief quality, production department head and assembly workshop inserts head.

b. In the area mounting inserts which has been established as an area of problem solving, was installed the flipchart QRQC form.

c. QRQC form completed by members of the committee include the following information:

- description of the problem:
  - what is the problem?
    - insert missing
  - who detected the problem?
    - client y
  - when the problem was detected?
    - to the client
  - how it was detected the problem
    - during assembly
  - how many cases are there?
    -147
  - why is it a problem?
    - can not be incorporated by the client
- why happened this problem?
  - were not respected the mounting rules for M4 inserts
- why was not detected?
  - control is sequential, only 10% from the number of pieces
- securing actions:
  - sorting of stock
  - who will be responsible
    - chief quality
- actions concerning reappearance:
  - construction of a control stand:
    - training operators report,
    - developing a working instructions for proper use of the gun tightening and the level of tightening torque,
    - validation of instruction.
- who will be responsible
  - production department head
  - assembly workshop inserts head
  - chief quality
- actions concerning non-detection:
  - introduction of self-control 100% on this reference
  - who will be responsible
    - operator mounting inserts.

At the end of the meeting, the solutions found to end QRQC application to eliminate failed outputs caused by improper mounting of inserts M4 were:
- building a support plate for placing inserts into groups with fixed number one landmark in part on the plate inserts occurring 5 batches of 5 pieces of that landmark.
- retraining operators mounting inserts on general rules,
- retraining operators on the rules mounting inserts,
- retraining operators on adjusting pistol mounted inserts,
- construction of a control stand for 100% verification of mounted inserts.

For control stand to get the lowest possible cost, its all were recovered from scraps of sheet for quashing.

After the components have been chosen and cut, were sent to the welding and painting stage followed later.

Subsequently, the surface of which were to be placed pieces that had to be checked and verified, it was applied a protective material.

Also, at the optimal level for visualizing it was fixed a panel with new work instructions on checking inserts for the operator.

Finally, on the control stand it was mounted a vise, with the role of guidance and fixing parts to be controlled.

On the vise jaws, it was applied each a rubber band, having a role in protecting all surfaces of parts to be controlled.

For checking inserts, the operator will use a torque wrench with which will be adjust exactly tightening torque of inserts, at the specific value f each parts separately.

3. CONCLUSIONS AND PERSPECTIVES

After implementation of the landmark method QRQC control box and the application of the solutions found, the number of problems encountered and the number of nonconforming parts decreased significantly.

Since inserts bench verification was finalized and installed on, it have been quickly identified them with problems.

Thus, mainly through the introduction of this stand, finished pieces were checked in detail, thus eliminating any possibility of sending damaged parts.

The technological production flow of study highlights control box now ameliorated includes a number of 18 stages (Figure 1).

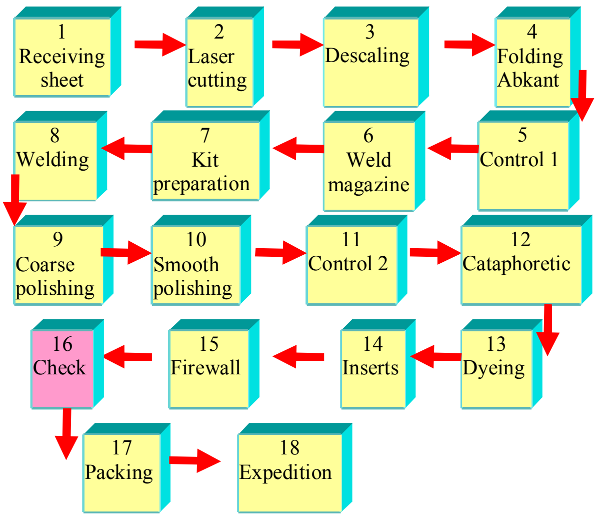

Fig. 1. The technological production flow of study highlights control box now amaliorated

In the improved production flow compared to the initial flow, it has added a post to check inserts, this post is located in close proximity to the final control – Firewall existing one.

By installing the stand to verify inserts (16), were eliminated and the last non-compliant parts, and so it was eliminated the possibility of sending to the clients damaged parts.

So the first advantage of using by the entire staff the same tools in problem solving and analysis processes is to create a common level of performance throughout the organization [6].

Second, inter-functionality increases when all departments of the company manufacturing analyze and report the results using the same type of tools and forms.

Third, once the company has developed the common denominator in the performance, it may change or update tools to achieve a higher competitive level in solving problems and improving production processes.

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