Tools Inspection Management System for Quality Assurance

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***Abstract*- Taparia tools is a hand tools manufacturing company. It has well established quality assurance department to monitor the quality of the product at different stages of production. However, they're facing issues regarding data entry of checkpoints of products which is done multiple times before being entered into an excel sheet. This tedious process increases paperwork as well as data redundancy. We are aiming to reduce data redundancy by digitizing the process which will improve efficiency of work. In order to elevate the process we'll be making predictions considering the information entered erstwhile to ensure whether the product will pass the evaluation.**

***Index terms*- checkpoints, data entry quality assurance, predictions**

I.INTRODUCTION

This project is being implemented for Taparia Tools. Taparia tools[4] started manufacturing hand tools in 1969 in India in technical collaboration with a reputed company of Sweden. The senior management from Taparia Tools had gone to Sweden and took practical training in their plant for more than an year. A senior technical manager from the Swedish company also came to India and stayed here for about two years to establish the technology in India with the appropriate hand holding. Taparia Tools has been since then consistently producing all the hand tools in India with the exact technology of its collaborators.

The Company has a design and development department with latest CAD design facilities where all the designs of products and modifications thereof and also fixtures and tooling's are made. This includes the designs of forging - dies, machining fixtures, cutting tools like broaches, etc.

Taparia's range is quite wide and is continually expanding. The quality, the features, the looks, the packings etc., of tools is continually improved. All these Hand tools are manufactured in our two modern factories, which are having full manufacturing facilities at Nashik and at Goa. Nashik is situated around 190 km from Mumbai and Goa is around 600 km from Mumbai.

Quality of 'TAPARIA' Brand tools everywhere is well received respected and appreciated. The company presently has over 800 distributors, distributing its products all over India. Besides being a Brand leader in India ` TAPARIA' Tools are exported to a good number of countries for last more than 25 years – including to the U.K., U.S.A, Denmark, Israel, Germany, Sweden, Norway, Finland, Dubai, Kuwait, Tanzania, Kenya, Hong Kong, Thailand, Mexico, Argentina, Uruguay, U.A.E & Sri Lanka etc.

The issues are being faced regarding checkpoints for raw material provided by vendors. The quality assurance department has to do data entry multiple times which is very time consuming and requires manual efforts. So, in order to ease the work we're implementing this system which will automate all this manual work. This system automates the work by automatically filling the checkpoints of a product based on input given by QA team. Taparia Tools has multiple checkpoints for each of the product which needs to be filled manually on paper and later again into the Excel sheet. This tedious process increases paperwork as well as data redundancy.

Example: The check points for the product 'Wire Stripper' are-

- Riveting
- Spring Tension
- Paper Cutting

II. PROBLEM STATEMENT

Quality Assurance Department of Taparia Tools are facing issues regarding data entry of checkpoints of products which is done multiple times before being entered into an excel sheet. This tedious process increases paperwork, data redundancy as well as manual labour.

III. LITERATURE SURVEY

Author P. Agger published the book A Practical Guide to Biomedical Research. Chapter 12[3] dedicated to data analysis suggests that fundamentally there are 5 steps in data analysis. They are collect, describe, depict, compare, visualize.

Step 1 and 2: Collect and describe

Data analysis is very much data specific, and often specialised. There are, how-ever, some initial strategies, which can be of use to get a general overview of your data. Whether you have conducted quantitative analysis of your qualitative data, or you already have quantitative data, you should start by collating your data in one place.

Step 3: Depiction You can next consider graphical representation of your data. Plotting the distribution is always a good idea.

Step 4: Comparison

There are many types of statistical software out there to help with step 4 of the analysis work ow, as a general rule you should use the one you understand and can navigate the best.

Many statistical tests are standardised and thus will produce the same output regardless of the software.

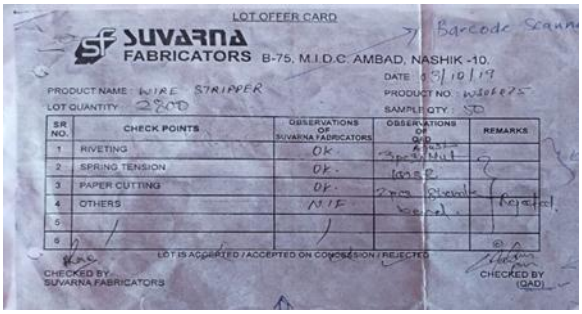
Step 5: Final Visualisation a comprehensive illustration of your research message is mightily important, as it will be the means by which peers assess the validity and significance of your findings.

Author B. A. Stickler and E. Schachinger, Basic Concepts in Computational Physics 2014,[2] proposed Data analysis is an important but often neglected part of natural sciences and in particular of numerical simulations. It consists mainly of consistency checks and error analysis.

Rogers proposed in Data Analytics Chapter 9, 2002[1] that one fundamental change in today business environment is the gradual replacement of the industrial society with the information society. Information has become one of the most powerful commodities in the world today. Information systems management is increasingly becoming integrated into corporate and business strategy, with data integrity and availability improving as a result. This process is providing a rich source of financial and business data, much of which is proprietary to an organization, which managers and investors can utilize for the analysis of strategic decisions.

IV. EXISTING SYSTEM

In Taparia Tools, after order is placed for raw materials to vendors then raw materials arrives from vendors in different lot quantity, and each lot is assigned a unit lot no. Based on operation and quantity of lot sample size (no of product to be checked) is decided. Each product has multiple checkpoints based on its operation, needs to be filled manually on paper and later again into the excel sheet as shown in fig 1.


LOT OFFER CARD

SUVARNA FABRICATORS B-75, M.I.D.C. AMBAD, NASHIK -10.

PRODUCT NAME: WIRE STRIPPER DATE: 5/10/19

LOT QUANTITY: 2800 PRODUCT NO.: W16825

SAMPLE QTY.: 50

SR NO.	CHECK POINTS	OBSERVATIONS OF SUVARNA FABRICATORS	OBSERVATIONS OF QAD	REMARKS
1	RIVETING	OK		
2	SPRING TENSION	OK		
3	PAPER CUTTING	OK		
4	OTHERS	N.I.F		
5				
6				

LOT IS ACCEPTED / ACCEPTED ON CONCESSION / REJECTED

CHECKED BY SUVARNA FABRICATORS

CHECKED BY (QAD)

Fig 1: Offer Lot Details

The issues are being faced regarding checkpoints for raw material provided by vendors. The quality assurance department has to do data entry multiple times which is very time consuming and requires manual efforts.

This tedious process increases paper work as well as data redundancy. As humans are prone to mistakes there may be a chance of entering inaccurate data. So by implementing the 'Tools Inspection Management System' we are there by saving paper and reducing sweat of ones brow. So, in order to ease the work were implementing this system which will automate all this manual work.

V. PROPOSED SYSTEM

This system digitizes the work by automatically filling the checkpoints of a product based on input given by QA team. Taparia Tools Ltd has multiple checkpoints for each of the product which needs to be filled manually on paper and later again into the

Excel sheet. The system is also being designed to make predictions and to analyse the risk associated with vendors. This system will also generate the reports which help us to analyse the quality of product and hence proves useful in making decisions. After selection of product name the checkpoints would appear of the selected product after which data-entry user would examine it and fill the remarks which would be used for further predictions and risk analysis.

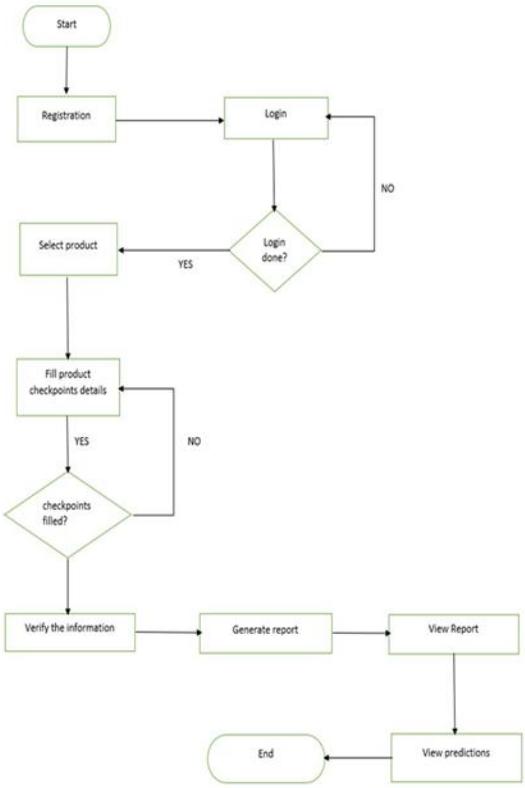


Fig 2: System Overview

Modules involve in Tools Inspection Management System are:

A. IT Admin

Functionality:

- Add vendor, Data Entry Viewer and report viewer
- Add Production Group – Names of products depend on product no
- Add operation – depends on product
- Add observation – depends on product
- Add checkpoint – depend on product and operation
- Add defect Type – depend on checkpoints and product
- Sample plan master - it includes sample plans for various lot quantity

B. Data Entry Viewer

- Offer Lot details:
  Lot no is auto generated and product no is selected product name is depends on product no so it is auto generated. Lot quantity, vendor no and date entered manually.
- Check Lot details:
  To view offer lot details enter from and to date. According to that it will display offer lot details which includes lot number, product name, lot quantity is auto generated and we have to enter sample plan for product which is selected. Min lot size, max lot size, sample size, no of max defective pieces permissible are generated automatically after sample plan for this product is selected.
  If actual defective pieces observed are slightly more than no max defective pieces permissible then they can be accepted on concession or else if the figure exceeds then no of max defective pieces permissible then it is rejected.

C. Report Viewer

Report viewer has the functionality to view the reports which contains rejection ratio in the following three formats. After analysis of the reports generated, QAD head can predict the rejection ration of each particular vendor and can thus conclude the best among them.

There are three formats of reports as follow:

Date Wise

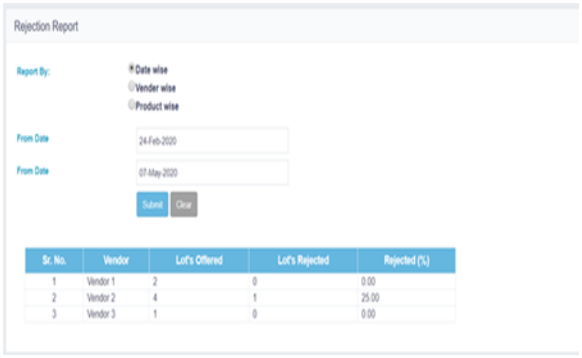


Fig 3: Date Wise Report

Vendor Wise

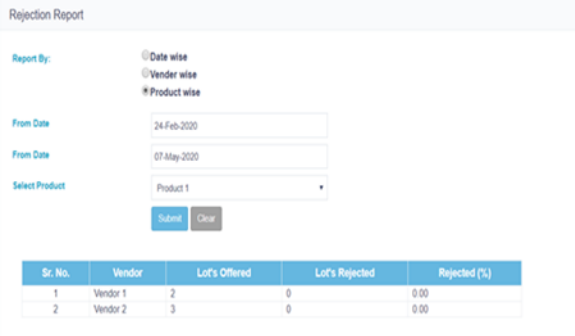


Fig 4: Vendor Wise Report

Product Wise

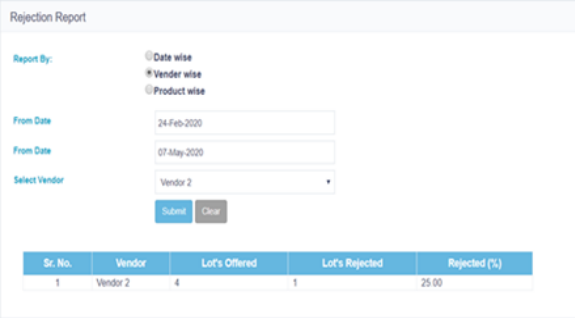


Fig 5: Product Wise Report

VI ADVANTAGES

1. Increased Productivity: Reduction in manual labor leads to happy employees which signify.
2. Increased profit: Productive employee's leads to growth of organization which eventually increase profit bar.
3. Portable: As the system is web based application, anyone can work from anywhere with the internet access.

VII LIMITATIONS

1. Space: It acquires huge amount of space.
2. Internet Speed: It requires high speed internet.
3. Other Party issues: Data collected from different sources (third party vendors) can vary quality and format.

VIII CONCLUSION

Taparia tools encountered a lot of issues regarding data entry of checkpoints for products. These issues consist of multiple data entries including on paper entry as well into an excel sheet. This was a tedious task to perform for employees. Hence to reduce their work this system is being introduced. The main aim of this system is being able to solve multiple entries by reducing data redundancy and digitizing the process. Thus Tools inspection digitizing system has potential to help and improve Quality assurance department of Taparia Tools.

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