

Rejection/Rework Analysis during QA/QC Inspection of ANF (Agitated Nutsche Filter) & RVPD (Rotary Vacuum Paddle Dryer)

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Abstract— Quality Assurance and Quality control is the combination of quality assurance, the process or set of processes used to measure and assure quality of a product and quality control, the process of ensuring products and scenario meet consumer expectations. This paper presents the detailed analysis of rejection and rework for ANF & RVPD pressure vessel. It includes the analysis carried on basis of processes, on basis of engineers and on the basis of characteristics from an annual data provided by the industry. Furthermore, it also figure out the criteria in which more rejection and reoffer take place.

Key words: ANF (Agitated Nutsche Filter), RVPD (Rotary Vacuum Paddle Dryer), Rejection/Rework, Quality Assurance and Quality control

I. INTRODUCTION

Quality control (QC) is a procedure or set of procedures intended to ensure that a manufactured product or performed service adheres to a defined set of quality criteria or meets the requirements of the client or customer. The objectives of quality control in different organizations are continual improvement, satisfaction, employee development and on time delivery to increase profit and impression of organization in market.

To achieve the above objective in company, it is required to reduce number of Reoffered part of product. The product made by company are given as below.

- 1) Rotary Vacuum Paddle Dryer (RVPD)
- 2) Agitated Nutsche Filter (ANF)
- 3) Agitated Nutsche Filter Dryer (ANFD)

A. Rotary Vacuum Paddle Dryer (RVPD)



The rotary vane vacuum dryer is designed to counteract the stresses created by the rotating hollow shaft to obtain dry powder from the cake or wet solution using a paddle dryer, creating vacuum and temperature variations. Its efficiency is very high and the operating costs are low compared to other types of dryers.

Components- Product filter, condenser, receiver, vacuum pump, hollow shaft, Discharge valve, Gearbox etc.

B. Agitated Nutsche Filter (ANF)

Agitated Filter is a closed vessel designed to separate solid and liquid by filtration under pressure or vacuum. It can carry out various phases of process operations via: Crystallization, Filtration, Extraction, Discoloration, Washing and Drying.

Components Filter Media Filter Cloth/Sintered, Wire Mesh, Detachable Bottom, Mechanical Seal, Discharge valve and sampler etc.

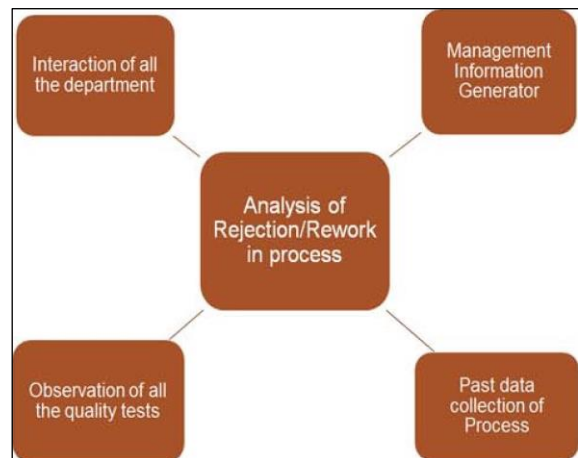


II. OVERVIEW

On the analysis of the past data of interval from 1st January 2016 to 30th August 2017. The total parts offered to company were 40445 out of that 25394 parts were accepted and 14612 parts were reoffered .

So, on the basis of the data, we did analysis according to inspection test wise, engineer wise & characteristic wise.

A. Design of Experiment



III. DATA ANALYSIS

A. Analysis Based on Inspection Test wise

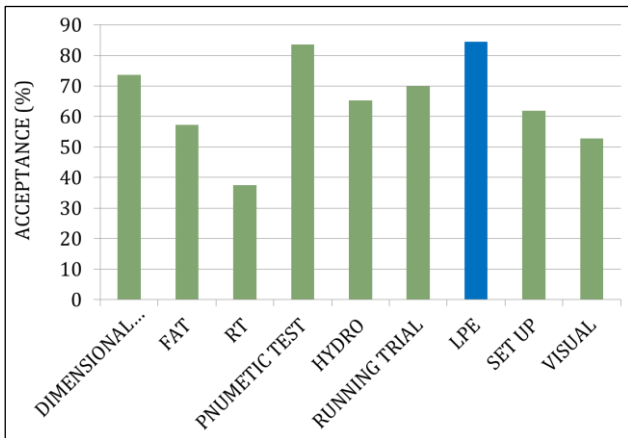


Fig. 1:

Inspection Test	Dimensional Check	FAT	RT	Pneumatic	Hydro	Running Trial	LPE	Set Up	Visual
Acceptance	73.69	57.32	37.5	83.58	65.32	69.87	84.46	61.87	52.80

Table 1:

As shown in figure (1), it depicts acceptance in various inspection tests, as it is observed LPE inspection test has the highest rate of acceptance that is 84.46% with second highest rate acceptance of about 83.58% in pneumatic test followed by dimensional check, Running Trial, hydro testing, set up, FAT, Visual, RT with 73.69%, 69.87%, 65.32%, 61.87%, 57.32%, 52.80%, and 37.5% respectively.

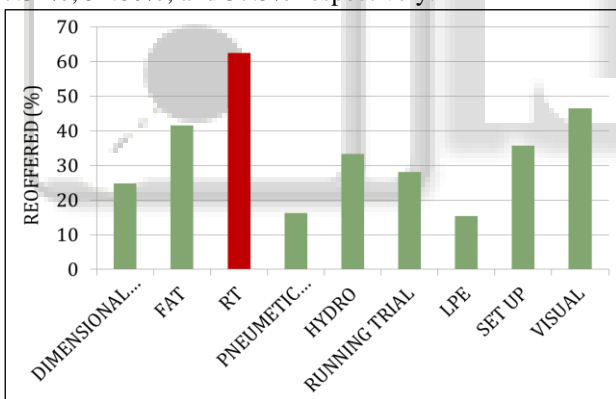


Fig. 2:

Inspection Test	Dimensional Check	FAT	RT	Pneumatic	Hydro	Running Trial	LPE	Set Up	Visual
Reoffered	24.83	41.60	62.5	16.23	33.36	28.09	15.35	35.70	46.48

Table 2:

Similarly figure (2) portrays reoffering in various inspection tests, in which RT (Radiography testing) has the highest percentage of reoffering of about 62.5% but on the contrary out of 40445 only 15 jobs were offered for RT as per client's requirement out of which 12 were reoffered 3 were accepted, thus as it's ratio is too less hence RT is neglected in this case. Furthermore, visual stands highest as of about 46.48% followed by FAT, Set Up, Hydro, Running Trial, Dimensional check, Pneumatic, LPE contributing 41.6%, 35.70%, 28.09%, 24.83%, 16.23% and 15.35% respectively.

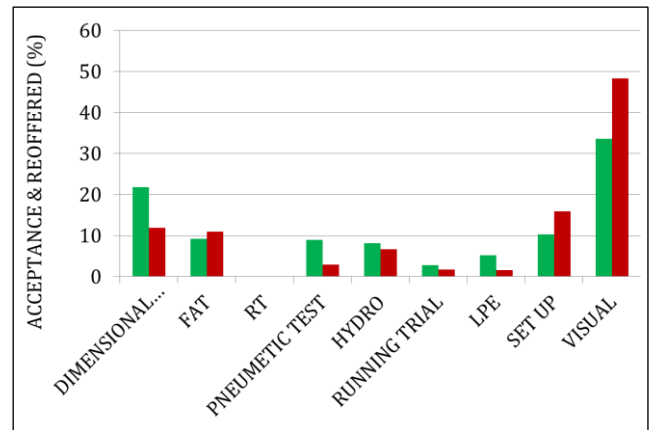


Fig. 3:

Inspection Test	Dimensional Check	FAT	RT	Pneumatic	Hydro	Running Trial	LPE	Set Up	Visual
Acceptance	21.79	9.25	0.02	8.95	8.10	2.74	5.23	10.23	33.64
Reoffered	11.91	10.91	0.06	2.86	6.712	1.77	1.56	15.84	48.34

Table 3:

To conclude the overall rate of acceptance and reoffering of inspection test wise analysis figure (3) is shown in which it can be observed that out of total jobs offered in the firm visual inspection test has the highest rate of acceptance of about 33.64% following a downward trend in dimensional check, set up, FAT, Pneumatic testing, Hydro, LPE, Running Trial, RT with 21.79%, 10.23%, 9.25%, 8.95%, 8.10%, 5.23%, 2.74% and 0.023% respectively.

B. Analysis Based on Characteristic Test wise

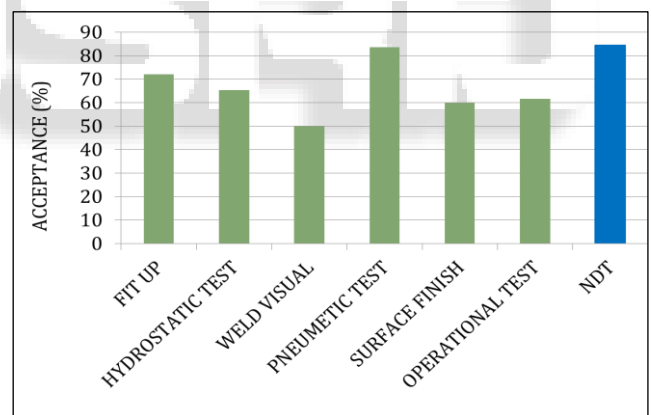


Fig. 4:

Characteristic	Fit Up	Hydrostatic Test	Weld Visual	Pneumatic Test	Surface Finish	Operational Test	NDT
Acceptance	72.03	65.20	49.91	83.58	59.89	61.54	84.37

Table 4:

Figure (4) shows the acceptance in various characteristic test, it can be seen that NDT has the highest percentage of acceptance of about 84.37%, Fit Up with 72.03%, Hydro Test with 65.20%, Operational Test with 61.54%, Surface Finish with 59.89% and Weld Visual with 49.91%.

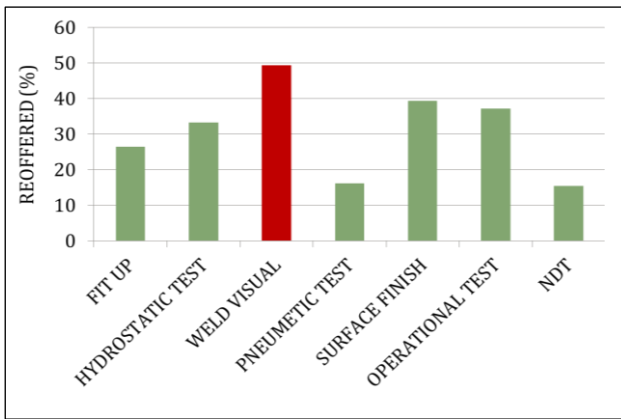


Fig. 5:

Characteristic	Fit Up	Hydrostatic Test	Weld Visual	Pneumatic Test	Surface Finish	Operational Test	NDT
Reoffered	26.50	33.30	49.33	16.23	39.33	37.20	15.43

Table 5:

Similarly, figure (5) shows the rate of reoffering in characteristic wise inspection in which weld visual has the highest percentage of reoffering of about 49.33% followed by surface finish, operational test, Hydro Test, Fit Up, Pneumatic Test and NDT with 39.33%, 37.20%, 33.30%, 26.50%, 16.23% and 15.43% respectively.

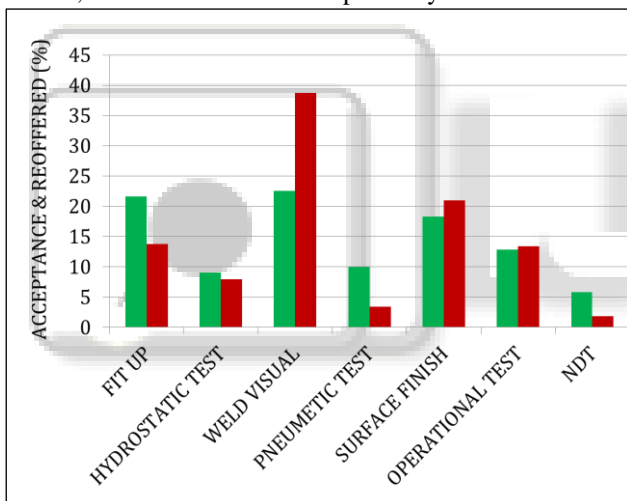


Fig. 6:

Characteristic	Fit Up	Hydrostatic Test	Weld Visual	Pneumatic Test	Surface Finish	Operational Test	NDT
Acceptance	21.57	9.02	22.54	9.98	18.27	12.81	5.77
Reoffered	13.72	7.97	38.69	3.40	20.92	13.40	1.85

Table 6:

To conclude the results of characteristic wise analysis figure shows overall rates of acceptance and reoffering on the bases of the done analysis is in which weld visual out stands 22.54% of acceptance and 38.69% of reoffering and thus weld visual becomes the major causes of reoffering in the firm on the bases of characteristic.

IV. CONCLUSION

- 1) On analyzing acceptance in inspection tests LPE (Liquid Penetration Examination) has highest rate of acceptance.
- 2) On analyzing reoffering inspection tests RT (Radiography Testing) has highest rate of reoffering.

- 3) On observing combined rates of acceptance and reoffering visual inspection test has highest rate of reoffering and is the main cause of reoffering in the firm.
- 4) Characteristic wise analysis shows highest rate of acceptance in NDT and highest rate of reoffering in weld visual.
- 5) On observing combined rates of reoffering and acceptance weld visual is the main cause of reoffering and hence causes huge loss to the industry.

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