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Mass Manufacturing- APQP (Advance Product Quality Planning)

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Abstract: **There are many APQP's in existing scenario instead many OEM's are facing quality issues, and communication between the suppliers, OEM's faces a big thread and the need of customer is to be satisfied and to be establish by a systematic way, In the product life cycle management, APQP is required for the automobile industries to optimizing the cost, by developing this improved technique we can satisfy the basic need of QCD without any investments and also reducing additional wages towards this implementation by neglecting errors caused after the production can easily spotted at the earlier stages by deploying this improved technique the production can be done effectively.**

Keywords: **automobile industries, customer, quality issues, OEM's, APQP's.**

NOMENCLATURE:

APQP: Advance Product Quality Planning,

PLM: Product Life cycle Management.

QCD: Quality Cost Delivery,

OEM: Original Equipment Manufacturer,

PPAP: production part approval process,

RTS: Review on Technical Specification,

PHR: Part Handling Review,

FEMA: Failure Mode Effective Analyze**,**

QMS: Quality Management System.

BOM: Bill Of Material,

DFEMA: Defect Failure Mode Effective Analyze,

PFMEA: Product Failure Mode Effective Analyze.

1. INTRODUCTION

APQP influencing PLM ,this helps to provide a good platform to the plant life cycle management where the problems and flaws occurs in the supply chain management can also be easily resolved and rectified, APQP not only implies for the quality management as well as the PPAP process, Where the issues can be viewed in a single window PLM influences to face the challenges related to product development which incorporates global collaboration and existing market challenges globally bringing the product depending upon the demand towards the market an integrated cycle of activities which enables efficient collaborative working at every stage improving the way of view towards the existing challenges in the current scenario deploying a APQP in PLM to achieve quality and regulating on time delivery to the customer this influences product complexity by shortening development cycle and ensuring quality of productivity

The below prescribed chart will explains the APQP flow process.

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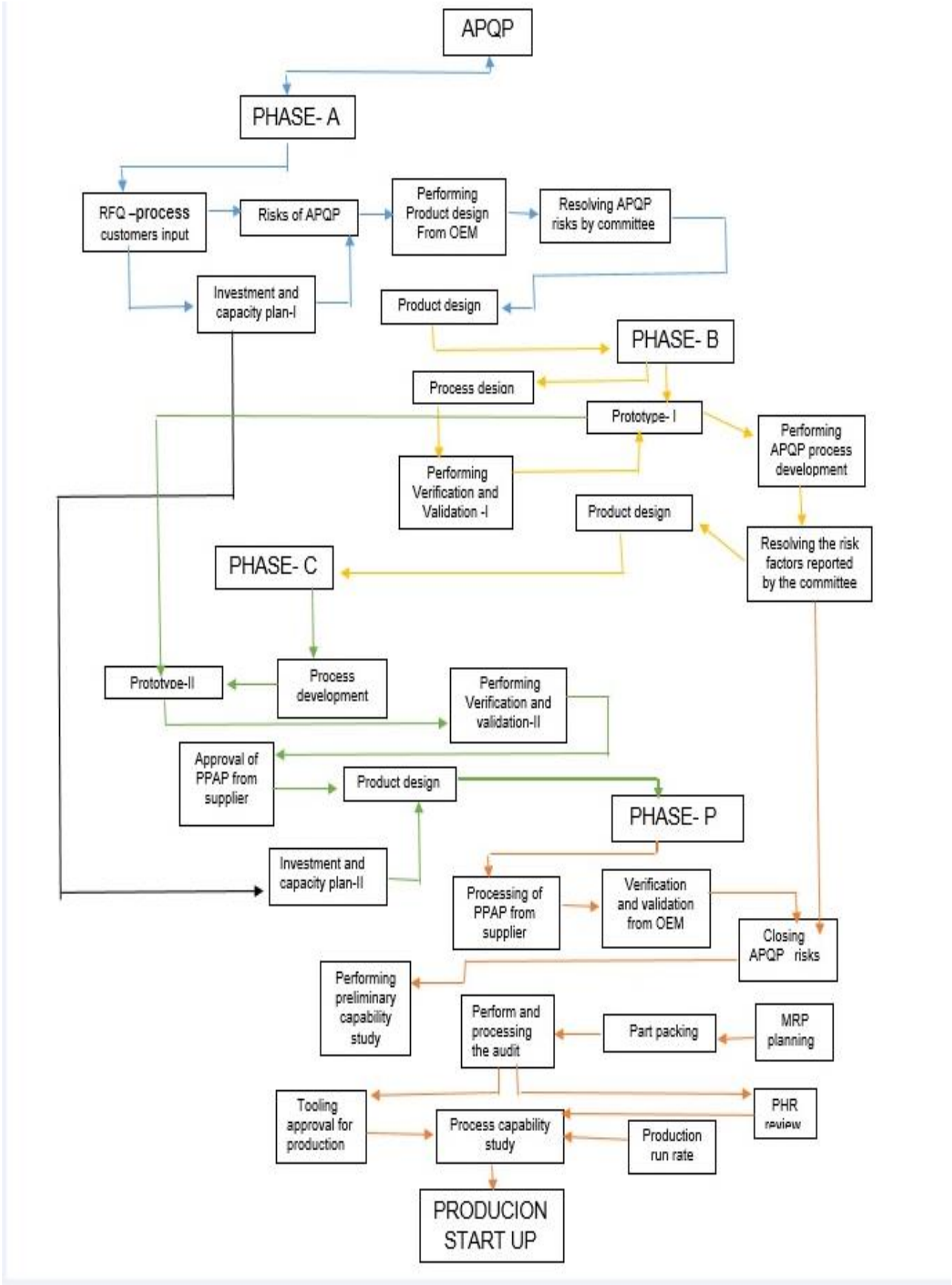

Fig. 1 APQP flow process

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2. PHASE - A

The starting stage of the APQP starts here where, the following process are carried out during the initial stage of APQP which I prescribed below,

2.1 RFQ- process:

In the RFQ process gathered customer input is given and request for quotations and is been ready, then RFQ is sent to proceeding suppliers then initial APQP plan is built from this process it is being separated into different verticals of suppliers, reliability performance study according to the qualities swap the fault frequencies is being reduced tentatively initiation of product feasibility investment and capacity plan I is been initiated at the first stage after finalizing RFQ process in investment and capacity plan list of equipment to be invested in production thereby, risk factors are identified at this stage OEM performs the product design analysis then APQP risk factors are resolved and put into action with accordance to that the product design framed.

2.2 Product design:

In the product design engineering drawings preliminary designs are developed by having the two main ideas such as commercialization and conceptualizing by escalating these ideas turning them into a new good commercial product to the industry where having a RTS with the concern OEM in order to satisfy the needs and sale in the market from here the preliminary phase A is completed.

3. PHASE - B

In phase -B process designs preliminary adoption of prototypes, APQP process developments and resolving the risk factors in the prototypes refined product design is developed.

3.1 process design:

Building up of process chart for the production, manufacturing steps are defined there and proper floor plan layout for logistics flows are defined and Product and process validation amendments of PPAP is processed by incorporating latest path specification received by the supplier in order to launch the production of samples from serial process After this process send to process validation engineer to check its feasibility then it is approved for mass manufacturing control plan is being updated to perform MRP after the process validated product is been validated preliminary study are done and the statistical measures for the concerns manufacturing process has been produced after meeting all expectation then it sent to perform prototype I.

3.2Prototype I:

The product design which was developed in earlier phase A is put in action at this stage where it is tedious to understand and imagine the actual work done in the product design by the OEM so, as a result in the earlier stage where a practical aspect of approach towards this issues is prototyping , In order to avoid Errors and flaws in dimension aspects and any changes in the plan can be easily fed in to prototype modelling easily where it cannot be done in the real time the product is manufactured ,the ultimate target of the this prototype I is to put the product design into real type component.

3.3 Product design:

From the APQP process development the identified risks are resolved and the complexity in the prototype I is sorted out for the next proto release, design review is finalized ,then components are validated for technical paper documentation between supplier and the OEM, RTS is fed in the system, RTS is carried out with the knowledge of OEM and supplier an action plan performed to solve the issues in which it ensures the product feasibility after this phase it sent to phase c for further processing.

4. PHASE - C

This phase releases the prototype II, a process development plan with the knowledge of investment and capacity planning II for the final product design towards the production.

4.1 Process development:

In this stage fine-tuned layout plan is set ready for the production manufacturing updates which regards the production flow updates and manufacturing steps to the PFEMA then the product /process risks are identifies ,evaluated and corrected which is further escalated to the manufacturing unit control for prototyping II.

4.2 Prototype II:

This is the number of prototypes are being done and tested with several process then prototype test certified as success according to its specifications as per the norms and the customer requirements from the phase A preliminary product / process control can be defined and incorporated with the prototypes for performance and verification validation test as the results are set ok which is approved by the OEM then it is sent to process design.

4.3 Production part approval process:

In this process verification and validation is done where the prototype inspection is done successful which can moved further product design and investment capacity plan II.

4.4 Product design:

In this phase approval of PPAP is incorporated with investment and capacity plan is done, where updates from investment and capacity plan is also incorporated with plan where it is finalized by concluding all list of all equipment, tooling measurement devices are defined MSA (measurement system analysis) is done listed equipment is installed finally the process moves to process design where all the need corrections are fed to system production phases started.

5. PHASE - P

Phase production incorporates the product design plan from the phase c finalized APQP industrialized review is done in order to close all the APQP risks which was reported by the committee are put in action towards production phase start up.

5.1 Processing of PPAP:

The production part approval process is completely processed and finalized in this stage which regulates the supply chain to perform effectively, final verification and validation is done all the identified risks are concluded and resolved, risk factors which are reported by the committee from the following phases are successfully resolved and incorporated final APQP risks are closed, preliminary capability study is carried out in material requirement planning is carried out.

5.2 MRP:

Material requirement planning, this very essential process the amount of material is been planned and scheduled as per the order received from customer for manufacturing process where this is a complex process on estimating each and every individual parts required for the manufacturing is clearly documented in order to avoid complexity, material shortage and demands can easily be full filled in this process logistics flow is also defined Planned in this process this process is to avoid part damaging.

5.3 performance audit:

A performance audit is done to ensure all the manufacturing machines works correctly without errors and tooling, measuring equipment, control equipment updated and accepted for the manufacturing then it is further escalated to the process capability study.

5.4 process capability study:

Samples products are manufactured and samples are confirmed to it desired specification and quality needed, a statistical measures are taken in this process where

Produced product meets all the required structure as a finished goods to be placed or dispatched to the market a secure production is ramp upped issues due to the raw material supply are tracked and resolved and also performance run rate is carried out to check whether it meets the quoted production rate PHR (part handling review) is done for the stability in the manufacturing by ensuring the QCD factors , then it is confirming by the OEM no damage occurred in the production line and the process can successfully deployed in production.

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6. DEPLOYMENT APQP

The represented figure 2 show the developments phases as well as the production phase on employing the various development process of APQP phases where below mentioned D and E are the phase P of the above fig 1 flow chart

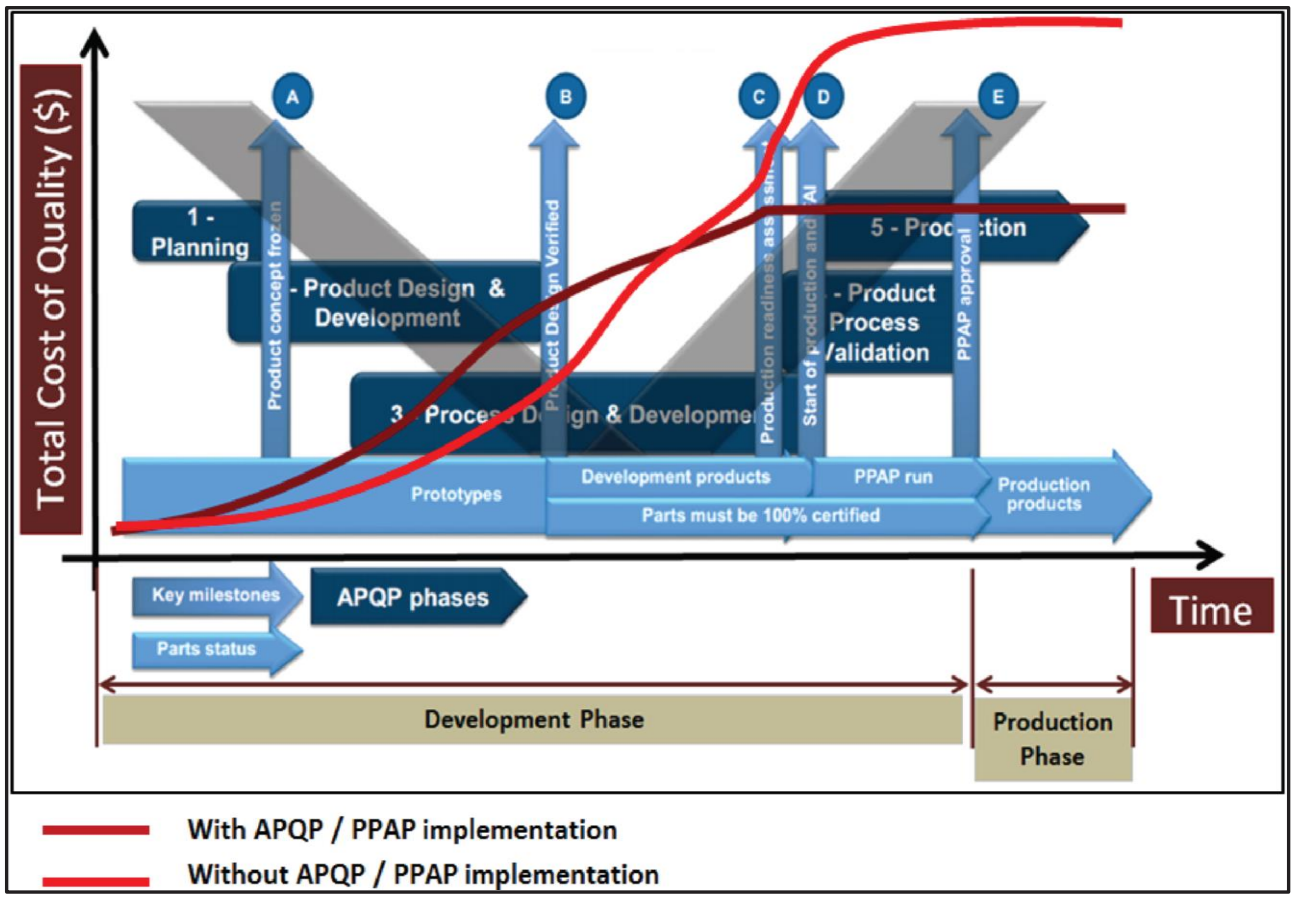

Fig. 2

7. CONCLUSION

By concluding this technique, I claim that this technique would improve Team to Team Communication a fundamental language among Customer and Organization Involvement towards the robust productivity rate which will be improved, this influence the frequency of error rate and part rejection will be simultaneously Controlled and reduced thereby the standards of quality and quantity will be increased without compromising on time delivery by deploying this technique (QMS) Quality Management System error and long cycle R&D process will be tentatively traced and optimized

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