

Process Optimization and TAKT Time Reduction Through Structured Component Quality Planning (CQP) for Flawless Implementation

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Abstract: In today's business scenario strategic structuring of an organization with narrowly mapped Roles & Responsibilities helps to drive company's performance. Every single human endeavor takes a shot at the guideline of complementarity. Nothing is conceivable aside from through co-activity and co-appointment. This is on the grounds that man is fundamentally a social creature. All creatures are supplied with necessities and the satisfaction of these requirements requires joint venture. In any case, in the undertaking to satisfy human needs, once in a while the parts of the undertaking happen to be on inverse sides and in this way there are difficulties in such co-employable ventures. Mankind has an impulse for assets and the sense for sharing isn't similarly solid. Subsequently it happens that public activity is enmeshed in unfriendly interests. Down the ages, the contradicted premiums have been extensively run based on physical quality which enables to command and the absence of it that prompts accommodation: the ownership of land and its absence, the entrance to capital-money sources, and the scholarly and functional capability to sort out and abuse capital from one viewpoint, and its absence, coming full circle in the enterprising premiums set against the premiums of the work force or labor. CQP results in flawless launch with desired parameters.

Index Terms: Component quality planning, Process optimization, Value engineering, Waste elimination, Supplier development, TAKT time, Flawless implementation.

I. INTRODUCTION

Economic conditions, regulatory context, consumer trends, globalization, localization, and technological innovation mean that we operate in an incredibly fast-paced, exciting - and challenging - industry. Furthermore, Original Equipment Manufacturers are increasingly adopting a zero-tolerance policy for deviations in quality from their supply partners, cost remains the ultimate differentiator. As a Project Team we need strive to differentiate by providing our customers with exceptional quality and delivery at a competitive cost by leading the right supply base. To do this work with a panel of suppliers with a proven track record of consistency and high performance, In addition, each and every supplier will have demonstrated a commitment to our strategy pillars of Innovation and Technology, Global Capability and Excellence in Execution. Working better together will deliver business growth for the companies. It is highly important to nominate a supplier who will strive to achieve excellence and should have the maturity, organization to undergo a structured process of development.

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Objective:

1. To Fulfill customer and automotive standard requirements and to select the best supplier for new business so as to guarantee smooth project accomplishment and Excellent QCD performance in serial production.

2. To have constant improvement on the contribution level through Value Engineering, Process Optimization, Efficiency increase, waste elimination etc. This enables the organization to improve its GOM (Gross Operating Margin).

Scope:

1. Project is taken to regularize an existing part where Value engineering & Process optimization is done on the process to reduce the TAKT time from 2 min to 1 min to reduce cost, there by retaining the desired contribution levels without compromising on Quality and delivery.

2. The Component Quality Planning (CQP) is followed for Determination and assignment procedure to every business decision. This included new projects as well as reallocation of existing business, Process optimization etc.

Supplier Development & Integration

It is a Part of Strategic sourcing & Supplier development department, they follow this technique for flawless implementation of supplier parts. The same is explained below in detail

To achieve excellence in part development process, tools like Component Quality Planning (CQP) helps to carry out the process flawlessly. It's in depth process analysis helps to cover all the functional areas in the development so that the results are unchallenged.



Fig 1 – Supplier Development Stages

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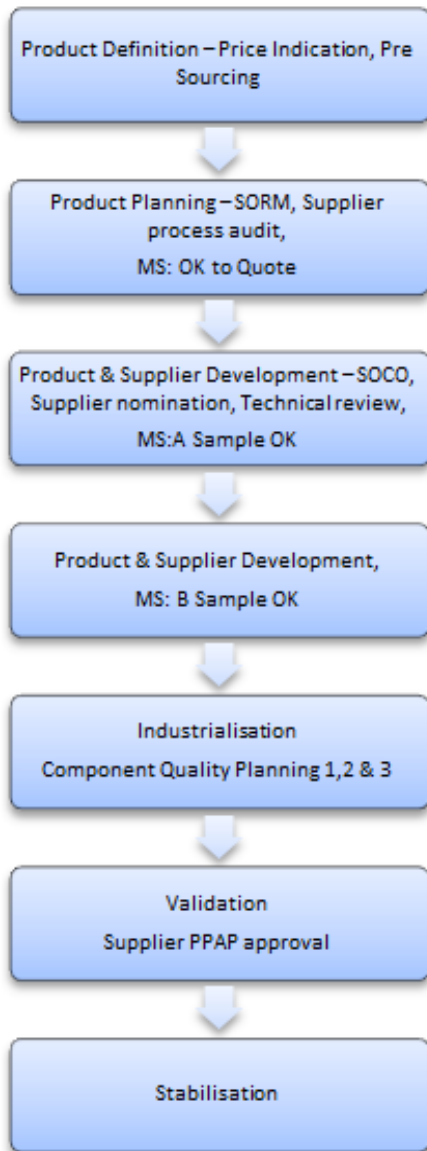


FIG .2 CQP PROCESS DIAGRAM

Existing Parameters & Results

The actual realization of the project is achieved by understanding the existing operational parameters, so that the project path is clear and visible. Also it is important for the project team to understand that project undertaken will add value to the customer as well as to the organization. The actual data gives the team on the real focal parameters.

Table 1 - Table Showing the Existing parameters

S.No	Detail	Existing Value
1	Takt time in Sec	120
2	No of Process	10
3	Output / HR	26
4	No of operators	10
5	Contribution level	19%

Supplier Base Pre-Requisite

Before getting in to real awarding of any business, the certain basic Pre-Requisite is necessary in order to have a right Business partner.

Code of Conduct:

It helps all of us live up to the highest ethical standards, to meet our obligations to the law, our commitments to our customers and our responsibilities to each other and our shareholders. It protects company's reputation and creates a culture in which we can all thrive. The suppliers and service providers must provide assurance of their compliance with applicable laws. To manufacture long haul associations with suppliers and grant business to them based on the esteem they give. In return we expect them to share our ethical standards, uphold the Code or a code with equivalent provisions and report on compliance in key areas, including anti-bribery legislation, the use of conflict minerals and the exploitation of child, compulsory, forced or slave labor.

II. SUPPLIER - STRATEGY SET-UP:

A prerequisite of being part of a Target Panel is the fulfillment of automotive standard requirements. Any interested potential suppliers will be asked to complete Supplier Profile Questionnaire where, in addition to standard company information, suppliers are asked to prove certification in terms of IATF16949 and their automotive experience. Should a new potential supplier meets strategic requirements, it will be assessed by VDA 6.3 based Supplier Process Audit. To be confirmed as a supplier, the standard contract package must be signed by the authorized representatives. Once a member of a Target Panel, a supplier will need to perform in line with various strategic statistics based on spend maturity and QCDI performance. In case of any deviation from expectations and targets, the supplier can be put on, at any time, a 'New Business on Hold' (NBoH) status, which will immediately block any business increase.

III. SUPPLIER RISK MANAGEMENT

The motivation behind Supplier Risk Management is to verify clients' store network by envisioning, perceiving and in this way minimizing or alleviating the provider's financial hazard. The supplier hazard evaluation program applies to all present and potential suppliers. The achievement relies on a sound inventory network in which each provider and subcontractor is monetarily steady. Need to deal with any hazard by applying a risk rating to every provider. The real appraising depends on outside and inside sourced information, and contemplates standard KPIs, just as observational data and geophysical set up. The rating guides our basic leadership process when granting contracts to providers and is routinely checked on. Only when a supplier has been assessed no or low risk can it be awarded new business. For existing partners of our supply chain, we reserve the right to put them on 'New Business on Hold' (NBoH) if there is a decline in performance vs. our risk assessment criteria. If a supplier's performance does not subsequently improve, it is likely that it will be phased out from supply base.



IV. STANDARD SUPPLIER AGREEMENTS

This Includes

1. Non-Disclosure Agreement
2. Master Supply Agreement
3. Project Agreement
4. Tooling Agreement
5. Quality Assurance agreement
6. Part Pricing Agreement
7. Warranty Reimbursement agreement

V. SUPPLIER TARGETS

Supplier targets are intended to set clear QCD focuses for providers and to evaluate supplier execution by overseeing key performance indicators (KPIs). Supplier targets are connected to all immediate material providers. Business drives perfection by defining quality, cost and delivery targets for each provider. These objectives are checked on and affirmed recorded as a hard copy to every supplier yearly.

Quality

QUALITY KPIs for supplier quality are as follows:

- Customer incidents due to suppliers' defect
- Defective Parts counted Per Million (PPM)
- Number of total incidents
- Response time for claim handling
- Supplier caused Cost of Poor Quality (CoPQ)

As we believe that rapid and proactive problem solving is key to eradicate non quality, we measure supplier response time in QR6 σ (Quick Response Six Sigma). We continuously aim to reduce PPM defects across its business and execute a zero defect strategy. As a result, we will implement prevention-oriented supplier management activities in the introduction process of goods and services. On time provision of qualification parts and documents and release without deviations will be also closely tracked by KPIs for Supplier Quality. Cost targets measure, on a full year's basis, a supplier's ability to continuously reduce the cost of the function supplied. Those teams led by our Segments Leaders are the supplier's preliminary contacts in order to engage in business discussions on Value Creation, long term business agreements and partnership matters.

VI. DELIVERY

Delivery targets are defined to ensure that the 'right part at the right time in the right quantity' is delivered. Targets will be measured on a monthly basis. As foundations for excellent delivery performance, we expect suppliers to focus on preventive actions and delivering the right capacity, as well as being reactive - delivering 'Quick Response' actions on time and in an efficient manner.

Supplier Nomination

The nomination procedure consists of 3 core steps and is accompanied by CQP process (Component Quality Planning/APQP)

- Pre-Sourcing Committee
- Request for Quotation (RFQ)
- Sourcing Committee

VII. PRE-SOURCING COMMITTEE:

To underpin a robust selection of suppliers that will receive a RFQ. The Pre-Sourcing Committee is applicable for any item that must follow the nomination process. The Pre-Sourcing Committee ensures that, in addition to our internal strategy considerations, the selection of suppliers to receive a RFQ takes into account the following:

- Ability of the supplier to meet customer requirements
- Validation of panel versus latest QCD performance
- Validation of panel versus current projects running with potential RFQ candidates

The Pre-Sourcing Committee is responsible for first alignment on possible business nomination across the functions. Organized by the buyer responsible for the project, and with the participation of Global Commodity and Business Unit representatives, the Pre-Sourcing Committee ensures the appropriate selection of candidates for our business. The Committee is supported by local purchasing teams from preferred countries and experts from Quality Management, Product & Manufacturing Engineering. Based on the decisions made by the committee, buyers are allowed to send RFQs for particular business requirements to identified suppliers (Target Panel suppliers in the first instance).

VIII. REQUEST FOR QUOTATION (RFQ)

The purpose of the RFQ is to accumulate suppliers' quotations in line with necessities for specified projects. eRFQ is open for current and potential suppliers and provides guidance on any change or creation of a supply chain (Quality, Cost, Delivery). Any quotation delivered via the platform is binding. The eRFQ contains component drawings and/or specifications, as well all relevant attachments that are mandatory to participation in the eRFQ, such as Standard Agreements and Cost Breakdowns, Initial and Final Feasibility Declarations, plus any project related obligatory documents. If marked mandatory, these documents are to be considered & confirmed as feasible in order to submit a valid quote. When submitting quotations, suppliers must use the Supplier Portal. Quotations sent by email or in a different format than expected will not be considered. Providing a quotation in the predefined format will help to analyze and feedback as quickly as possible and in a structured and fair way, allowing suppliers and candidates to understand the reasons behind the decision.

IX. SAFE LAUNCH CONCEPT

Safe Launch Concept (SLC) is a strategy to guarantee that dispatch dangers are moderated and dispatch issues are rectified as fast as conceivable amid increase. The of SLC will:

- Validate the production control plan of the supplier
- Protect plants from quality non-conformances amid item dispatches



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- Ensure that any quality issues that may emerge are immediately distinguished, contained, and redressed at the provider's area
- Increase association and perceivability of supplier's best administration

SLC applies from start of project until the completion of launch and all aspects of the containment area. Safe Launch is a containment initiative designed to ensure a supply of defect free parts for SOP and the acceleration phase. The supplier is required to recognize all extra assessment, testing, and dimensional checks required in the regulation territory dependent on Key Product Characteristics, Customer Interface, high RPN and additionally issues distinguished amid item and procedure improvement. Control must stay set up for a timeframe or amount of parts as indicated by SQE. The exit criterion is shipment of 0 defects for the duration of this containment. If a problem is identified in CSL1, this activity will stay essentially for at least 2 weeks after the provider has executed the changeless

restorative activities. In the event that time or amount isn't determined, SLC will stay basically all through quickening or for at least 3 months, whichever is longer. The graph beneath demonstrates the key components of SLC.

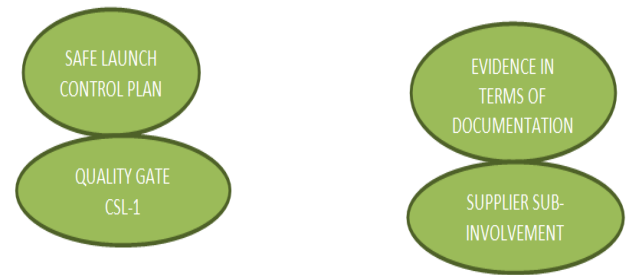


Fig 3: KEY ELEMENTS OF SAFE LAUNCH

Table 2: Component Quality Planning Process:

Review	Purpose	When?	Input	Output
Supplier Offer Review Meeting (SORM)	Review supplier offer so as to affirm provider duty and capacity to meet the undertaking necessities on time, play out a pre-specialized review	Before Sourcing Committee, before supplier nomination	Clear task timing - Quotation with Cost separate from provider - Tooling Cost breakdown - Drawing with uncommon qualities - Component Criticality Assessment - Safe dispatch necessities - Sub-segments and sub-forms list - Additional and Customer prerequisites not expressed on the - List of required tests from Product Engineering	All undertaking prerequisites explored with provider - Updated provider citation (if material) - Tooling idea structure - SORM part - SORM report
Technical Review (TR)	Detail structure and parts necessities survey with provider - D-FMEA contribution to provider - Review provider proposition for advancement (cost, quality)	After supplier nomination, before design freeze	Component drawing and/or specification - Technical Component Risk Assessment (TCRA) available with importance to function for every dimension from the drawing - SORM meeting validated - Tooling concept form SORM part validated - CQP action plan followed	Design optimization proposals from supplier - TCRA reviewed with supplier - Sub-supplier status list - Tooling concept form - TR part - TR report
CQP 0	final technical audit to affirm sequential particular - Confirmation subtleties of provider process arranging	Before design freeze, before tool order issue	Refreshed illustration with changes concurred amid TR - TCRA (producing and no location hazard assessed by a provider) - TR meeting approved - CQP activity plan pursued - Tooling idea structure (SORM and TR part) approved	TCRA (part 1 and 2) finished - Measurement methods agreed - Updated tooling and manufacturing process concept form - "Green light" to serial drawing release and tool order - CQP0 report
CQP 1	Check if procedure and device arrangement is as per plan - Review status and advancement of value arranging (P-FMEA, control strategy, capacity thinks about)	After serial drawing release	Sequential illustration discharged - Tool request accessible at provider - CQP0 meeting approved - CQP activity plan pursued	Reviewed supplier preparation - CQP1 report

CQP 2	Perform Initial Samples creation preliminary at provider so as to affirm that they are completely off device and they meet quality necessities - Confirm sequential instrument	During production of Initial Samples	Connection to Initial Samples PSO - Serial tooling at provider - Sub-provider (PPAP level 3 for segments created out of Special Processes) - CQP1 meeting approved - CQP activity plan pursued	Initial Samples - Production order for Run Rate - CQP2 report
CQP 3	Affirmation of sequential procedure at provider, Supplier Process Audit - PPAP tests generation - Runrate	During production of PPAP samples	Connection to PPAP PSO - Initial Samples PSW affirmed (positive aftereffect of useful test) - Serial tooling and procedure accessible at final supplier localization	SPA poll with review result - Capacity Verification Report - PPAP tests - CQP3 report
CQP 4	Confirmation of supplier performance - Release of project team	6 months after SOP, before project team dismantling	Component performance after SOP - CQP action plan - Pending issues - PPAP status - SCR (Series Change Request) status - Long term capabilities	CQP action plan closed (no open issues) - PPAP fully released - CQP4 repo

Process Outputs:

Table 3 –Process outputs after applying CQP process

S.No	Detail	Revised Value
1	Takt time in Sec	72
2	No of Process	6
3	Output / HR	42
4	No of operators	5
5	Contribution level	24%

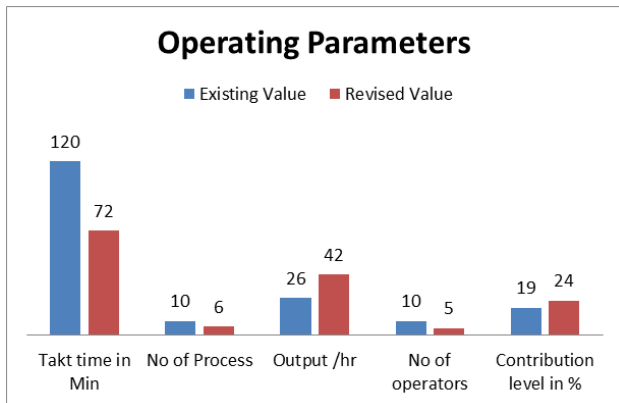


Fig 4 – Comparison of data

X. CONCLUSION:

The CQP process has resulted in Flawless launch of the part with the desired operating parameters set for the project. A constant customer feedback is obtained so as to ensure smooth running of the part. Of course further improvements can be done time to time so as to add value to the customer and the organization.

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