

Addressing Advance Product Quality Planning Challenges by Leveraging PLM

contents

Abstract	2
Automotive Product Development Scenario	3
APQP Overview	4
Business Challenges	6
Addressing APQP challenges	7
Using PLM for management of APQP	9
Business benefits of PLM-based solution	10
Conclusion	11
References	12
About the Author	13
About L&T Infotech	14

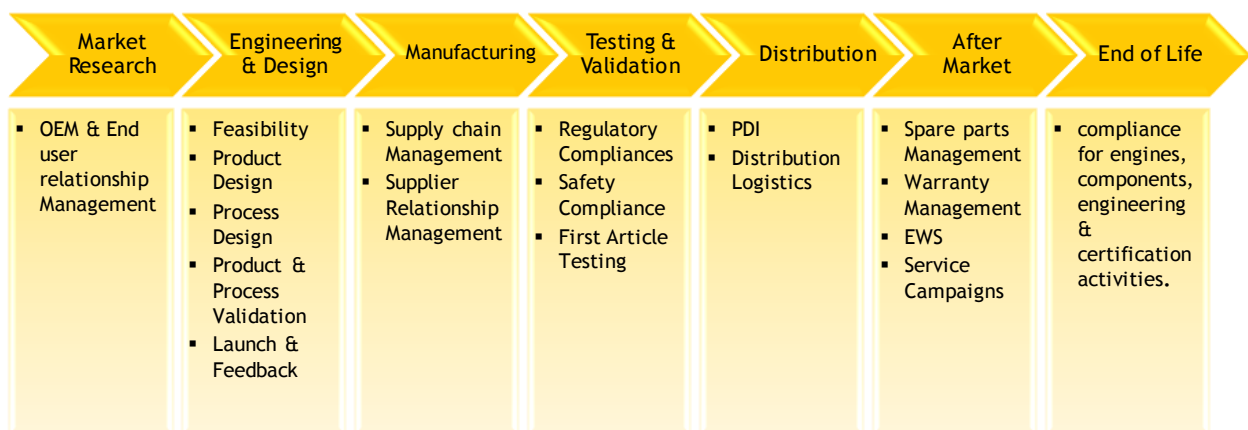
Abstract

While working with discrete product manufacturers (OEMs) and their suppliers, L&T Infotech has encountered challenges related to implementation and sustenance of Advanced Product/Part Quality Planning (APQP) processes; challenges which demand strong document management tools and collaboration processes. This document addresses the APQP challenges and presents solutions on how Product Lifecycle Management (PLM) tools and processes can help address them.

Automotive Product Development Scenario

An increasingly competitive global automotive industry demands innovation and high quality from OEMs and suppliers alike. In order to survive in this competitive market space, an automotive OEM must constantly innovate while collaborating with Tier 1 Suppliers. The key outcome from the collaboration is to ensure the quality and speed of delivery meets and ideally exceeds market demand.

We have found that the automotive product lifecycle runs in stages as demonstrated in the illustration below:



1: Automotive Value Chain

To ensure a timely product launch, OEMs and their suppliers must start collaboration at the design and engineering phase. To manage collaborative product development, different approaches such as Six Sigma, and Stage Gate are applied. Among these approaches, APQP is most widely used.

APQP Overview

The Automotive Industry Action Group (AIAG) defines APQP as follows:

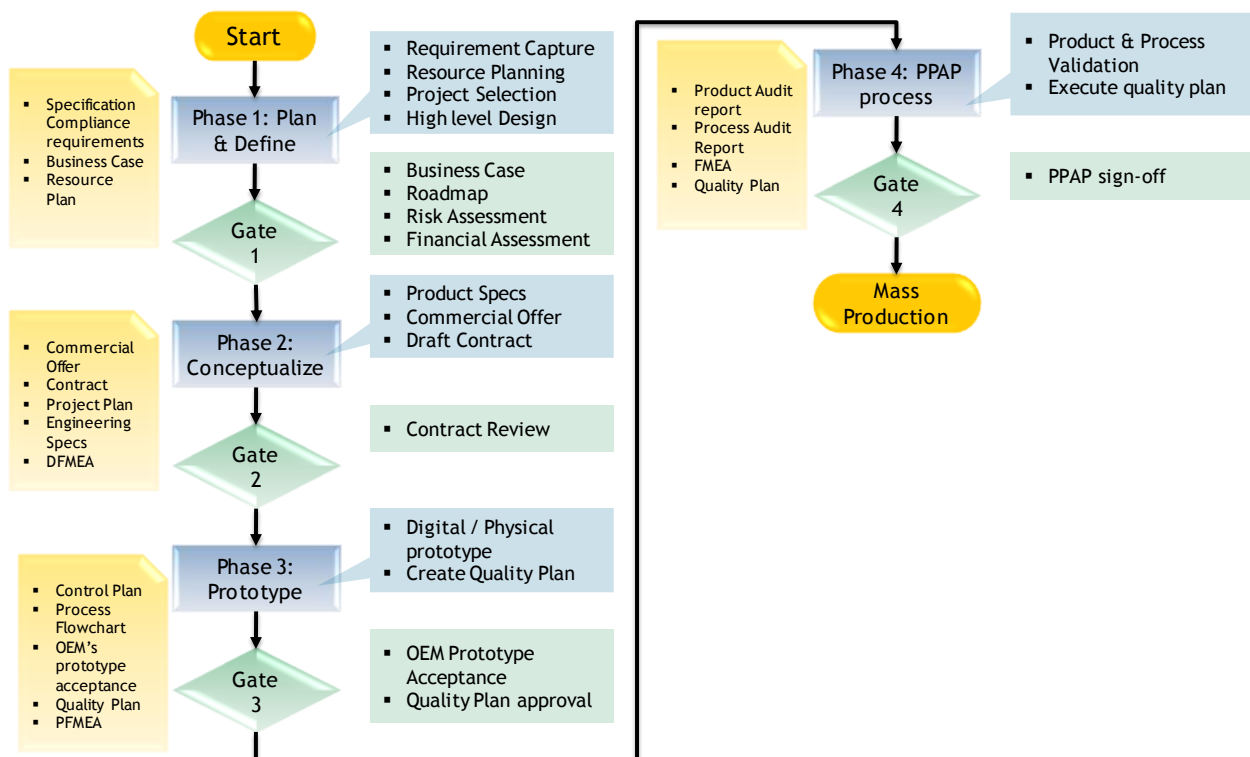
“APQP stands for Advanced Product/Part Quality Planning. APQP is a framework of procedures and techniques used for developing products in the manufacturing industry, mainly, the automotive industry.”

According to AIAG, the purpose of APQP is “to produce a product quality plan, which will support the development of products or services that will satisfy the customer”.

Execution of APQP is generally staggered and occurs in phases, with a gate validation for graduation into the next phase. The APQP framework further divides these phases into a set of activities.

The transition from one phase to the next occurs through the gate review, which involves validation and review of processes and deliverables, which are then attached as the output of activities in the associated phase.

APQP brings a rigorous discipline and designates responsibilities clearly to help assure the right quality of end product is delivered on time and at the right cost.



2: APQP Process

There are several commercial off-the-shelf products and PLM software applications that provide a fixed level of automation for standard APQP process. The PLM based software applications provide connectivity between the engineering and supply chains, which enable improved and auditable information flow.

PLM research analysts have observed that APQP management remains a challenge for discrete manufacturers and have therefore expressed a need for APQP automation.



Electronic APQP systems provide suppliers with automated tools for the labor-intensive and document-heavy processes

- Kevin Prouty, AMR Research

Business Challenges



OEM

- More no. of NPD programs
- Conform to Quality Requirements & International Standards
- Shortening Product life cycle
- Management of Certification
- Document / Deliverable management
- Standardization & Knowledge reuse
- Collaboration within eco system & with extended enterprise
- Planning & Execution of APQP project
- Visibility to Quality activities



Tier-1

- Manage changes related to
 - OEM's NPD plan
 - Specifications & Design
 - Quality Plan & Deliverables
 - Regulation
- Validations & Reviews by OEM
- Management of Certification
- Conformance to OEM specific quality standards
- Conformance to several International quality standards

3: Business Challenges – OEM and Tier 1 perspective

The challenge faced by the automotive industry in APQP compliance requires a defined structure for reporting the product development status and launch. This is further complicated because suppliers supporting multiple OEMs use different versions and therefore require different variations of APQP. For suppliers, it is difficult to satisfy all OEM requirements, while maintaining efficient product development processes and running a profitable business.

The leading business challenges faced by OEMs and suppliers are related to collaboration, information management and visibility & traceability of deliverables; and planning and increase in the number of New Product Development (NPD) programs. This impacts them in the following ways:

- Time required for validation of product and process quality deliverables
- Conformance to OEM standards and international quality standards
- Efficiency and success of NPD programs

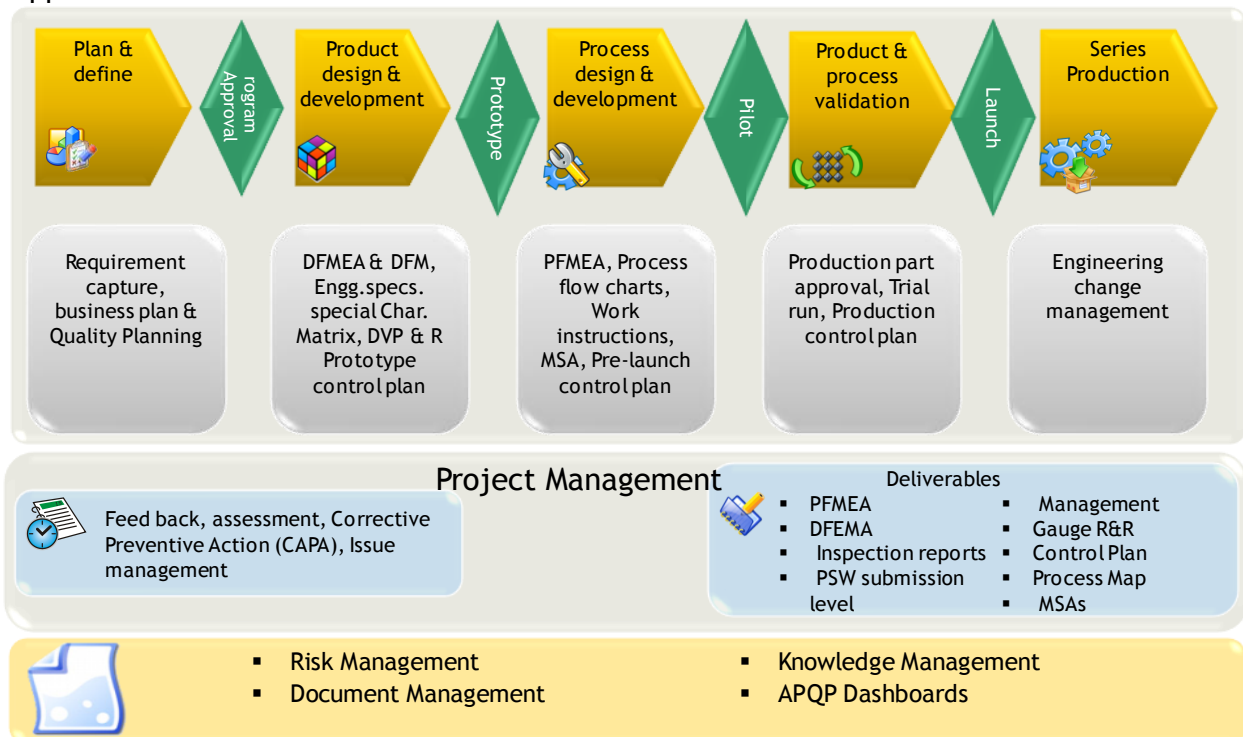
Addressing APQP challenges

The APQP involves collaboration with internal departments as well as extended stakeholders during ‘New Product Development’ initiatives. Ideally, APQP is managed as a quality program involving several stakeholders, namely: quality, sourcing, manufacturing, engineering, etc. in the overall quality planning process.

The following are the major activities involved in the APQP process:

- APQP is managed as a project, using the phase gate
- The core of the APQP is a built-in document management capability
- Electronically enabled Production Part Approval Process (PPAP)
- Quality dashboard to track APQP progress

The product and process quality planning involves collaboration, deliverable and document management, project management and tracking, along with the need for real-time status updates of different activities. To achieve this objective, which is critical for overall NPD, the solution should have the following blocks to address the challenges faced by OEMs and their suppliers.

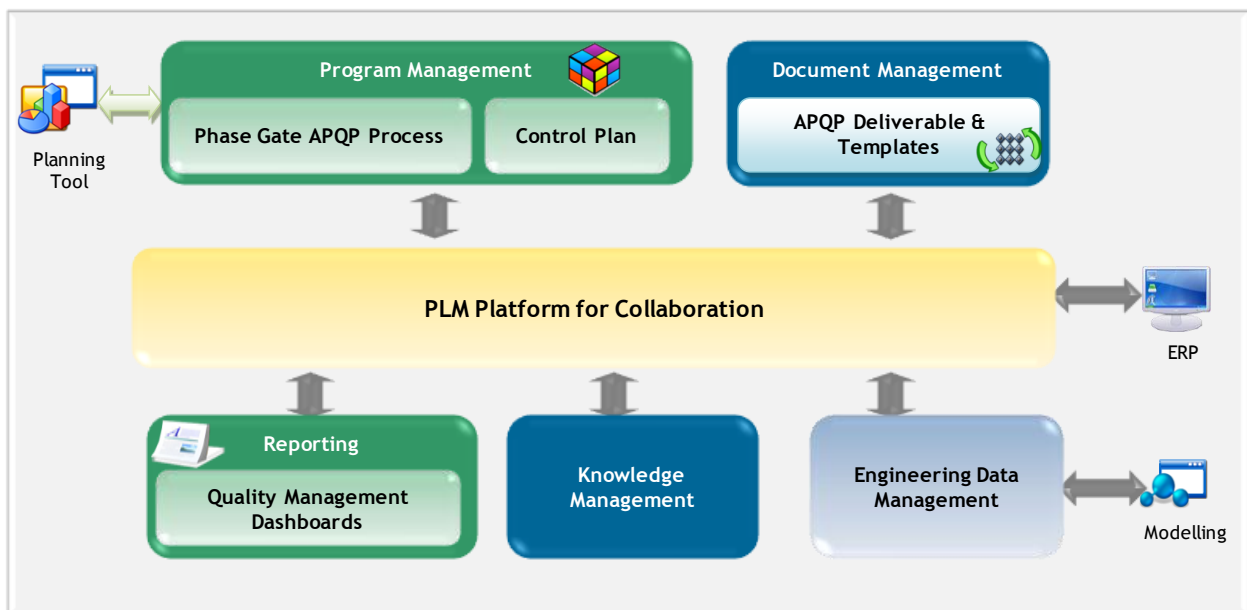


4: APQP Solution Blocks

The archetype APQP solution requires a collaborative phase gate process and strong project management fundamentals to support the planning and tracking activities. It should have rigorous document management processes sustaining both the deliverables and PPAP. The solution must have the capability to manage several products' process quality templates to capture the information/knowledge, during each phase of product development. Moreover, a good dashboard and reporting mechanism enhances information visibility, increasing the number of stakeholders that can be involved early and often in the NPD process. Most importantly it must address the need for a single version of truth across the entire supply chain.

Using PLM for management of APQP

PLM solutions have been designed for enterprise-wide applications and these systems are supported by a robust database for storage of information, powerful workflow engine for collaboration, seamless integration capabilities with other applications and excellent KPI dashboard management capability. The diagram below demonstrates the archetype PLM-based APQP solution.



5: PLM-based APQP solution

The PLM-based APQP solution uses the key PLM features of engineering data management, program management, dashboards and document management to address the key challenges of automotive industry in handling APQP.

Below are the key features of L&T Infotech's APQP solution:

- Phase gate approach and control plan by leveraging project management
- Document management system to manage deliverables, templates
- Integration with e-mail, ERP, CAD and engineering data base for seamless flow of information
- Extended application for 'tacit and explicit' knowledge management
- Reporting and analytics for APQP-KPI dashboards

This solution is based on the guidelines of the international quality management systems such as QS 9000, TS 16949 and integrates project management and phase gate disciplines. Similarly, this solution helps in planning for the product, process and systems quality.

Business benefits of PLM-based solution

APQP systems gain executive visibility and improve launch performance by integrating APQP program management, and product development.

Following are the key benefits:

- Conformance to requirements of ISO 9000/TS 16949/QS 9000/QMS
- Consistent and timely quality deliverables
- Process standardization and simplification
- Expanded process visibility
- Collaborative environment between various stakeholders of APQP process
- Reduction in NPD cycletime
- Single version of truth spanning the supply chain
- Improved traceability of processes

Conclusion

The implementation of a PLM-based APQP solution has considerable, and measurable, positive impacts on the overall 'New Product Development' initiative. The benefits of a PLM based APQP will benefit the entire value chain. These benefits are achieved by using an integrated technology and process driven solution that reduces the time required to complete the process. With increased visibility of current bottlenecks, the management can take quick and more informed decisions at a faster pace.

The availability of electronic APQP and PPAP processes helps improve the management of deliverables required for the launch of the vehicle and its components. In a similar manner, reusing knowledge decreases the necessity of recreating the wheel every time and as such, increases time to market.

PLM, along with its other advantages, ensures a strong enterprise solution base which can be leveraged either to other departments or to the APQP process for improving ROI.

Abbreviations and Acronyms

AIAG	Automotive Industry Action Group
OEM	Original Equipment Manufacturer
NPD	New Product Development Program
PPAP	Production Part Approval Process
KPI	Key Performance Indicator
ROI	Return On Investment
DVP & R	Design Verification Plan & Report
PFMEA	Process Failure Modes Effects Analysis
DFMEA	Design Failure Modes Effects Analysis
CAPA	Corrective Action Preventive Action
QMS	Quality Management System

References

AIAG	http://www.aiag.org/
International Automotive Task Force	http://www.iatfglobaloversight.org/
Windchill PLM	http://www.ptc.com/
Teamcenter PLM	http://www.plm.automation.siemens
ENOVIA PLM	www.3ds.com

About the Author



Sachin Kulkarni leads PLM industry solutions group at Larsen & Toubro Infotech Ltd. He has over 15 years of industry and consulting experience in New Product Development and Supply Chain Management domains. He has worked in India, North America, Europe and South East Asia in Automotive and Industrial product companies. Sachin has a BE in Mechanical Engineering with a MBA in Marketing. In addition to this, he is a Certified Supply Chain Professional (CSCP) from American Production & Inventory Control (APICS) and Qualified Project Management Professional (QPMP).

About L&T Infotech

Larsen & Toubro Infotech (L&T Infotech), one of the fastest growing IT Services companies, is a part of USD 11.7 billion L&T Group, India's 'Best Managed Company' with presence in the areas of engineering, manufacturing and financial services. It is ranked by NASSCOM as 8th largest Indian software & services exporter from India, is amongst NASSCOM's Top 20 IT-BPO Employers in India (FY2009-10) and is ranked 7th in DATAQUEST-IDC top 20 IT Best Employers Survey 2010. L&T Infotech is differentiated by its unique Business-to-IT Connect, which is a result of its rich corporate heritage.

It offers comprehensive, end-to-end software solutions and services in the following industry verticals: Banking & Financial Services; Insurance; Energy & Petrochemicals; Manufacturing (Consumer Packaged Goods/Retail, High-tech, Industrial Products, Automotive), and Product Engineering Services (Telecom).

The Company's new emerging verticals include Media & Entertainment and Life sciences & Healthcare. L&T Infotech also delivers business solutions to clients in the following horizontals/Service Lines: SAP, Oracle, Infrastructure Management Services, Testing, Consulting and Business Process Services; while its other service offerings are: Business Intelligence/Data Warehousing, Legacy Modernization, Applications Outsourcing, Architecture Consulting, Enterprise Integration, Service Oriented Architecture, Systems Integration and PLM.

L&T Infotech also offers Unitrax®; a SaaS-based transfer agency product, enabling fund managers to process product types such as mutual funds, fixed income, structured notes, annuities, segregated and retail venture funds. Unitrax® provides web-based BI reporting, sales analytics and CRM features. Unitrax®'s Web services-based architecture eases inter-connectivity to in-house applications. With a consistent high client satisfaction measure, the product improves efficiencies through streamlined and automated client processing and administrative features whilst ensuring a high level of compliance with regulatory requirements and industry standards.

For more information, visit us at www.Lntinfotech.com
or e-mail us at info@Lntinfotech.com.