

The AIAG APQP Manual 3rd Edition and AIAG Control Plan Reference Manual Version 1

The journey to good product development governance



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Introduction

The AIAG APQP 3rd Edition and AIAG Control Plan reference manuals are set to launch soon, replacing the previous version (AIAG APQP and Control Plan Manual 2nd Edition). With the official release of the new manuals just around the corner, organizations within the automotive supply chain are questioning the significance of the changes and how they will impact their organization—if at all. Although there is no contradiction between the previous APQP and Control Plan 2nd Edition and the new manuals, the improvements prescribed in the new AIAG APQP 3rd Edition and AIAG Control Plan reference manuals should not be overlooked. Effective implementation goes beyond conformity to OEM's Customer Specific Requirements (CSRs). In short, the core output is still product conformity during launch and mass production, but the ultimate benefit is to enhance your organization's competitive advantage by integrating a robust governance model into the product development process.

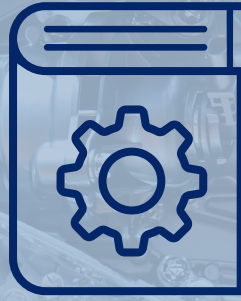
This white paper provides a brief overview of APQP and Control Plan, followed by an emphasis on the most important improvements you can expect to see in these new manuals, pointing up benefits in terms of product and process innovation, compliance with safety and performance requirements, and agility in the time-to-market.



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APQP at a glance

Advanced Product Quality Planning (APQP) is a methodology that originated in the automotive industry to ensure that the development and production of high-quality products meet customer requirements and expectations. APQP includes a series of steps and tools to ensure that all necessary planning and preparations are made before mass production. The goal of APQP is to prevent quality problems, improve overall customer satisfaction, and drive continuous improvement.

The key benefits to APQP include:

- Improved product quality - APQP's rigorous risk assessments, design and process FMEAs, control plans, and production trials prevent a host of quality problems before parts are mass produced.
- Enhanced customer satisfaction - To put it simply, higher quality products result in greater customer satisfaction/and happiness. When customers are satisfied, their relationships with manufacturers and suppliers improve.
- Increased efficiency - Quality problems in the development and manufacturing process hinder efficiency and time-to-market. APQP provides a reliable framework to catch and address these problems early to reduce the need for rework.
- Reduced costs - Quality problems, hangups in the development and manufacturing process, rework, product returns, warranty claims, and more all result in greater costs to the manufacturer. APQP drastically reduces these issues to save significant costs.
- Improved supplier relations - By factoring in a detailed understanding of customer requirements and expectations, APQP allows suppliers to better understand their customers which leads to improved customer supplier relationships and a more collaborative working relationship.
- Better risk management - APQP's risk assessment processes allow suppliers and manufacturers to identify, address, and develop measures to mitigate potential quality issues early.
- Improved process control - the combined methodologies outlined above in combination with APQP's statistical process control (SPC) processes allow suppliers and manufacturers to monitor/control the production process in even greater detail.

Other key benefits that are worth mentioning include:

- To direct resources to satisfy the customer.
- To promote early identification of required changes.
- To increase First Time Quality in new parts and eliminate the need for changes after launch.

Control Plan at a glance

Control plans provide a written summary description of the systems used in minimizing process and product variation. The Control Plans support the Product Quality Planning Cycle:

- Early in the product life cycle its primary purpose is to document and communicate the initial plan for process and product control.
- Subsequently, it guides manufacturing in how to control the process and ensure product quality.

The control plan is an integral part of the APQP and is said to be utilized as a living document, evolving to incorporate improvements and lessons learned as they occur. It is built progressively, according to the stage of the product development (Prototype, Pre-Launch, and Production)

The key benefits of Control Plans include:

- Guides manufacturing in how to control the process and ensure product quality. During regular production runs, the control plan provides the process monitoring and control methods that will be used to control product and/or process characteristics.
- Provides the organization with the baseline to evaluate output, review the control plan, and make appropriate changes based on lessons learned and quality performance data.
- When utilized as “Family Control Plan” or “Foundation Control Plan”, allows a more efficient/new product development and launch.



The AIAG APQP Manual 3rd Edition

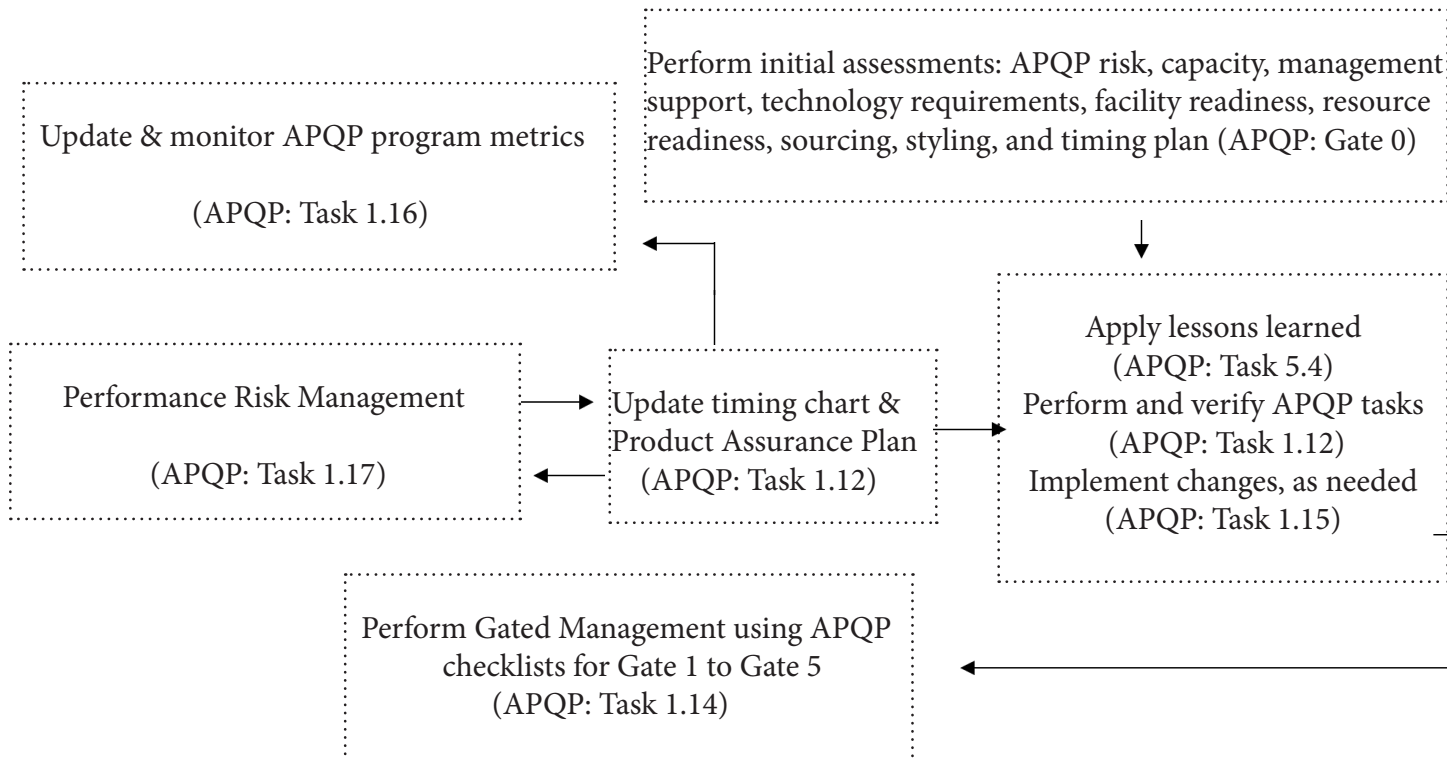
Why has the AIAG APQP Manual been revised?

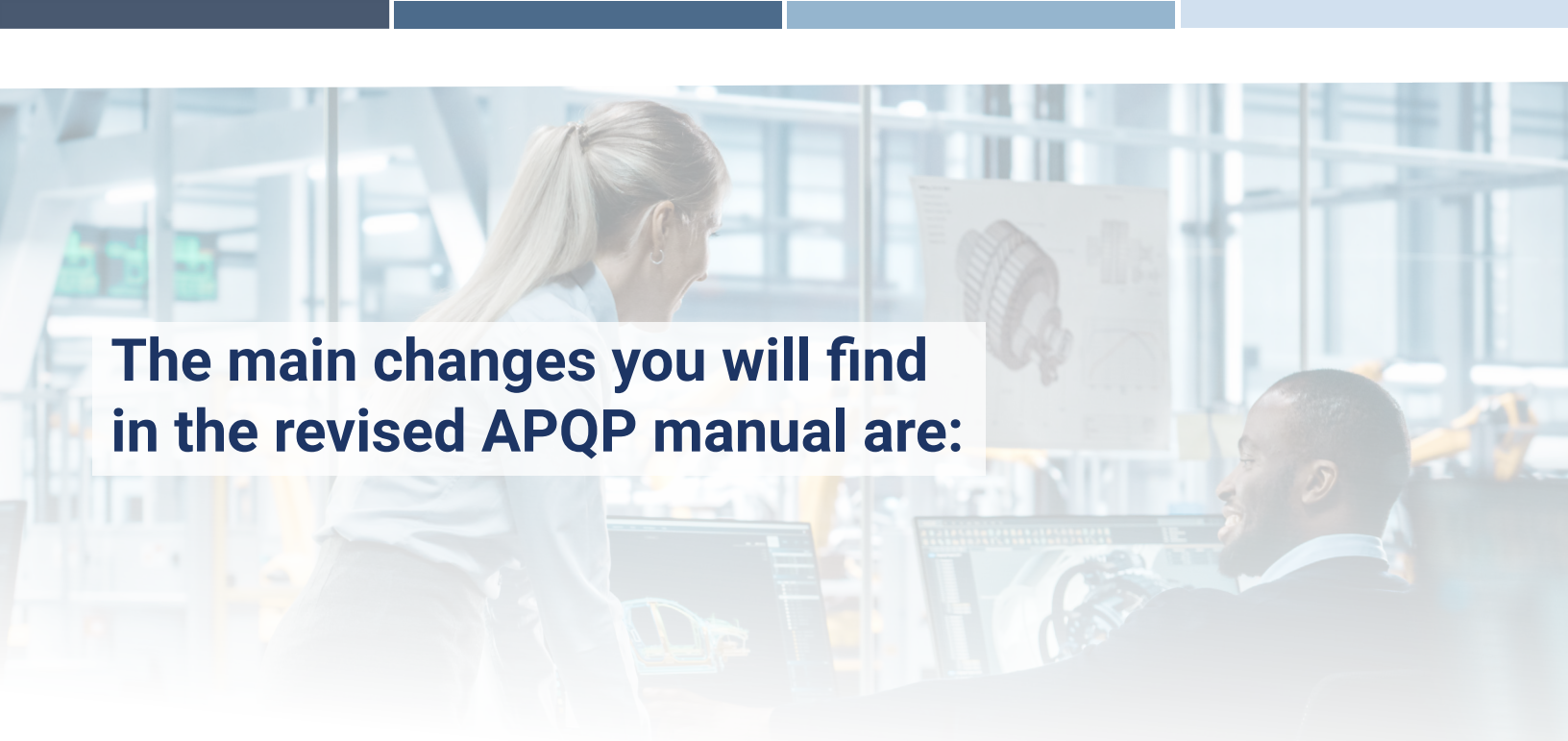
The APQP manual was revised to incorporate lessons learned from issues with escapes and delays during new product program launches. The new and revised requirements were determined based on collaboration between automotive OEMs and suppliers' representatives, including "new technology" suppliers enabling acceleration to ACE (Autonomous, Connected, and Electric vehicles). The team used a fast feedback approach enabling an accelerated development cycle (quicker/earlier stakeholder input) based on a cross-section of AIAG membership representing major commodities with global insight.

What are the major changes?

The most noticeable change in the AIAG APQP 3rd edition manual is the emphasis to the robustness of managerial activities, such as Sourcing Risk Analysis, Change Management, APQP Program Metrics, Risk Assessment Mitigation Plan, Leadership (instead of management) Support, Ongoing review of lessons learned and best practices reflected into new and revised checklists, and Gated Management (gate reviews). Obviously, these enhanced project management activities imply a strong leadership and engagement from all relevant stakeholders, going beyond "APQP as a product development methodology" to "APQP as a governance framework of the product development process".

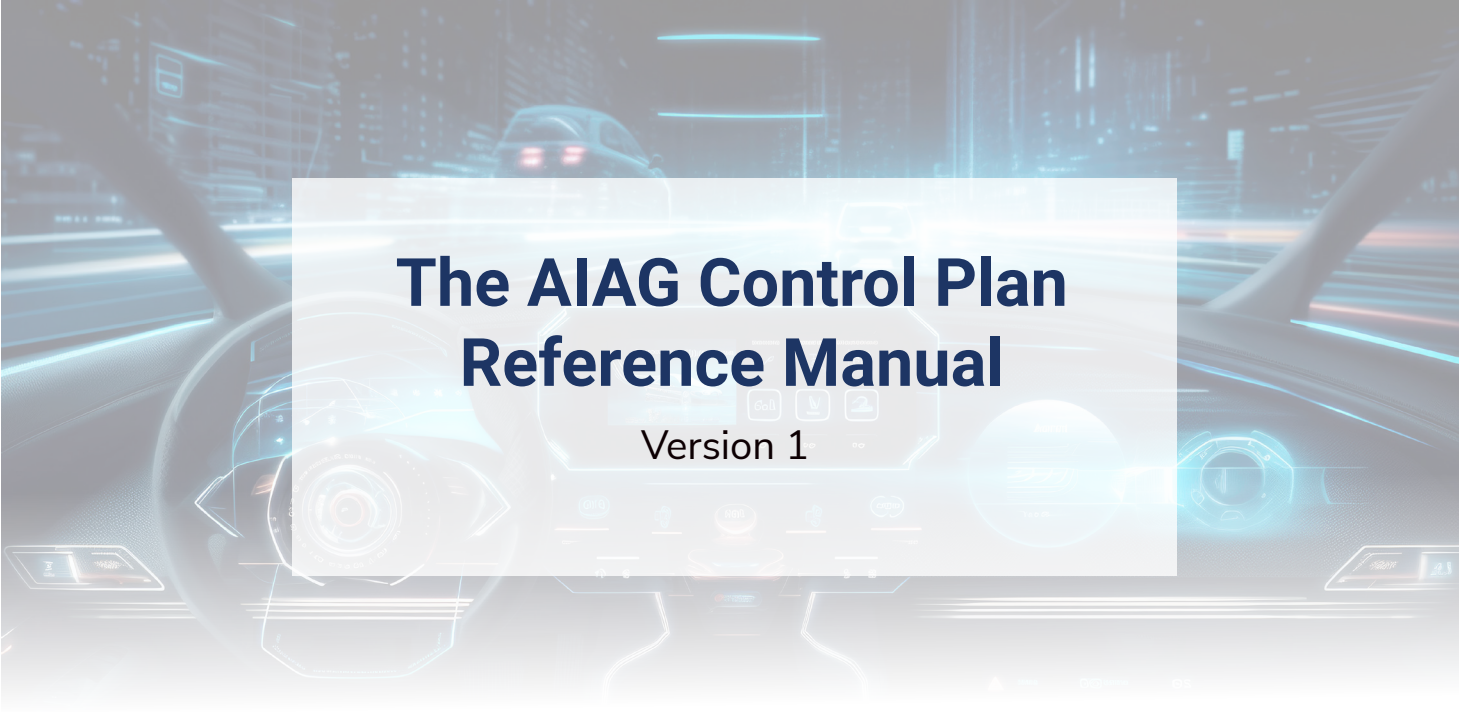
Figure: APQP as a governance framework of the product development process





The main changes you will find in the revised APQP manual are:

- Emphasis on the importance of ongoing review and application of lessons learned and best practices.
- Removed Control Plan content into a stand-alone document.
- Added a Sourcing section and Sourcing Checklist, requiring a High Risk Supplier Evaluation method.
- Added a new capacity (contracted volume) assessment, planning, and evaluation.
- Added a Change Management section and Change Management Checklist.
- Added a section for APQP Program Metrics, i.e., requiring the management of the effective completion of program tasks and phases through appropriate metrics.
- Added a section for the Risk Assessment Mitigation Plan, with the purpose of analyzing and addressing risks on an ongoing basis to identify opportunities for improvement and risk mitigation actions.
- Added "Part Traceability" content.
- Improved task completion review checklists.
- Added a New Gated Management Appendix, including:
 - Suggested documentation checklists for each "gate" review,
 - Alignment to typical Program milestones,
 - Support of the expectation for "gate review" in 1.14 (Leadership Support), and
 - Review of supplier (sub-tier) APQP activity, not just Organization's.
- A comprehensive program concept review prior to the award of business (gate 0) and launch readiness review (gate 5), this last one requires a review of several factors, such as:
 - Program results,
 - Process capability,
 - Internal approval to end safe launch and implement Production Control Plan, and
 - Implementation of "Lessons Learned" related to the current part, Family/Foundation FMEAs and Control Plans (if applicable), and the organization's system to ensure application of lessons learned across the entire organization.



The AIAG Control Plan Reference Manual

Version 1

Why was APQP and Control Plan split into separate manuals?

The Control plan continues to be an ongoing point of audit non-conformances during IATF audits and is consistently in both the top ten major and minor non-conformances as identified by the International Automotive Oversight Bureau (IAOB). The new Control Plan manual...

1. Incorporates Lessons Learned from escapes during both Product Launch and Mass Production.
2. Includes allowances and considerations for new and/or highly automated manufacturing processes.
3. Provides opportunity to harmonize Customer Specific Requirements of Ford, General Motors, and Stellantis.
4. Provides a more detailed and thorough guidance to all users for development, maintenance, and utilization of the Control Plan.
5. Provides guidance on how to evaluate the effectiveness of the Control Plan by assessing the linkages with quality assurance methods, such as LPA and Reverse FMEA.
6. Allows more frequent change of the Control Plan to reflect continuing evolution of automotive product and processes.

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What are the key sections of the new manual?

The most noticeable change in the AIAG Control Plan reference manual (when compared with the previous Control Plan section inside the APQP 2nd Edition manual) is the clear description of control plan requirements and further clarification guidelines on how to effectively implement control plans, including their linkages with other quality assurance methods.

The main changes you will find in the new Control Plan manual are:

- Detailed requirements and guidelines for topics based on past problems/opportunities: Control Plan format, Special Characteristics, Pass-Through Characteristics (PTC), Error Proofing Confirmation, Families of Control Plans, Interdependent Processes and/or Control Plans, Rework and Repair Processes, Reaction Plan Details, 100% Visual Inspection, “Black-Box” Processes, Non-Design Responsible Organizations, Direct Supply, and use of Software to Develop and Manage Control Plans.
- Detailed guidance on how to develop control plans, not just form fields. Previously just described “Form Field content”, now includes description of how to obtain information and some minimum expectations, including:
 - Frequency: if not 100%, must be volume-based and support containment,
 - Reaction Plan: clarified expectation to include contain suspect product, stop the process from creating more suspect product, steps to bring the process back to control, and
 - Reaction Plan: Requires inclusion of the “Owner/Responsible” for the Reaction, or reference to a detailed instruction document.
- Addition of “Safe Launch” requirements: must establish judgment criteria to exit Safe Launch, typically 90 days performance with no problems to customer and no problems identified by Safe Launch additional/enhanced controls/containment.
- The Production Control Plan is a living document and should be updated with lessons learned and other continuous improvement data sources.
- Consideration points for effective use of QMS and other elements related to Control Plan implementation, such as: Reverse PFMEA, Using Software to Develop and Manage Control Plan, Layered Process Audit as Control Plan Verification, Control Plans in Highly Automated Processes, Using Family/Foundation Control Plans and FMEAs, Control of Storage and Handling Related Risks, and Abnormality Management related to Control Plans.

Good Product Development Governance

Numerous metaphors arise to describe the complexity of product development in the automotive industry and its interconnected supply chain. Product development is akin to conducting an orchestra, where diverse components come together under a unified vision to create a harmonious final piece. It is a teamwork, that requires not only competent musicians to play their instruments (team members), but also a great conductor (project team manager) able to communicate and collaborate within and between technical and managerial teams, inside and outside the organization; each of these stakeholders with potential conflicting expectations in terms of timing, cost, quality, innovation, and performance.

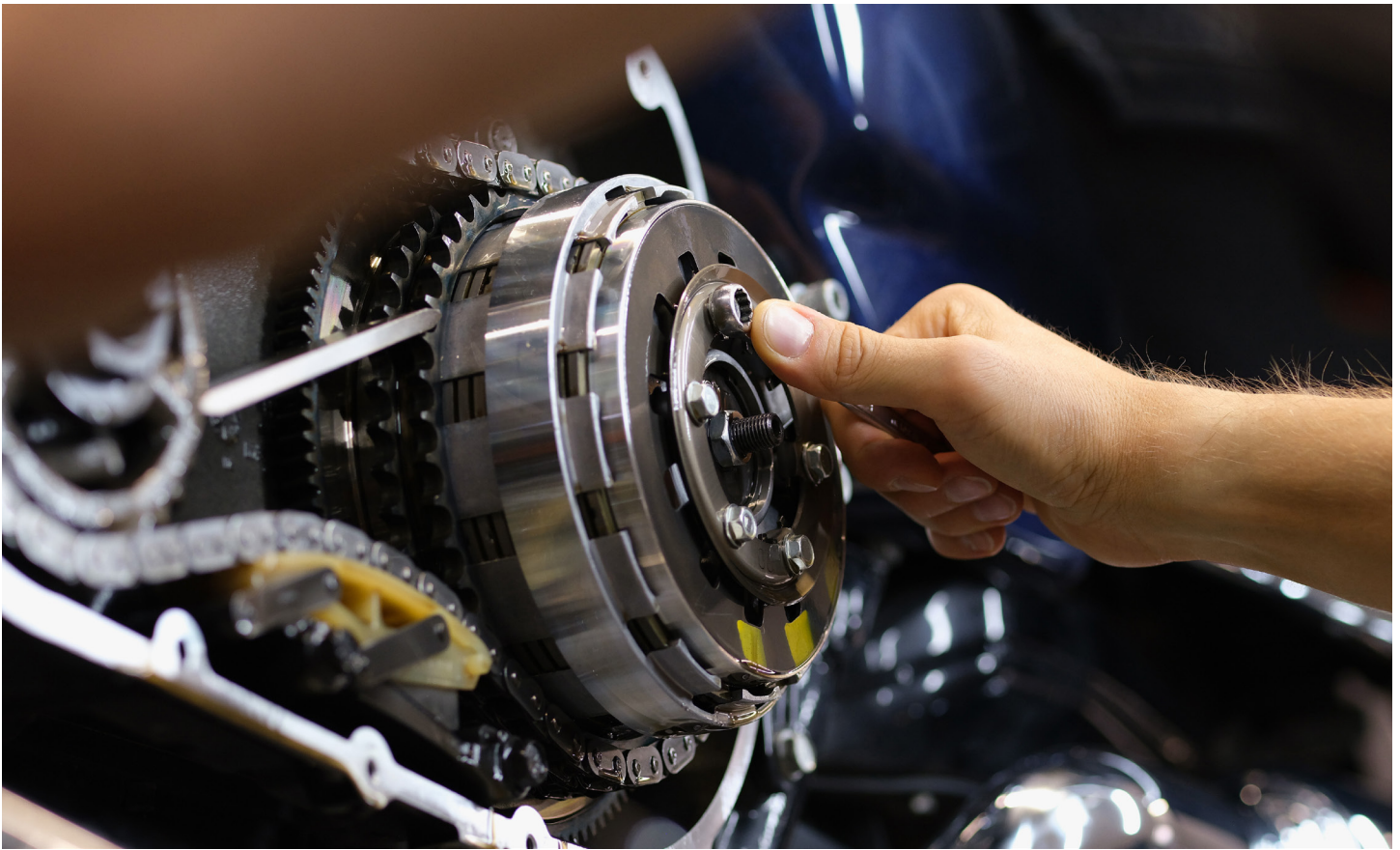
Balancing governance in the product development process is like orchestrating a symphony where innovation, compliance, and agility harmonize. Innovation fuels product differentiation, attracting customers, while optimizing production processes to improve quality and drive down costs. Compliance safeguards against risks and ensures product performance on operating conditions, and agility ensures supporting your customer's product launch timing requirements.

The new APQP and Control Plan manuals add a strong emphasis on managerial aspects of the product development process while keeping the importance of solid technical expertise, effective core tools application and its linkages, supported by a committed leadership.

In this sense, these manuals are all about good governance of the technical and managerial aspects of the product development process, which can only be sustained by an integrated risk management during the entire product lifecycle.

Next Steps

If you're currently using the AIAG APQP 2nd Edition or have yet to properly implement the APQP and Control Plan methodologies within your organization, there are important steps to follow once the new AIAG APQP and AIAG Control Plan manuals are released. Keep in mind that every organization is different, so the steps needed to adjust your product development process are likely to be unique to your situation. However, here are some steps that will help you get started on the journey:





1. Familiarize yourself with the new manuals. While many things have indeed changed, some remain the same.



2. Identify any organizational gaps which need to be addressed to meet the new requirements.



3. Provide appropriate training and awareness for all parties that have an impact on the development and support of APQP and Control Plans.



4. Revisit the gap analysis tool and develop an implementation plan for a specific “new APQP and Control Plan pilot project”. Consider the “timing to adopt” prescribed by your customers.



5. Implement the “new APQP and Control Plan pilot project” and record lessons learned (Things Gone Wrong, Things Gone Right, Benefits) on the use of the new methodology.



6. Standardize your product development activities to support the application of the new methodologies, with special focus on the governance of the product development process.



7. Apply a continuous improvement approach into your next generation APQPs and make your Control Plan living documents.