

Executive Summary

The production lifecycle has seen a decrease in recent time, with emphasis on the ability to manufacture products and maximize customer schedule. To achieve this, the traditional method of sequentially performing development of large products that are not cost effective is quickly being replaced with nouveau systems and techniques that develop varying products, while quickly adopt changing customer needs. This requires that the engineering change and its corresponding management process be performed quickly and effectively. In this report, the approach used to propose a standardized framework for engineering change management (ECM) and recommend effective ECM solutions for an industry client is outlined.

Through identification of the relevant stakeholders, documentation, and their interactions within the change management processes, we were able to map out the stakeholder process flows. These maps serve a dual purpose; for us, they were a stepping stone that guided our short-term and long-term recommendations, and for Bombardier these maps were an explicit statement of the actions necessary and documentation required depending on the point of change-initiation. This knowledge itself is an asset to Bombardier, as it enables traceability, accountability, and monitoring of the processes. These were the underlying principles behind all the recommended solutions, with the short-term solutions more focused on creating change with minimal cost/effort for Bombardier, and long-term solutions focused solely on creating change regardless of the cost/effort required.

Stakeholder identification and knowledge of change control documents were collected through meetings and interviews with various experts within the working team at Bombardier. It was possible to determine that the current engineering change scenario is exposed to two major risks: losing the documents and not being on schedule, because the system hinders the clear tracking and traceability of changes. There is a need for centralizing the "Condition of Supply" (CSD) document with concerning changes in a digital and easily accessible form. There is no scheduling in place concerning revisions, so there are no time frames established for the CSD to be revised. Employees don't follow a standardized way to keep the documents and the amendments are done through two different forms that follow different naming conventions.

As short-term solutions, the first proposition is to standardize the Change Control documents to be issued to all vendors. The current Condition of Supply Documents should be revised to incorporate changes and the revised CSDs should be digital, so the ECM can go paperless and easily accessible by all people involved within Bombardier. Lastly, it is necessary to carry out periodic revisions of the CSD, every 12 – 18 months, that allows for easy tracking of changes and avoids the piling up of amendments.

In terms of long-term solutions, it is essential for Bombardier to first formalize their engineering change management process and subsequently communicate it to all employees. This should be done immediately because currently it is not clear if all employees have a similar understanding of the process. With a thorough understanding of the engineering change process and a detailed classification of changes, the appropriate approach can be employed to find solutions. Furthermore, this will allow Bombardier identify bottlenecks in the process and also empower different stakeholders to successfully manage change.

It is also recommended that Bombardier start looking into some of the concurrent engineering initiatives that have allowed competing organizations such as Airbus excel in the aerospace industry. With concurrent engineering, Airbus has been able to manage the complexity of developing and manufacturing an aircraft by breaking the aircraft into smaller concurrent engineering sub-projects that can be worked on by teams in parallel. To achieve this, a transformational change is needed at Bombardier as it relates to data collection. It is essential for Bombardier to see data collection as a project deliverable and not a by-product. This ensures that mistakes made in the past are not repeated.