ASI DataMyte White Paper:

Achieving the ISO/TS 16949 Process Approach With Existing Quality Documentation Tools

The Problem and the Solution

The secret is out! ISO/TS 16949 differs dramatically from QS-9000 in that it takes a process-based approach. This process-based approach is better aligned with the way automotive organizations operate and can therefore offer many benefits. The question then becomes "How do we get the most benefit from this process approach?"

"In training sessions and seminars, the core tools are becoming some of the most important tools for the practitioner who wants to gain the advantages that ISO/TS 16949 represents," states Karl Dorr of Plexus Corporation in his article *Linking the Core Tools to ISO/TS 16949:2002*, published in the *ActionLine Special Edition* Exploring ISO/TS 16949.

The core tools he refers to are the QS-9000 reference manuals:

- Advanced Product Quality Planning (APQP)
- Failure Mode and Effects Analysis (FMEA)
- Production Part Approval Process (PPAP)
- Measurement System Analysis (MSA)
- Statistical Process Control (SPC)

Use of the core tools for TS 16949 is very powerful because they are already familiar. There is no huge learning curve – the tools just need to be applied with a process focus in mind.

Rather than try to address all the core tools, the primary focus of this paper will be APQP and FMEA. After the base concept is established, there will be a brief discussion of the interaction of APQP and FMEA with other core tools and business processes.

The remainder of this paper will address:

- Basic definition of a process
- Example of the basic APQP/FMEA process
- Interactions of APQP/FMEA with other processes
- How to jump start your transition to ISO/TS 16949

A Basic (Not Fancy) Process Model

In its simplest form a process consists of:

- Input from an outside source or previous internal activity
- Process step which adds value to the input(s) to create the…
- Output

The basic process model was presented to assure a common understanding before getting into the specifics of APQP and FMEA applied as processes.

The Process Approach to APQP and FMEA

Under QS-9000, it was acceptable to treat the APQP elements independently rather than as part of a process. As far back as the late 1980s, some organizations were recognizing big benefits in integrating the Process Flow, Characteristic Matrix, PFMEA, Control Plan and Operator Instructions. In 1993, MPACT software (originally DCP) was created to support the integration of APQP into a process.

The Evolution of Process-based APQP at Ford Powertrain

Dynamic Control Planning (DCP) was a very successful initiative at Ford Powertrain. In the late 1980s, some innovative Ford plants started integrating the APQP elements into a process that they called DCP.

There was variation in each plant's approach to DCP. Integral Solutions, Inc. (ISI – now part of ASI DataMyte) was brought in to assist in standardizing DCP in preparation for deploying it to the supply base. Because of the expertise built during the standardization, ISI was awarded a sole-source contract for implementation in the supply base.

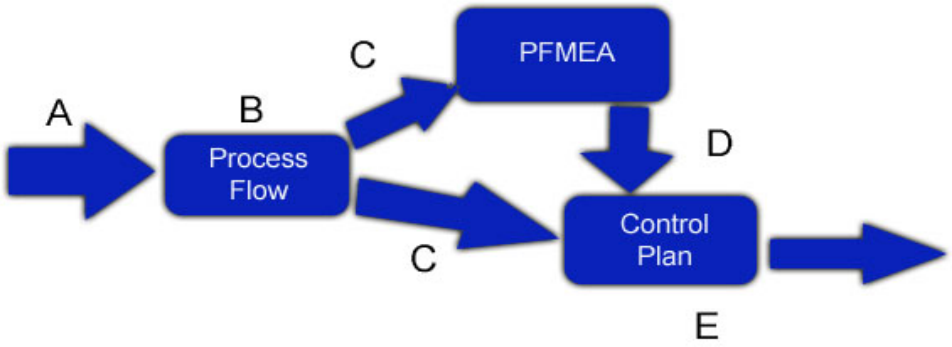
For several years ISI worked with Ford Plants and the supply base in a manual mode. Ford's standard practice was to capture the information on flip charts and spreadsheets. Ford carefully transferred the information between documents but the manual nature of the work left a lot of opportunity for error.

The DCP process was automated by tying the information into a relational database that can be shared by the documents. Even in its first rough form, the supply base enthusiastically embraced the software.

When QS-9000 was issued in 1994, few changes were required to make the DCP software compliant. With the compliance to QS-9000 the name was changed to Manufacturing Planning and Control Tool (MPACT).

With APQP and FMEA, the inputs and outputs are largely information. The information may be printed on a report or sent in an e-mail, but fundamentally it is still information. In manufacturing, inputs and outputs tend to be thought of as "things." But even in a manufacturing facility, many business processes are concerned with information.

For the purpose of demonstrating APQP as a process, only three process steps will be addressed: Process Flow, PFMEA, and Control Plan.



1. The Process Flow is getting input from another process. This "other process" is discussed later as an interaction with other processes.
2. The Process Flow is used to add knowledge about what operations make up the process and which characteristics are the results of each operation.
3. The operation/characteristic combinations are inputs for both the PFMEA and Control Plan.
4. The PFMEA is used to assess the risk that the operation will not be able to correctly produce the characteristic. The work to reduce or mitigate risk results in controls that are inputs to the Control Plan.
5. The Control Plan is used to document standard controls and to incorporate controls from the PFMEA. A highly value-added element of the Control Plan is the Reaction Plans.

This type of integration among the tools exactly meets the intent of ISO/TS 16949.

As each tool is strengthened by the information developed by the others, the benefits of the process approach become clear. The benefits are strongest when the information is stored in an integrated software package (relational database). For example, in MPACT if you change the specification of a characteristic on the Process Flow, it is automatically changed on the PFMEA and Control Plan.

Integration with other Core Tools and Processes

Here are examples of how the three-step process above can integrate with other processes:

Design. In the example above, the Process Flow is getting information from outside the three-step process. That information comes from the design process; the output of the design process is the input for the manufacturing process. Much of the design information can be stored in DPACT (Design Planning and Control Tool).

PPAP. Characteristics from the Process Flow are inputs to PPAP (Production Part Approval Process) in preparation for completing Dimensional Results.

MSA (Gaging). There is a process for managing and maintaining gages. The gage information is input to the Control Plan. MPACT's Gage Library stores gage information.

SPC. The ASI DataMyte Products are designed to integrate with one another to address all aspects of your manufacturing processes.

Jump Start Your Transition to ISO/TS 16949

1. If needed, refresh your organization's knowledge of the core tools.
2. If you don't have it, get software support for the tools. The ASI DataMyte PACT suite (DPACT, MPACT and OPACT) offers process-focused support for the core tools. This is not new – the PACT suite was originally designed with a process approach.
3. Apply the tools and software using process thinking.
    a. Define the boundaries of your process. If making a part, theoretically your process could start with ore in the ground and continue until your part is functioning in a vehicle. That's not manageable! Look for two things when establishing your boundaries:
        i. The interface to the processes that precede and follow yours must be clearly defined. There can be no uncertainty about which process is responsible for any given input/output.
        ii. No more than 5 to 10 people (the APQP team) should be required to understand everything within the scope of your process. If you get more than 10 people involved it becomes hard to be efficient. Note: You can and should call in other people on an as-needed basis when special knowledge is required.
    b. Focus on inputs and outputs within your process, as well as inputs and outputs of processes with which your process interfaces.

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