Quality Times

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CNSC Inspection June 2010

I am pleased to tell you that due to your hard work the CNSC inspection team informed us that they will close another 8 of the original 14 findings from the 2006 audit of our quality management system.

We had previously reported that the CNSC had closed 2 findings based on the March 2009 inspection. The inspection team returned to TRIUMF last month to assess our progress on the remaining 12 findings. Subsequent to the inspection we've provided additional information which we trust will resolve 3 remaining findings. That means that in their official inspection report due to be received soon we expect there to be only ONE action notice still to close!

Ivor Yhap, Amiya Mitra, Shirley Reeve (back row), Mike Wicken, Andy Hird, Ted Schenkeveld (front row) Glenn Jones, Brenda Morrey, Milan Pankovic (absent)

At the closing meeting the inspection team informed Dr. Lockyer that "...considerable progress has been made by TRIUMF to improve their QA Program since the last follow-up inspection." Thanks to all the Group Leaders for getting their group manuals released this past year. Thanks to Ivor Yhap, Milan Pankovic, Andy Hird and Mike Wicken, who spent a lot of time walking the inspection team through the manufacturing and calibration/inspection processes in the machine shop. Thanks to Shirley Reeve, Brenda Morrey, Ted Schenkeveld, and Glenn Jones for talking to the team about procurement and supply chain management. Thanks to Amiya Mitra for discussing RF group processes, and as always, thanks to the other members of the QMS Implementation Panel for all their continued efforts. *by Phil Jones*

Design Control – why we should love it

Back in the 5th issue I explained the Engineering Design, Manufacture, and Assembly TSOP.

In this issue I want to focus on the first part, Engineering Design, and explain the design control process that Remy Dawson has documented on the Engineering wiki. (To find this page from the *Quality Management* web page follow *Engineering Design > Design Control*.)

Design control serves several purposes which include; knowledge capture for the future, dissemination of information, and maximizing the likelihood of getting what is needed when making something. Design control connects our original expression of a need for something (e.g. a fast car) to the measured performance of that object (e.g. top speed) when it has been made. How can you not love that idea?

What do we need.

The design process starts with "requesting" some design work. I put that in quotes because sometimes the person that wants something designed is the same person that will design it. When requesting the design work the requirements of the device must be stated, and preferably stated in a way that is measurable.

A designer will not know if they have met the objective if they are asked to design the "tallest structure possible" but they will know if they have designed a "structure that is taller than the Burj Khalifa." (if Shirley can pull out obscure facts...)

We need what we need.
On receiving a work request someone participating in the design process may do some preliminary investigations to either aid in defining the requirements or explore possible solutions. If all you know at the start is "I need a tall structure to transmit a VHF radio signal" then the place to start is with some calculations that show signal coverage versus height. These calculations would then be documented in a Design Note that would serve as a design input. Design Notes further clarify requirements, and they explain to others in the future how you decided that the 553 metres of the CN Tower was tall enough. With this information we can produce our "requirements specification".

Can we make what we need?
Once you have settled on the requirements, a conceptual design is produced that would consist of any further calculations, a sketch or preliminary drawing, or perhaps a flow chart for software. The calculations may be to show that there is a way to make the tower you require, or explore multiple options for the design. These calculations would be documented in an Engineering Note that would be an interim design output.

> "Design control connects our original expression of a need for something to the measured performance of that object."

Will it do what we need?
This material is then reviewed at a Design Review where the initial requirements are examined and the proposed design concept is considered. The design review will determine if the requirements are stated clearly and completely enough to allow a meaningful comparison of those requirements with the proposed design. Secondly the proposed design is evaluated to determine whether the design satisfies the stated requirements. Thirdly the design is reviewed to determine if it is feasible to implement and what problems may exist.

The design review is an important control point, it may suggest another iteration of clarifying requirements, examining solutions, or finding further solutions to mitigate any failure modes. Once the conceptual design is approved, which means the specific method of satisfying the requirements has been chosen, the detailed design begins. At this stage any further calculations or specific information that is needed to build the designed object is documented in an Engineering Note. The drawings, or perhaps software source code, are the final design outputs.

Did we make what we designed?
When the design is assembled some tests may be performed to show that the device or program performs the actions intended. These are sometimes called "unit tests" and are not to be confused with commissioning. If the design calls for an air solenoid to extend a piston when the solenoid is open, the unit test confirms that this happens. It verifies that we built what the specification (e.g. drawing) called for.

Does it do what we wanted?
After the device or program is verified to conform to the design it can be commissioned, or validated, against the requirements specification stated at the beginning. Let's say our requirements specification stated we needed a tower tall enough to transmit a VHF radio signal 150 kilometres. The commissioning plan then will be to try and detect the radio signal 150 kilometres away. If we detect it then we have validated the design and we celebrate. If we cannot detect our signal 150 kilometres away then we likely want to investigate why. Fortunately we have a complete history that describes what we did and why we did it.

by Ken Buckley

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