DTI Training Consortium's

Talking Frog

A newsletter for the professionals who assure Quality for us all

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Busy December as DTI crosses from coast to coast

2008 was quite a year for the guys at DTI. New friends made, a new book released, expansion internationally and not least of all a new connection with students in the aviation world.

The month started with a presentation made to the certificate holders at the annual ATAC meeting held in Calgary. A quick flight out to west coast for some Transport Canada work and then a stop at British Columbia Institute of Technology in Richmond, BC. Here Dennis and Sol got to tour the brand new state of the art facility and more importantly got to work with and address the students attending. After a few days in the Vancouver area, the brothers, made the long trip to the other coast and the beautiful city of Moncton. Again Transport Canada was the main reason for the trip, but time

was made to visit Moncton Flight College, a historic institution that originated as a flying club in the glory days of aviation. A very thorough tour, included meeting some of the students who have come all the way from China to take advantage of the exceptional instruction from MFC.

As 2009 enters, we look forward to the new challenges and experiences that may come our way. New topics to discover at NASA, continuing our mission with Transport Canada and meeting more and more people willing to explore the benefits of Quality Assurance.

If you understand the following statement then you have been spending too much time with Dennis…..

"Remember, if you're not part of the solution, you're part of the precipitate!"

Drop us a line if you want an explanation of that statement.

DTI and Skyservice Airlines partner on Quality Assurance Training in Canada!

On February 11, 12 & 13, Skyservice is holding a basic QA class that is open to anyone interested in learning more about this very important topic, especially civil aviation companies in Canada.

To find out more about how you can attend a similar class or sponsor a session at your facility contact us at 1-866-870-5490

This month's QA topic - A Continuation of our series on Corrosion - Aircraft Corrosion

Corrosion damage to aircraft fuselages is an example of atmospheric corrosion. Airports located in marine environments deserve special mention in this context. The risk and cost of corrosion damage are particularly high in aging aircraft. In the United States alone, aircraft corrosion is a multi-billion dollar problem. On some military aircraft types, corrosion maintenance hours are known to outstrip flight hours.

Corrosion manifests in many different forms. Concentration cell corrosion, or ***crevice corrosion***, is the most common type found on airplanes, occurring whenever water is trapped between two surfaces, such as under loose paint, within a delaminated bond-line, or in an unsealed joint. It can quickly develop into ***pitting*** or ***exfoliation corrosion***, depending on the alloy, form, and temper of the material being attacked.

Crevice corrosion damage in the lap joints of aircraft skins has become a major safety concern, particularly after the Aloha airlines incident. On April 28, 1988 a nineteen-year-old Boeing 737 aircraft, operated by

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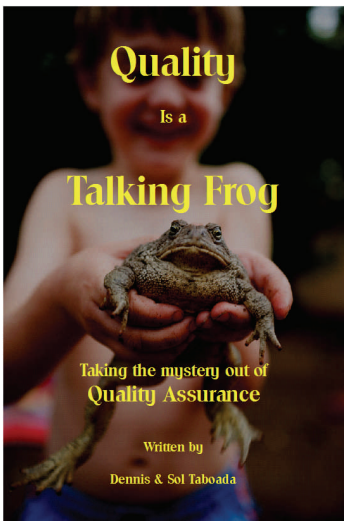

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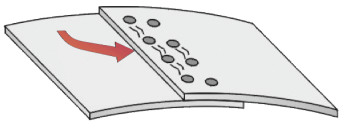
Corrosion Control (cont'd)

Aloha airlines, lost a major portion of the upper fuselage near the front of the plane, in full flight at 24,000 feet. The ***Aloha incident*** marked a turning point in the history of aircraft corrosion.

In 1998, the combined commercial aircraft fleet operated by U.S. airlines was more than 7,000 airplanes. At the start of the jet age (1950s to 1960s), little or no attention was paid to corrosion and corrosion control. One of the concerns is the continued aging of the airplanes beyond the 20-year design life. Only the most recent designs (e.g., Boeing 777 and late-version 737) have incorporated significant improvements in corrosion prevention and control in design and manufacturing. The total annual direct cost of corrosion to the U.S. aircraft industry is estimated at $2.2 billion, which includes the cost of design and manufacturing ($0.2 billion), corrosion maintenance ($1.7 billion), and downtime ($0.3 billion).

The structural failure on April 28, 1988 of a 19 year old Boeing 737, operated by Aloha airlines, was a defining event in creating awareness of aging aircraft in both the public domain and in the aviation community. This aircraft lost a major portion of the upper fuselage in full flight at 24,000 feet , near the front of the plane. Miraculously, the pilot managed to land the plane on the island of Maui, Hawaii. One flight attendant was swept to her death. Multiple fatigue cracks were detected in the remaining aircraft structure, in the holes of the upper row of rivets in several fuselage skin lap joints.

In the Aloha Boeing 737 aircraft, evidence was found of multiple site fatigue damage leading to structural failure. The resulting National Transportation Safety Board investigation report issued in 1989 attributed the incident to the failure of the operators maintenance program to detect corrosion damage. Earlier, in 1981, a similar aircraft had suffered an in-flight break-up with more than one hundred fatalities. Investigations pointed to corrosion accelerated fatigue of the fuselage skin panels as the failure mechanism.
Lap joints join large panels of skin together and run longitudinally along the fuselage. Fatigue cracking was not anticipated to be a problem, provided the overlapping panels remained strongly bonded together. Inspection of other similar aircraft revealed disbonding, corrosion and cracking problems in the lap joints. Corrosion processes and the subsequent build-up of voluminous corrosion products inside the lap joints lead to so-



called "pillowing", whereby the faying surfaces are separated. Special instrumentation has been developed to detect this dangerous condition. The aging aircraft "problem" will not "go away", even if airlines were to order unprecedented numbers of new aircraft. Older planes are seldom scrapped, and will probably end up in service with another operator. Therefore, safety issues regarding aging aircraft need to be well understood and safety programs need to be applied on a consistent and rigorous basis.