TRANSPORT CANADA AGING AIRCRAFT ACTIVITIES

S.R. Didrikson
Chief, Continuing Airworthiness
Department of Transport, Canada

SUMMARY

A description is provided of recent initiatives undertaken in Canada to address problems of aging of passenger airplanes. In addition to participation in and support of US aging aircraft programs, independent activities have been undertaken in such areas as regulatory control of nondestructive testing, aging fleet evaluations and measures to address the airworthiness of aging Canadian-manufactured airplanes.

INTRODUCTION

In recent years the Airworthiness Branch of the Transport Canada Aviation (TCA) Administration has engaged in a program of activities to improve the airworthiness of older aircraft. This program has included activities specific to Canadian conditions as well as activities in support of or in parallel with the aging aircraft programs originating in the United States. TCA aging aircraft activities have been concentrated in the following areas:

- Measures to improve regulatory control of aircraft nondestructive testing (NDT);
- Aging fleet evaluation projects;
- Measures to address the airworthiness of aging Canadian-manufactured passenger aircraft, in accordance with the recommendations of the International Conference on Aging Commuter Aircraft held in Kansas City, in April, 1989; and
- Other related activities.

NONDESTRUCTIVE TESTING

On May 11, 1987, a 43 year old Douglas DC-3 crashed in Northern Ontario as a result of a wing structural failure. The accident investigation subsequently found that a radiographic inspection of the failure area prior to the accident had failed to detect a fatigue crack.

Canada has a system of certification of NDT technicians to standards of the Canadian General Standards Board (CGSB). Nevertheless, in view of the accident findings, TCA conducted a review of civil aircraft NDT procedures and technician licensing. A report was issued in January, 1988, which recommended a number of measures to improve regulatory control. These recommendations have been adopted and are being implemented as follows:

TCA Regulation of NDT

It is proposed that all NDT will be brought directly under the regulatory control of Transport Canada by amendments to TCA airworthiness regulations to include it as "specialized work". This will require the NDT to be performed within the Approved Maintenance Organization structure with personnel qualified to CGSB or military standards and subject to TCA regulatory control.

Amendments to Transport Canada regulations and associated advisory material have been drafted and consultation with the Canadian aviation community is in progress.

Maintenance Personnel Training

Steps have been taken to improve the NDT knowledge of aviation maintenance personnel by upgrading the NDT content in the curricula of accredited community colleges involved in Aircraft Maintenance Engineer (AME) training. In addition, AME examinations have been reviewed and revised to include questions that deal specifically with NDT.

Transport Canada NDT expertise

TCA NDT expertise has been improved by the staffing of specialists in NDT. Also, NDT training has been provided for airworthiness personnel.

AGING FLEET EVALUATIONS

Two aging fleet evaluation projects have been carried out, a Supplemental Inspection Program implementation review and an Aging Aircraft Sampling Evaluation project for large passenger airplanes:

Supplemental Inspection Program Implementation Review

Following the Aloha Accident, a review team was formed and tasked to visit every Canadian air carrier operating Supplemental Inspection Document (SID) affected aircraft to assess implementation of the SID requirements. The team completed their review of the 18 Canadian air carriers affected and issued the final report in December, 1988. They were able to confirm compliance with the SID requirements by all affected Canadian operators. They found some weaknesses in TCA surveillance of air carrier SID implementation, which have since been corrected. The review also served to confirm the need to implement the recommendations of the NDT study.

Aging Aircraft Sampling Evaluation

TCA Airworthiness Inspection staff were invited by their counterparts in the US Federal Aviation Administration (FAA) to participate in some of the FAA Aging Fleet Program evaluation activities. The appreciation gained of the value of these activities influenced us to develop a parallel program in Canada, which was called

the Aging Aircraft Sampling Evaluation.

The survey of the condition of older passenger aircraft in service in Canada was carried out between August, 1989 and May, 1990, by visits to repair & overhaul facilities to observe high time aircraft undergoing heavy maintenance. The objective was to obtain first hand knowledge of the condition of a sample of older Canadian aircraft, and to assess the maintenance systems that support them, in order to determine any corrective action required.

The aircraft surveyed were a Boeing 727, B-737, McDonnell Douglas DC-9, DC-10, Convair 580 and Hawker Siddeley 748. Most of the aircraft were in relatively good condition considering their age. The exception was the B-727, which had recently been imported, and was extensively corroded.

The final report of the Aging Aircraft Sampling Evaluation team included 28 findings and recommendations, concerning such matters as corrosion control and prevention, repairs, nondestructive testing, and imported and leased aircraft. The recommendations of the report were assessed and adopted and are being implemented.

Presently we are seeking funding to carry out a similar evaluation of aging Canadian commuter aircraft.

CANADIAN AGING COMMUTER AIRCRAFT

The International Conference on Aging Commuter Aircraft held in Kansas City in April, 1989, included in its review of aging commuter airplanes the Boeing of Canada Ltd, de Havilland Division DHC-6 and DHC-7, which were manufactured in Canada. Following the conference a summary report (ref. 1) was issued, which included the following recommendations:

- Existing airworthiness directives (ADs) on all airplanes used in regional air carrier service should be reviewed to determine if repetitive inspections need to be replaced by terminating actions;

- Existing service bulletins (SBs) should be reviewed to identify issues specifically relating to aging airplanes, with the intent of possible mandatory compliance;

- Corrosion manuals and related documents should be prepared or updated; and

- Supplemental Inspection Documents should be developed, issued and mandated by ADs.

Following release of the conference report, Boeing of Canada Ltd, de Havilland Division (DHC) were requested to organize airworthiness directive and service bulletin reviews. This was done, with the participation of operators, the FAA and Transport Canada.

The DHC-6 and DHC-7 AD/SB reviews were held in April and June, 1990, respectively. For the DHC-6, ten ADs were selected for terminating action and four SBs were selected for AD action. For the DHC-7, three ADs were recommended for terminating action and seven SBs deemed to warrant mandating by ADs. TCA have issued airworthiness directives to fully implement the recommendations of the

reviews.

DHC were also requested to develop corrosion manuals for the DHC-6 and DHC-7. Work is progressing satisfactorily and the manuals are expected to be completed early in 1992. Transport Canada expects to issue ADs to mandate the corrosion programs.

DHC have also been requested to develop SIDs for the DHC-6 and DHC-7. They have proposed instead that a retirement life should be fixed for the DHC-6. The engineering substantiation to support the life proposed is presently under discussion between DHC and TCA. DHC have also indicated their intention to develop a SID for the DHC-7.

OTHER RELATED ACTIVITIES

Transport Canada airworthiness engineers are participating in the working groups of the US Airworthiness Assurance Task Force. The airworthiness directives resulting from Task Force activities are being implemented in Canada.

At the request of Transport Canada, Bombardier Incorporated, Canadair Aerospace Group have developed a SID for the CL-44, a four-engine turbo-prop airplane manufactured in Canada. An AD has been issued to mandate the SID.

An amendment to the TCA regulations and an accompanying advisory document have been issued to give TCA the authority to require manufacturers to produce SIDs. This is equally applicable to imported and Canadian-manufactured airplanes.

CONCLUSIONS

The commercial operation of aircraft whose age exceeds their original design objectives is likely to persist indefinitely.

Much excellent work is being done by air carriers, manufacturers and airworthiness authorities worldwide to improve the safety of operations of aging airplanes.

Transport Canada support and cooperate with these initiatives. In addition, TCA are taking action:

- to ensure that Canadian regulations and maintenance systems address older aircraft (with particular emphasis on NDT);
- to assess the condition of older passenger aircraft operating in Canada; and
- to work with Canadian manufacturers to facilitate the support of aging Canadian-manufactured aircraft.

REFERENCES

1. Summary Report, Regional Airline Association, General Aviation Manufacturers Association International Conference on Aging Commuter Aircraft, April 25-27, 1989, Kansas City, Missouri, pages 48-50.