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Date of Birth: June 22, 1942

ACADEMIC QUALIFICATIONS:

Date	University	Degree Granted
1965	University of British Columbia	B.A.Sc - Metallurgical Engineering
1970	University of British Columbia	Ph.D - Metallurgical Engineering

Additional Courses:

1978	University of Southern California	Helicopter Accident Investigation

PROFESSIONAL QUALIFICATIONS / AFFILIATIONS:

Professional Engineer - Province of British Columbia
Member, American Society for Metals
Private Pilots Licence - not current
Member, University of B.C. - Metals and Materials Engineering Advisory Council.

AWARDS **Transport Canada Aviation Safety Award 2003**
&
2003 British Columbia Aviation Council Award

WORK EXPERIENCE:

Date	Company	Position
1970-71	Tree Island Steel Co.Ltd. Richmond, B.C.	Plant Manager

Tree Island Steel was the largest manufacturer of steel wire and wire products east of Ontario and north of California.

1972 Self-Employed - Engineering Consulting

Primary Clients:

General Steel and Wire	Los Angeles, California Riverside, California
Tree Island Steel Co.Ltd.	Richmond, B.C.
Dendoff Springs Ltd.	Vancouver, B.C.

1973-76 Noranda Metal Industries Inc. — Assistant Manager, Western Division

The Western Division of Noranda metal Industries produced up to 30,000,000 lbs. of copper and copper alloy products annually at manufacturing facilities in British Columbia and the State of Washington.

1975 - present Engineering Consultant

In 1975 R.J. Waldron and Co.Ltd. was formed to provide an engineering service in the area of failure analysis, accident reconstruction and investigation. The company's activities concentrated in the investigation of aircraft accidents and incidents. Some industrial failures/accident investigations were conducted on a selective basis.

Since 1975, I have personally investigated in excess of 600 accidents and incidents. The Company has investigated more than 2000 aircraft accidents, incidents and failures. The nature and level of activity in any one investigation varies considerably and ranges from participating in the search for a missing aircraft to a failure analysis of a single component, some time following the accident. The range of aircraft involved in the accidents/incidents that have been investigated vary from small home-built aircraft to wide body commercial transport aircraft. An estimated 60 percent of the accidents involved helicopters.

During the course of these investigations it has often been necessary to perform the following:

- search and recovery of aircraft;
- on-site documentation and analysis, wreckage dispersion analysis;
- sequence of in-flight break-up;
- test flights to accumulate data or simulate accident sequences;
- reconstruction of aircraft;
- engine failure analysis;
- design reviews;
- flight path reconstruction;
- specification reviews;
- certification data reviews;
- flight data recorder and cockpit voice recorder analysis.

Normally detailed metallurgical or failure analyses are performed and include the following:

- fracture analysis;
- metallographic studies;
- stress studies;
- light bulb analysis;
- composite and non-metallic material failure analysis;
- non-destructive testing;
- fuel and lubricant assessments;
- instrument examination;
- fuel control system analysis;
- aircraft systems (i.e. hydraulic, pneumatic, electrical) analysis.

A majority of the accidents/incidents which have been investigated occurred in North America. However, a large number of accidents which have occurred outside of North America have been investigated. This includes investigations of accidents in the following countries:

Japan	New Zealand	Venezuela
China	India	Columbia
Thailand	Egypt	Peru
Malaysia	UAE	Brazil
Indonesia	Saudi Arabia	England
Brunei	Zambia	Sweden
Gabon	Ireland	Papua,New Guinea
Australia		Norway

ENGINE PERFORMANCE / DESIGN SURVEYS:

Fleet-wide reviews of the performance of engines and the design of these engines have been performed.

1. Performance of Allison Model 250-B17 Series Engines in Nomad Model N22B and N24A Aircraft (1985)

   Reviews completed for: Hughes Aircraft (Suma Corporation)

   The Nomad is a small fixed wing aircraft powered by two Allison 250-B17 engines. The 250-B17 engines are 250-C20/20B engines to which a propellor reduction gearbox is added.

   A review of the operational history of the Nomad/B17 engine identified four primary engine problems. At the time the review was completed, these problems had accounted for approximately 400 failures, malfunctions or other service difficulties.

2. Review of the Avco Lycoming LTS-101 Series Engine Service History (1988)

   Review completed for: Aerospatiale Helicopter Corporation

   The performance of the LTS-101 series engines used in Aerospatiale AS350, Bell 222 and Boelkow B177 helicopters was reviewed to identify the primary operational and design problems.

   At the time the review was completed a total of 585 failures, malfunctions or service difficulties had been reported.

TEACHING / LECTURES:

Lectures on the subject of Aviation Safety, Aircraft Accident Investigation and Failure Analyses have been presented to a wide range or organizations, including:

- Air Transport Association of Canada
- B.C. Bar Association
- Canadian Airlines Inc.
- Imperial College London - Dept. of Engineering
- University of British Columbia - Dept. of Metallurgy
- British Columbia Institute of Technology
- Business Aircraft Association

- American Society for Metals
- The Insurance Institute of London
- Aerospatiale Helicopters Inc. - Offshore Oil Exploration Group

In addition, lectures have been given at the following courses:

- University of Southern California - Helicopter Accident Investigation
- National Academy for Aviation Safety - Aircraft Accident Investigation

EXPERT TESTIMONY:

R.J.Waldron has been accepted as an expert in aircraft accident investigation and/or failure analyses and has testified as such in courts in several jurisdictions, including:

British Columbia	California
Alberta	Utah
Ontario	Texas
Quebec	Louisiana
Washington	Connecticut

APPENDIX I

MODELS OF AIRCRAFT / POWERPLANTS INVOLVED IN
ACCIDENT / INCIDENTS INVESTIGATED BY R.J.WALDRON

A. Helicopters

Bell	B-47 series (including Soloy conversion)	
	B-206A/B	
	B-206L series	
	B-204	
	B-205A-1	
	B-212	B-214 A/B
	B-412	B-214 ST
	B-222	B-407
Sikorsky	S-55 / 55T	
	S-58 / 58T	
	S-61 series	
	S-76	
Hughes	500C	
	500D	
	300 series	
Hiller	FH 1100	
	12-E	
	12-L (incl. Soloy conversions)	
Aerospatiale	Alouette II	
	Alouette III	
	Gazelle	
	Lama	
	AS-350 A-Star	
	AS-355 Twin Star	
	Super Puma	
Boeing	BV 107	
	CH 47	
	B234	
Others	Robinson R-22	
	Enstrom	
	MBB B0.105	

B. Fixed Wing Aircraft

Accidents involving single and multi engine fixed wing aircraft manufactured by the following:

Beechcraft	Douglas	Lockheed
Boeing	Fokker	Mitsubishi
Rockwell	Grumman	Mooney
Cessna	Helio-Courier	Nomad
DeHavilland	Lake	North American Rockwell
Dornier	Lear	Piper
		Airbus

These include piston and turbine powered, pressurized and unpressurized models. Several ultra-light and home-built models have also been investigated.

C. Power Plants - Turbine

Garrett	TPE/TSE 331 series	
Rolls Royce	Dart series	
	Gnome series	
General Electric	CT-58	
	CF-6	
Pratt & Whitney	PT-6 series	JT-8D
	JT-8 series	
Lycoming	T-5508D	
	T-53 series	
	LTS-101 series	
Detroit Diesel Allison	C-17 series	C-18 series
	C-20 series	C-28
	C-30	501 series
Turbomeca	Artouste series	
	Astazou series	
	Makila	
	Ariel series	