Fibre mix flies light

A materials revolution is developing in the aircraft industry that features the replacement of heavier aluminum parts with light fibre composite structures, reports *The Globe and Mail.*

The objective is to save weight, "which translates into increased payload (or fuel saving) without changing the aircraft's size", said Michael Davy, vice-president of engineering for de Havilland Aircraft of Canada Ltd., Toronto.

The composites are made of glass or carbon-graphite fibres, or combinations of both. They are embedded in epoxy resins that, after baking and curing in an autoclave pressure oven, have the strength of steel.

They are easily sculpted and do not require the heavy machining that metal requires in order to become a part. However, extensive use of the composites is being held back by cost and the need to meet the certification standards being established for them.

The cost of composite material can range from $40 to $100 a kilo, with $2 a kilo for metal. The trade-off comes from the lighter weight and the ease of tailoring a component to the strength required, compared with the time to machine the same part from a billet of aluminum.

Composites can be built up from continuous, short – or "whisker" – fibres embedded in resin. The fibres can be oriented in one direction or laid down at random. "You can build in the direction you want your strength," Mr. Davy said. "And you get an extremely clean finish."

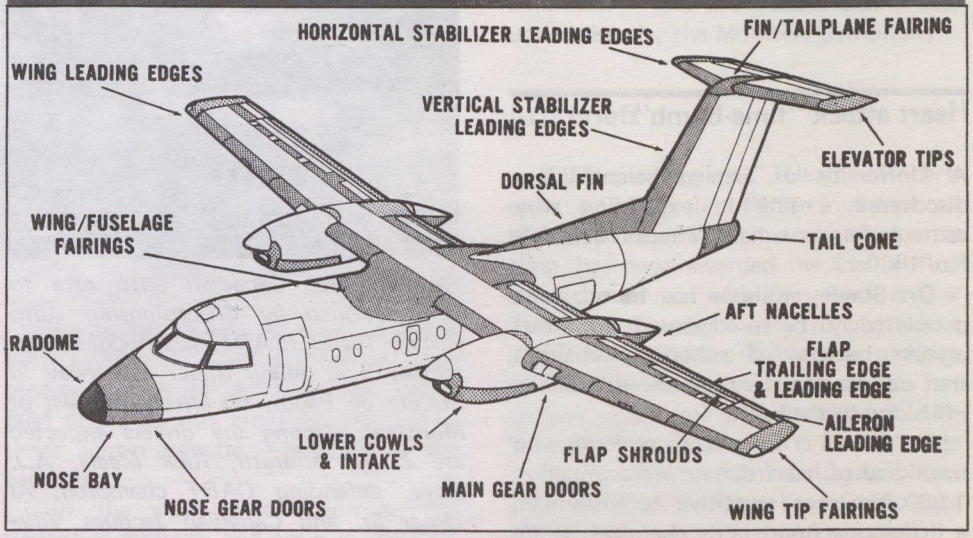
De Havilland has pioneered the use of fibre composite aircraft structures in Canada, beginning seven years ago with its 50-passenger *Dash 7* commuter airplane. It has substantially increased the amount of composite material it uses in its new 36-passenger *Dash 8* commuter airliner.

Composite structures

All aircraft that have come off the drawing boards in the past few years are flying with composite structures. The new *Boeing 767* and *Boeing 757* airliners use composite parts.

Canadair Ltd. of Montreal has used composite structures to reduce the weight of its *Challenger* business aircraft. Innotech Ltd., also of Montreal, has gained industry recognition as a manufacturer of lightweight cabin interior walls made of glass-fibre for corporate aircraft.

Tony Honeywood



De Havilland Dash 8 *uses composites in secondary structures to save weight.*

De Havilland, which builds its own cabin interiors, is making extensive use of composite materials for cabin floors, bulkheads, walls, galleys and toilets. In the floor alone, there is a weight saving of about 60 kilograms.

The move to composites has been gradual, but their use is increasing as experience increases. All fibre composites at de Havilland are being used in secondary structures – those whose loss would not be a hazard in flight.

However, there is a move to application of composites to primary structures, such as a wing spar, which bears the load of the wing.

Other applications seen for composites are under-fuselage skins and the front of the aircraft from the nose to the cockpit. De Havilland has experience in working with composites that would enable it to build a small aircraft – the size of its 19-passenger *Twin Otter* – with major composite components.

Composites in the *Dash 8* are used in the nose bay, tail cone, cabin floor, landing gear doors, wing-to-fuselage and wing tip faring, flap shroud and other parts.

Aid for refugees

Canada will provide $900 000 in humanitarian assistance to Cambodians displaced by conflict in their country. The grant will provide medical, relief and protection services to Cambodians living in camps along the Thai side of the border.

To date, Canada has contributed $27 million to assist these displaced persons.

Also announced is a grant of $125 000 to the United Nations High Commissioner for Refugees for some 10 000 Sudanese refugees in Ethiopia. The refugees fled Sudan after the mid-1983 reorganization of the regional government in South Sudan. They settled near the town of Gambela, 80 kilometres from Sudan.