

The Parliament of the Commonwealth of Australia

Sports Aviation Safety

Report of the House of Representatives
Standing Committee on Transport Safety

January 1987

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Terms of Reference of the Committee

That a standing committee be appointed to inquire into and report on:

- (a) the most effective means in terms of cost and efficiency of achieving greater transport safety in Australia;
- (b) the main causes of air, sea, rail and road transport accidents in Australia;
- (c) the particular aspects to which those concerned with transport safety could most advantageously direct their efforts;
- (d) the economic cost to the community of transport related accidents in Australia, remedial measures and equity considerations in the burden of cost;
- (e) those sections of the community most affected by transport related accidents; and
- (f) occupational health and safety issues in the transport sector.

Terms of Reference of the Inquiry

That the Committee inquire into and report upon the development, proclamation and enforcement of aviation standards. The Committee will examine:

- (a) safe practice of the various forms of sports aviation;
- (b) safety promotion;

- (c) regulatory measures, including self regulation, appropriate to the various forms of sports aviation;
- (d) the respective roles of individual participants, sports aviation organisations and the Department of Aviation; and
- (e) the appropriate means of funding of (b) and (c) above.

Membership of the Committee

Chairperson
Deputy Chairman

Mrs Elaine Darling, MP
Mr Bruce Goodluck, MP

Members

Mr Ken Aldred, MP
Mr Russ Gorman, MP
Mr Colin Hollis, MP
Mr Tony Lamb, MP
Mr Peter McGauran, MP
Mr John Mildren, MP

Secretary to the Committee
Research Officer

Mr Allan Kelly
Ms Monica Telesny

Mr McGauran replaced Mr Tim Fischer, M.P., who resigned from the Committee on 18 September 1985.

Mr Aldred replaced Mr Alexander Downer, M.P., who resigned from the Committee on 28 May 1986.

Abbreviations

ABF	Australian Ballooning Federation
ANO	Air Navigation Order
ANR	Air Navigation Regulation
APF	Australian Parachuting Federation
ASRA	Australian Sport Rotorcraft Association
AUF	Australian Ultralight Federation
BASI	Bureau of Air Safety Investigation
DoA	Department of Aviation
FAA	Federal Aviation Administration (United States)
FAI	Federation Aeronautique Internationale
GA	General Aviation
GFA	Gliding Federation of Australia
HGFA	Hang Gliding Federation of Australia
ICAO	International Civil Aviation Organisation
LAME	Licensed Aircraft Maintenance Engineer
MAAA	Model Aeronautical Association of Australia
MTOW	Maximum Take-Off Weight
OCTA	Outside Controlled Airspace
QFA	Queensland Flyers' Association
SAAA	Sports Aviation Association of Australia
US	United States of America

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Recommendations

The Committee recommends that:

1. the Minister for Aviation

- (a) introduce legislation making the registration of ultralights compulsory; and
- (b) in conjunction with the AUF, examine ways in which comprehensive national statistical records can be collected on ultralight aircraft.

(Paragraph 32)

2. the Minister for Aviation

- (a) re-allocate priorities within the Department to ensure that ultralight accidents and incidents are comprehensively investigated; and
- (b) ensure that the criteria and priorities used in ultralight accident investigation are clearly documented and published.

(Paragraph 51)

3. the Minister for Aviation

- (a) ensure that the Department either publish ultralight accident investigation findings in a recognised national aviation magazine, or individually mail this information to all ultralight operators through a national mailing notification scheme; and
- (b) take steps to rectify the current situation which allows a 12-18 month period to elapse before any safety information

is released on an ultralight accident, by examining ways of releasing interim warnings within a 3 month period.

(Paragraph 58)

4. the Minister for Aviation introduce legislation to amend the *Air Navigation Act 1920* to require the tabling of ANOs in each House, so that Parliament can oversight the use made of the delegated power.

(Paragraph 73)

5. the Minister for Aviation examine the adequacy of funding provided to the AUF and make appropriate provision for financial assistance in future budgets.

(Paragraph 118)

6. the Services Agreement be amended to incorporate a section which clearly delineates the specific responsibilities and lines of authority of the Department and the AUF.

(Paragraph 139)

7. (a) the height restrictions applying to ultralight aircraft be lifted to:

- (i) 1,500 feet for aircraft which are registered; fitted with an approved, calibrated altimeter; and flown by a pilot who holds at least AUF pilot certification; and

- (ii) 3,000 feet for aircraft which, in addition to meeting the requirements in (i) are fitted with a radio to ANO 20.8; and that

- (b) the new height ceilings be reviewed, on application by the AUF, after a minimum period of 3 years.

(Paragraph 156)

8. the existing 95.10 category of ultralight be replaced by a category limited to owner-designer-builders, covering single-place aircraft with a maximum empty take-off weight of 150 kg, together with basic airworthiness requirements to at least the standard specified in the AUF Technical Bulletins Nos. 1 to 4.

(Paragraph 179)

9. (a) owner-designer-builders under the new 95.10 category be actively encouraged by the AUF and the DoA to use more comprehensive standards;
- (b) that construction of aircraft in this category be comprehensively supervised by a team of qualified inspectors and technical officers in the airworthiness area, as nominated by the AUF;
- (c) that sale of this category of aircraft not be permitted until a data package is presented to and approved by the AUF, including:
 - drawings, specifications and basic structural elements;
 - proof of compliance to acceptable structural loading tests;
 - a signed statement by an AUF qualified person defining take-off weight, centre-of-gravity range, maximum speeds and power limits; and
 - a history of safe operation for over 50 hours.
- (d) the aircraft is clearly placarded as a limited airworthiness prototype and not be used for training purposes.

(Paragraph 181)

10. (a) a 12 month amnesty be granted to existing overweight aircraft which have a maximum empty weight not exceeding 150 kg; and
- (b) this amnesty be in accordance with the requirements set out in Appendix C, with the additional conditions that flight in an aircraft below Category 3 is limited to syndicated ownership and that an aircraft can neither be re-registered nor sold until it meets the requirements of Category 3.

(Paragraph 197)

11. the Department of Aviation examine and document the areas where a civil or mechanical engineer could perform structural tests and approvals for ultralight aircraft.

(Paragraph 207)

12. the Department give priority to the finalisation and promulgation of 101.55 incorporating a provision for a glide path ratio of at least 15:1 and incorporating specific requirements for performance and handling

standards and engine and propeller standards.

(Paragraph 226)

13. in addition to the use of BCAR(S) as the design standard for ANO 101.55, the Department of Aviation prepare a list of recognised overseas equivalent or higher standards which would be accepted as alternatives under ANO 101.55.

(Paragraph 227)

14. manufacturers of all ultralight aircraft sold in kit form be required to demonstrate that the completed aircraft will comply with ANO 101.55.

(Paragraph 230)

15. on advice from the Department of Aviation, import controls be exercised to ensure that imported ultralight aircraft, kits and components comply with the relevant Air Navigation Orders.

(Paragraph 232)

16. the Attorney-General, under the Trade Practices Act, declare the airworthiness provisions of the revised ANOs as product safety standards for the two categories of ultralight.

(Paragraph 236)

17. (a) the Department of Aviation eliminate the current inequities in the acceptance of local design under the amateur-built category, ANO 101.28; and

- (b) for ultralights built under the amateur-built category, delegation should be given to approved organisations or individuals, such as the AUF and approved engineers, to administer the process in a similar way to that currently operating in the Gliding Federation of Australia.

(Paragraph 252)

18. all ultralight pilots be required to be certified to the standards specified in the AUF Operations Manual.

(Paragraph 282)

19. the AUF, in consultation with the Department of Aviation, compile a short training program appropriate to pilots who hold existing licences, emphasising the different flying characteristics of ultralights and appropriate emergency procedures.

(Paragraph 292)

20. Section 21 of the AUF Operations Manual be amended to require the pilot instructor candidate to demonstrate competency in aircraft handling and a command of sound instructional ability before certification as Pilot Instructor.

(Paragraph 298)

21. the AUF prepare and implement a syllabus, in consultation with the Department of Aviation, for a formal instructor certification training course of a least 2 weeks duration which incorporates effective airborne instructional techniques and an appropriate level of operational, emergency and procedural spin/stall training.

(Paragraph 299)

22. current legislation be changed to legalise spin/stall training for ultralights and that spin/stall training in 2-seat aircraft be incorporated into the flight training syllabus of student pilots.

(Paragraph 303)

Chapter 1

Introduction

Background to the Inquiry

1. In April 1985 the Minister for Aviation the Hon. Peter Morris, MP wrote to the Committee asking it to undertake an Inquiry into Sports Aviation Safety. Whilst the Minister requested a review of the whole spectrum of sports aviation, the major impetus for the Inquiry arose from concerns related to ultralights: concern that while self-regulation was working for other categories of sports aviation, such as gliding and hang gliding, it had not been proceeding as successfully for the new category of ultralight aircraft; adverse media coverage of ultralight aircraft accidents; and above all, the need to ensure that adequate safety standards were being maintained by ultralight flyers. For quite some time before the inception of the Inquiry, self-regulation of ultralight activities had been seen as a large problem by both the Department and the Minister.¹ Two of the main concerns had been the lack of progress made by the recently established national body, the Australian Ultralight Federation (AUF); and conflict and confrontation between the Department of Aviation and the burgeoning ultralight movement.

Definitions

2. Sports aviation encompasses a variety of aerial activities. The public is reasonably familiar with the more popular sports aviation activities such

¹Evidence, p.67.

as gliding, hang-gliding, parachuting, ballooning, and model aircraft and therefore definitions are not provided here.

3. Gyroplanes are a form of aircraft which derive their lift from one or more rotors, rotating in a substantially horizontal plane. These rotors are not powered in flight, but rotate quite freely under the action of air movement alone. Propulsion is by a conventional engine and propeller. Aerobatics describes feats of expert or stunt flying, usually at low altitudes during public displays.

4. Ultralights are sometimes described as a nostalgic step back in time to the era of the Wright brothers, their open cockpits and uncowed engines being reminiscent of the old machines of early aviation. Most ultralights are small, single seat aircraft that require no registration or pilots' licence to fly. Construction is usually simple, consisting of aluminium tubing and Dacron sailcloth braced into a rigid lightweight structure by means of stainless steel cables. The result is a light but strong airframe which is cheap and simple to build and able to be dismantled for transportation. Some more conventional-looking models incorporate fibreglass in the wing components and have enclosed cockpits.

5. The terms ultralight, microlight, featherlight, minimum and superlight are often used interchangeably. Whilst perhaps technically different in points of detail, they are all described in this report as ultralights.

Description of the Sport

6. Sports aviation activities are bound together by virtue of their classification as a sport and their use of airspace. The requirements for flying a model aircraft will obviously need to be quite different from those of an ultralight aircraft or a hot-air balloon. Similarly, regulatory measures and safety standards will need to vary accordingly. National groups exist to both represent and regulate each of the sports. The Federation Aeronautique Internationale (FAI) is the principal international sport co-ordinating body, defining the various classes of sporting activity. It does not, however, concern itself with safety or airworthiness.

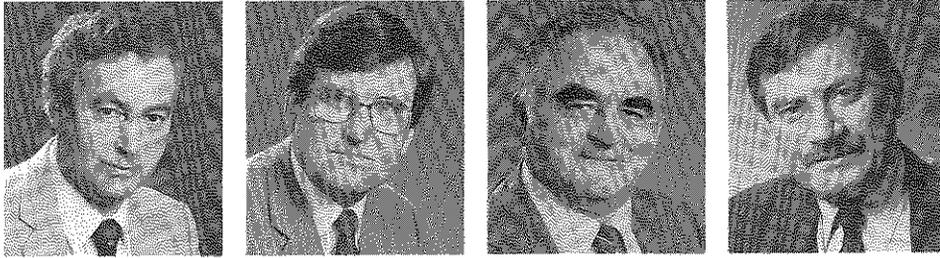


Figure 1.1: *The Standing Committee on Transport Safety. Above, Left to Right: Mr Bruce Goodluck, MP (Deputy Chairman), Mr Ken Aldred, MP, Mr Russell Gorman, MP, Mr Colin Hollis, MP. Below, Left to Right: Mr John Mildren, MP, Mr Tony Lamb, MP, Mrs Elaine Darling, MP (Chairperson), Mr Allan Kelly (Secretary), Mr Peter McGauran, MP.*

7. Pursuit of some sectors of sports aviation such as gliding and hang-gliding are dependent on group activity. For example, an unpowered glider requires towing by a small aircraft to become airborne. This encourages strong group activity and a club structure. In contrast, ultralight flying is an individual activity in an autonomous aircraft. This situation does not encourage group activity or strong club ties. One of the industry's problems has been encouraging club membership.

8. Reasons for participation in sports aviation differ: participation may be for pleasure, for commercial purposes or for competition. There appears to be a high turnover of persons interested in a particular activity, probably due to the high cost of investment in sports aviation hardware. For those activities which have a strong club structure there is the opportunity of hiring equipment, training, use of launching facilities and exchange of information.

9. The level of activity in many sports aviation activities is difficult to quantify due to the lack of reliable statistical information. Direct participation in sports aviation is roughly estimated at over 20,000 Australia wide.² Participation rates are particularly difficult to estimate for ultralights as there is little reliable information on levels of activity, number of operators or aircraft.

10. The accident rate is difficult to determine due to the lack of information on participation and activity rates. An additional complication is that not all accidents are reported to the Bureau of Air Safety Investigation (BASI) even though most witnesses believed that all fatalities are reported. Under the Regulations it is mandatory that all aircraft accidents be reported to BASI.

²Rough estimate based on the average figures given by witnesses and Department of Aviation estimates. There have been wide discrepancies between industry and Departmental figures.

11. In terms of Commonwealth outlay, air transport received 0.68% in 1985-86.³ This represents roughly \$500 million out of \$72,000 million. Sports aviation is only a very small part of overall air transport. Economically and legislatively, sports aviation is only of minor importance when compared to overall aviation activity. The Department's responsibility for sports aviation, which is on the periphery of the Department's charter, will be further discussed in Chapter 5.

Scope of the Inquiry

12. While examining all sports aviation activities, the Committee isolated ultralight activities as the main area of concern in terms of safety standards and regulatory measures. A large proportion of submissions identified legislative, enforcement, self-regulatory and safety problems in relation to ultralight activities. Many witnesses considered the design and structure of ultralights a major area of concern. The need for adequate pilot training was also identified by most witnesses. The problems being experienced by the ultralight movement appeared to be more serious than in any other area of sports aviation and showed no signs of resolution.

13. Apart from legislative and administrative areas, other issues of concern to the Committee were consumer protection, funding of the ultralight movement and the potential for an ultralight industry. The remaining sectors of sports aviation were given full consideration, but no particular safety problems were identified which required the same depth of investigation as necessary for ultralights.

Emergence of Ultralights

14. Ultralight aircraft first appeared in Australia in 1976. Although the appearance of hang-gliding is also comparatively recent, most other sectors

³1986-87 Budget papers. Figures taken from Budget Document Number 1. Calculated using

$$\frac{\text{Aviation Expenditure}(\$492.2m)}{\text{Total Commonwealth Outlays}(\$72,233m)} \times \frac{100}{1} = 0.6814\%$$

of sports aviation have existed for many years. Regulations were specifically written for the first powered ultralight, the Skycraft Scout, in November 1976. The Australian Air Navigation Order 95.10 broke new ground being the first legislation in the world specifically designed to cover powered ultralight flying machines.⁴ Despite being the first country to formulate specific ultralight regulations, Australia has largely drawn on overseas design standards in subsequent regulations.

15. Under ANO 95.10 ultralight aircraft weighing less than 115kg empty weight have no airworthiness requirements and do not require any kind of licence to fly. They are by their very nature basic aircraft with narrow performance limits. A small proportion of ultralights are 2-seat models intended for training. These are covered by ANO 95.25, have a maximum take off weight (MTOW) of 400kg, require type approval and an AUF pilot certificate to fly. Single seat aircraft under ANO 95.25 have MTOW of 290kg.

16. Legalisation of 2-seat ultralight training aircraft with adequate standards was the primary purpose of Air Navigation Order 95.25 which was introduced in March 1985. The first two-seat trainer aircraft did not receive Departmental approval until mid 1986.

History of the Ultralight Movement

17. Unlike most other national sports aviation organisations, which emerged over time from state and regional groupings, the ultralight movement has experienced difficulties in forming one cohesive, representative body. During 1978 the Department received representations from various people involved in the ultralight aeroplane movement, seeking changes to Air Navigation Order Section 95.10. The Department's intention was that ultralight activities be regulated in the same way as other sports aviation activities, which was through one representative national organisation. The Department refused to deal with the disparate groups and individuals, saying that it would only deal with a single national body. It arranged a meeting with people interested in the sport with the aim of encouraging the movement to form

⁴Kimberley, G.J. *Fun Flying! A Total Guide to Ultralights* 1984, p.19.

a national body. A steering committee, comprising interested people, was formed but conflicting factional interests caused its collapse in mid 1979. Even though a number of ultralight clubs were in existence by the early 1980s they were by no means cohesive in either organisation or objectives.

18. The Department continued to encourage the formation of a national body and in 1982 the Australian Ultralight Association was formed. This body was renamed the Australian Ultralight Federation (AUF) in 1983. However, there was continued rivalry between the Sport Aircraft Association of Australia (SAAA) and the AUF, both seeking recognition by the Department as the organisation representing the ultralight movement. Even after the AUF was recognised as the national body, rivalry between the SAAA, the Queensland Flyers Association (QFA) and the AUF continued. Several ultralight groups questioned the choice of the AUF as the representative body and several groups have attempted to break away from the AUF. The AUF and SAAA have resolved major differences to the extent that at the last hearing of the Committee and during previous informal discussions the two organisations appeared and gave evidence together.

19. Political infighting and rivalry has retarded the development of the AUF and its ability to deal effectively with the Department of Aviation. These differences posed difficulties for the Committee during the Inquiry. The ultralight movement had not fully conceptualised nor fully agreed on its goals and conflicting evidence was presented by various sectors of the movement.

20. Some internal conflicts and contradictions appeared in submissions and evidence from the AUF. Only recently has the AUF become a more unified and widely accepted body. There was noticeable improvement during the Inquiry in the cohesion and approach to problem resolution of the ultralight movement.

21. Whereas the infrastructure for the self-regulation of most air sports has been in place for some time and working satisfactorily, self-regulation of the ultralight movement has been plagued with difficulty. The Department doubts that self-regulation of ultralights will be as successful as it is for

gliding, hang-gliding and parachuting because the nature of ultralight flying does not encourage group or club activity and hence is not supervised at similar levels as club-based sports. ⁵

22. One of the main problems facing the Committee during its Inquiry was the vastly differing assessment and interpretation given by witnesses of the ultralight situation. Evidence in relation to ultralights has tended to be disjointed and conflicting, often based on personal viewpoints rather than facts. This applies both to departmental witnesses and ultralight enthusiasts.

Previous Inquiries or Studies

23. During the 10 years since the emergence of ultralights, no authoritative Australian studies or inquiries have been made into the area. The Committee is only aware of one overseas safety study of ultralights. The United States Government National Transportation Safety Board has made a study of ultralight vehicle accidents and their causes.⁶ The conclusions are relevant to the Australian situation and are quoted in relevant sections of this report.

⁵Evidence, p.5.

⁶National Transportation Safety Board, *Safety Study — Ultralight Vehicle Accidents*. Washington, D.C., 1985.

Chapter 2

Safety Statistics

Introduction

24. Official accident statistics provide the means by which the trends and characteristics of aircraft crashes can be identified. The primary purpose of these statistics should be the improvement of aviation safety. Without uniform, comprehensive collection practices and procedures, it is not possible to compile an adequate database for the accurate identification of accident trends and implementation of accident prevention measures.

25. The current situation in relation to sports aviation safety statistics is that under ANR 271 owners and operators of all aircraft are required to notify the Bureau of Air Safety Investigation (BASI) of all accidents. With the exception of gliding, amateur-built and aerobatic aircraft, sports aviation accident data is not very reliable. Despite the mandatory requirements to notify accidents, witnesses to the Inquiry, including BASI, generally agreed that many more accidents take place than are reported. However, BASI is confident that all fatal accidents are reported.¹ The Department believes that less than 25% of ultralight accidents are currently being reported.² Fatal accidents are always investigated and generally more thoroughly investigated and recorded than other accidents.

¹Evidence, p. 17.

²Evidence, p. 727.



Figure 2.1: The Committee considering the report. Left to right: Mrs Elaine Darling, MP (Chairperson), Mr Tony Lamb, MP, Ms Monica Telesny (Research Officer), Mr John Mildren, MP.

Inadequacy of Existing Data

26. The Department of Aviation told the Committee that it could not produce reliable analyses of accident data.³ The Department said firstly, it did not know how many ultralight aircraft were currently operating; secondly, the actual participation rate was not known; thirdly, not all accidents are reported to BASI; and fourthly, in-depth investigations are not conducted in all cases.⁴ Assessing the primary cause of an accident was a further complication.

27. Where statistics have been collected and participation rates estimated, conclusions based on these figures cannot be considered reliable. The Department itself warns of the unreliability of the existing statistics and their limited value. Table 1 demonstrates the extent of accident statistics compiled for sports aviation. Without flying hours and participation rates, only very broad and general conclusions can be drawn. Accident prevention measures are therefore also limited.

28. Other available data indicates that there have been 77 accidents involving ultralight aircraft reported to BASI in the period 1978-86, causing 35 fatalities, 28 serious injuries and 8 minor injuries. Of this data, only the statistics for fatalities can be considered reliable.

29. Using the available statistics at September 1985, and estimating the activity rate, the Department of Aviation claimed ultralights had a very poor safety record and that:

- the fatal accident rate for ultralights is 10 times greater than that for general aviation (GA) aircraft; and
- ultralight fatalities attributable to airworthiness causes are likely to be 50 times higher than for GA aircraft.⁵

³Evidence, p.17.

⁴Evidence, p.19.

⁵Evidence, pp. 20,21.

Table 2.1: Summary of Sport Aviation Accidents and Comparison With Total GA Accidents, 1980 - June 1985

Activity	No.	Fatalities	Injuries	
			Serious	Minor/Nil
Gliding	118	21	27	107
Amateur built	39	10	4	48
Parachuting	29	17	5	7
Hang-gliding	51	16	30	3
Ballooning	3	-	1	1
Gyroplanes	16	7	5	4
Aerobatics	7	7	-	-
Airshows/Trials	12	2	1	1
Ultralights	50	18	21	7
General Aviation	1305	258	144	2687

Note: Columns cannot be totalled as aerobatic category includes 3 ultralight and 1 hang-gliding accident and 2 amateur built aircraft also included under other categories. There is also double counting in airshows/trials and amateur built and other categories.

Source: Department of Aviation, Evidence, p. 53.

30. The Australian Ultralight Federation provided statistics which were based on the Department's fatality figures, but on the AUF's estimated participation rates, which led it to conclude that ultralights compared quite favourably to GA aircraft.⁶ Evidence was given by the Queensland Region of the Department of Aviation that "when you look at the figures, ultralights are not doing too badly."⁷

31. In the absence of accurate statistics and reliable activity rates, the Committee could not accurately determine the comparative safety of ultralight aircraft. However, the evidence indicates that the major causes of accidents are already known. Nevertheless, the Committee sees an urgent need for improved, reliable statistics upon which to accurately assess the safety level of ultralight aircraft. A system of data collection should be in-

⁶Evidence, p. 417.

⁷Evidence, p. 1015

stituted so that the safety of ultralights can be gauged, trends identified and adequate prevention measures implemented.

32. There was strong support from both the Department of Aviation and the AUF for the compulsory registration of ultralights. Registration is mandatory in Britain, Canada and Germany. The United States does not currently have registration requirements, but is moving towards it.⁸ The Committee therefore recommends that:

the Minister for Aviation

- (a) introduce legislation making the registration of ultralights compulsory; and
- (b) in conjunction with the AUF, examine ways in which comprehensive national statistical records can be collected on ultralight aircraft.

Overseas Data

33. A United States ultralight safety study⁹ has been the only comparable statistical data available to the Committee. Little has been found on safety statistics in other countries. Whilst collection of US and Australian statistics is similar, direct comparison is difficult mainly because the definition of an aircraft accident is not the same in both countries.¹⁰ Not all occurrences which would be classified as accidents in Australia are recorded or investigated in the United States. For example, whereas one of the most common accidents in Australia is "the heavy landing without involving injury", this is not classified as an accident in the US.

34. Due to the different accident definitions applied, only the direct comparison of fatal accidents would be valid. Table 2 compares United States and Australian ultralight fatalities. The US, like Australia has had to rely on estimates of activity rates. Similarity of accident trends in the US and

⁸Evidence, p. 1014.

⁹National Transportation Safety Board, *Safety Study — Ultralight Vehicle Accidents*, Washington D.C., 1985.

¹⁰Evidence, p. 15.

Australia are evident. The American situation is likely to be indicative of the direction in which Australian ultralight activities are heading.

Table 2.2: Comparison of Australian Ultralight, United States Fatal Ultralight and Australian General Aviation Accidents

Type of Occurrence	Australia	%	United States	%	Australia GA
Loss of control	10	38.5	37	42.1	8.3
Airframe	7	27.0	28	31.9	4.2
Weather	1	3.8	2	2.3	-
Loss of power	2	7.7	8	9.1	14.0
Collision with object or terrain	5	19.2	10	11.4	33.6
Other	1	3.8	2	2.2	-
Totals:	26	100.0	88 [sic]	100.0	-

Note: United States data from National Transport Safety Board Technical report SS-85/01, "Safety Study - Ultralight Vehicle Accidents", Washington, February 1985 — 88 fatal accidents.

Australian data obtained from a Bureau of Air Safety Investigation preliminary research study of comparable Australian data, June 1985.

The General Aviation data is compiled from the 263 accidents which occurred in 1983.

Source: Source: Department of Aviation, Evidence, p. 52.

35. The conclusions drawn in the US study indicated there were serious deficiencies in:

- the knowledge and skills of ultralight operators;
- the design, building and maintenance of ultralight vehicles;
- the notification of ultralight owners about safety defects; and
- the rules governing the operation of ultralight vehicles.

36. Evidence heard by the Committee pointed to very similar problems in Australia. The Committee believes that it is important to investigate

these trends and that a similar study undertaken in Australia would fill the current research void.

37. The AUF claimed that the US analysis was totally inapplicable to the Australian situation due to the vast difference in operational limitations. Whilst the Committee does not dispute the differences in operational conditions; the airworthiness, structural and pilot factors found in the study paralleled the evidence taken by the Committee.¹¹

Conclusions

38. The existing statistics highlight the dearth of both Australian and overseas ultralight safety information. Lack of accurate information on participation rates and hours flown make any meaningful comparisons with GA aircraft difficult. The Committee was unable to conclude from the statistical evidence whether the ultralight safety record is far worse than other sports aviation activities or general aviation aircraft. Despite this, many safety problems were identified, even though unable to be quantified, on which remedial action can begin. Collection of statistics on ultralight aircraft should be made a priority. The Committee believes that the establishment of an adequate database is a major prerequisite for the establishment of future ultralight safety standards.

¹¹Evidence, p. 400.

Chapter 3

Accident Investigation

Introduction

39. Claims have been made that the Bureau of Air Safety Investigation (BASI) has withheld ultralight accident reports which, if released, may have prevented subsequent accidents. It has also been claimed that sports aviation accident investigation, particularly ultralight investigation, receives a very low priority in terms of time and resources.

40. Even after the release of ultralight accident information, proper mechanisms are not in place to publish the information. Legal liability seems to be the major impediment. The Department of Aviation expects the AUF to release details of accident reports through newsletters. The AUF claims it puts itself into a tenuous legal position and risks being sued if it publicises accident reports which have found faults in particular aircraft. The result has been that safety notices which may have prevented a similar accident in the future have not been published.

Bureau of Air Safety Investigation Policy

41. BASI, which is a part of the Department of Aviation, but which is independent of the regulatory elements of the Department, is responsible for the investigation of all accidents and incidents, and for advising the appropriate operational areas of the Department of significant information regarding safety standards, which is revealed by those investigations. Part

XVI of the Air Navigation Regulations outlines the Bureau's powers and areas of responsibility in relation to investigation of aircraft accidents and incidents. Australia has a unique requirement for the mandatory reporting of all incidents which may have air safety implications, and has a more comprehensive incident reporting system than any other country.¹ However, in relation to investigation, the Director of BASI told the Committee that there is no mandatory requirement in the ANRs to investigate these accidents and incidents. The Secretary's power in relation to aircraft accident and incident investigation is discretionary.² The Secretary has delegated this authority to the Director of BASI and the decision whether or not to investigate an accident is left to the discretion of the Director of BASI.

42. BASI's long-standing policy on aircraft accidents has been to allocate priority to the investigation of registered aircraft, even though the regulations make no distinction between registered and unregistered aircraft. Since ultralights require no formal registration, their investigation is not a priority. Nevertheless, BASI claims it has investigated every ultralight accident of which it has been notified.³

43. Investigation of accidents to 95.10 aircraft where the safety of the public is not involved is restricted to establishing the facts and the circumstances. In its submission BASI said that "In the absence of any standards for the design, construction, maintenance or operation of the aircraft and of any pilot standard, it is not possible for the Bureau to make any meaningful safety recommendations to the Department. . .".⁴ The current policy in relation to 95.25 aircraft is that since they have some airworthiness standards, they are treated in the same way as accidents to registered light aircraft.

44. BASI told the Committee that not much meaningful information can be established by accident investigation of unregistered aircraft such as ultralights. BASI also claimed that information collected is largely irrelevant if the aircraft is one of a kind, because there are no other owners to notify.

¹Report of the Independent Inquiry into Aviation Cost Recovery, *The Bosch Report*, Canberra, AGPS, 1984, p.323.

²Evidence, p. 1085. Refer also to ANR 278.

³Evidence, p. 1086.

⁴Evidence, p. 1056.

45. The Committee believes that this argument is only valid if it is based on the assumption that accidents can only occur as a result of aircraft failure. Evidence indicated that a considerable number of accidents were caused by human factors.

46. The Committee does not agree that meaningful information cannot be obtained from an investigation into accidents involving aircraft which do not meet formal design or airworthiness requirements nor that results are irrelevant. The cause of an accident can be identified whether or not formal design requirements exist, and may prevent future accidents in the same kind of aircraft. It is important to remember that the fundamental objective of accident investigation is the prevention of future accidents.

47. If only one example of an aircraft exists, results of the investigation may do no more than contribute to aeronautical knowledge and identify safety problems which may have implications for other aircraft. This in itself, the Committee believes, is of positive benefit. Examination of BASI's accident investigation summaries, however, reveals that there were very few accidents involving one-off aircraft. Most were in limited production. Where several examples of an aircraft exist, for example completed kits or plans of aircraft, or where a model is in limited production, there should be a reasonably thorough accident investigation to discover the cause of the accident, in order to prevent a similar accident in the future. This is in accordance with BASI's primary objective of accident prevention.

BASI Resources

48. The Committee heard that apart from the lack of standards, the reason that full accident investigation was not being carried out by BASI on uncertified aircraft was primarily a resources problem. BASI told the Committee that allocation of priority to registered aircraft was a realistic approach to this resources problem. The Committee does not accept the validity of the Department's arbitrary distinction between registered and unregistered aircraft.

49. BASI claimed that resources were a problem in both central and regional offices. The Committee was concerned at a statement made by BASI indicating that even if there were an increase in resources, they would certainly not be devoted to ultralights.⁵ This attitude disturbed the Committee, particularly since evidence suggests that ultralight accident investigation already receives a low priority. The Committee believes that BASI has as much responsibility to investigate ultralight accidents as it does fully certificated aircraft. Obviously, however, investigation of ultralight accidents will not receive the same sort of priority as investigation of commercial airliner accidents or accidents to other passenger-carrying services.

50. One of the problems appears to be that ultralight aircraft are often not perceived by the Department as "real" aircraft. This attitude, which is contrary to the intentions of the Act and Regulations, has contributed to the ultralight safety problem. The Committee believes that had ultralights been treated seriously and allocated sufficient priority and resources in the past, the existing problem may not have assumed current proportions.

51. There is an urgent need for re-examination of ultralight accident investigation priorities and resources. The Committee does not believe that this will occur under present conditions and therefore recommends that:

the Minister for Aviation

- (a) re-allocate priorities within the Department to ensure that ultralight accidents and incidents are comprehensively investigated; and
- (b) ensure that the criteria and priorities used in ultralight accident investigation are clearly documented and published.

52. The AUF is being actively encouraged by BASI to participate in its ultralight accident investigations. The Committee would like to see an increase in AUF involvement in accident investigation, not only to relieve the resource problem, but so that results of investigations can be better understood and that necessary action be taken as quickly as possible. BASI

⁵Evidence, p. 1091.

should still retain oversight of the accident investigation process and responsibility for the choice and training of its AUF assistants. The Committee suggests that BASI prepare a manual containing guidelines and conditions of accident investigation for the benefit of the AUF members assisting it. One officer in BASI should be identified as a point of contact for ultralight accident investigation and should co-ordinate AUF involvement.

53. One of the problems with AUF involvement in accident investigation brought to the attention of the Committee is that of legal liability.⁶ Assistance by sporting bodies in accident investigation will need to be accompanied by suitable legal protection for their findings and recommendations. Legislation can be introduced if necessary, but the Committee believes legal protection of AUF members rests with the Department of Aviation, especially if such assistance is provided on a voluntary basis. Whilst the Department itself appears to have little legal protection against defamation, it has the authority and resources to stand by its recommendations.

Accident Reports

54. Under ANR 283, the Secretary of the Department has discretion to publicly release or withhold the results of an accident investigation. However under the same Regulation the Secretary may publish comments and recommendations while an investigation is in progress, if it may prevent a similar accident in the future.

55. Representatives of the ultralight movement alleged that delays and secrecy surrounded the release of BASI accident reports. A number of these witnesses believed a death in 1985 would have been prevented had BASI accident reports been available sooner. Correspondence in 1981 from the Air Safety Investigation Section of the Department of Transport confirmed the unavailability of ultralight accident reports. The letter stated that it was the "long standing policy of the Department not to make documents of this type public."⁷

⁶Evidence, p. 1151.

⁷Letter from Department of Transport to Mr Ross Nolan dated 14 July 1981, over the signature of G.V. Hughes.

56. According to more recent evidence, the Department's policy has apparently changed. Where there is a critical safety consideration, the Department advises relevant sectors of the industry as soon as these are identified and in advance of formal accident investigation reports.⁸ The Committee trusts that the practice of releasing interim reports, where possible, will overcome the alleged delays in releasing full reports which generally take 12 - 18 months to complete. The Committee received conflicting evidence on the availability of accident reports. Although the Committee is unable to determine the precise situation from the evidence, it is confident that reports are now being released. Despite the fact that the Department claims it has a certain amount of protection under ANR 283(1), accident reports are not privileged documents.⁹ As a rule, a summary BASI accident report is released rather than the full accident investigation file. The summary report contains adequate causal information on the accident.

57. Although BASI accident reports are apparently being released, no proper mechanism exists for the notification of ultralight accident investigation findings to other owners of that type in order to prevent future accidents. The AUF told the Committee that it does not publish details of BASI reports because it places itself in a tenuous legal position and risks being sued. The current situation of information being passed to members verbally is unsatisfactory. The Committee believes that the AUF has a responsibility to pass this sort of information on to its members, even if it is merely to state the salient investigation details.

58. The Committee believes that investigation findings should be publicly available and actively disseminated. The current problems could be overcome by notification in either a recognised national aviation magazine such as the *Aviation Safety Digest* and reproduction of this information in the AUF Newsletter, or the establishment of a mailing notification system to all ultralight operators. These steps would assure prompt communication of important safety information and overcome both the safety and the liability problems. The Committee recommends that:

⁸Evidence, p. 1081

⁹Evidence, p. 1021.

the Minister for Aviation

- (a) ensure that the Department either publish ultralight accident investigation findings in a recognised national aviation magazine, or individually mail this information to all ultralight operators through a national mailing notification scheme; and
- (b) take steps to rectify the current situation which allows a 12-18 month period to elapse before any safety information is released on an ultralight accident, by examining ways of releasing interim warnings within a 3 month period.

Conclusions

59. The Committee found that significant problems existed in relation to accident investigation and reporting. Fortunately, some of these problems have begun to be remedied during the course of the Committee's Inquiry.

60. Claims by the industry that sports aviation, particularly ultralights, received a very low priority by BASI were found to be justified. The Committee believes investigation of priorities and resources in relation to ultralights is essential.

61. Evidence presented led the Committee to conclude that much of the ultralight community's dissatisfaction regarding accident investigation and reporting was directed toward the Department of Aviation's Central Office. Relationships between the ultralight movement and regional offices were considered to be good.

62. Due to conflicting evidence presented by the industry and the Department, the Committee was unable to determine whether the release of BASI accident reports was deliberately delayed and/or withheld, and whether their release would have prevented a subsequent fatality. It is clear however that the dissemination of findings from BASI investigations to prevent

recurrences of accidents — the primary safety function of the Department — has been poor. Although the situation has apparently improved, prompt publication of accident report summaries in aviation journals or mailing lists to all ultralight operators would ensure that such information is readily delivered to operators of similar aircraft. Appropriate follow-up action is essential, if results of BASI investigations indicate safety problems.

Chapter 4

Legislation

Commonwealth Power to Regulate Aviation

63. Because enactment of the Constitution preceded the advent of aviation, the Constitution does not contain any references to aviation and the Commonwealth has had to rely on various heads of power to regulate aviation. The Commonwealth has turned to those parts of Section 51 of the Constitution relating to trade and commerce, postal services, defence, external affairs, territories and matters incidental to the execution of Commonwealth powers to support its aviation legislation. In addition, the States agreed in 1937 that Air Navigation Regulations framed by the Commonwealth should become applicable to intrastate aviation. However, four States (New South Wales, Queensland, Western Australia and Tasmania) and the Northern Territory continue to licence the operators of intrastate air services.¹

64. The Department's powers to regulate aviation stem from the *Air Navigation Act 1920* which also ratifies Australia's commitment as a signatory to the Chicago Convention. Section 26 of the *Air Navigation Act 1920* make regulations and is the authority for the Air Navigation Regulations. The Secretary is empowered to make Air Navigation Orders. The Air Navigation Regulations and Orders issued under the Act reflect the International Civil Aviation Organisation's (ICAO's) Standards and Recommended Practices (SARPS) to a considerable degree.

¹ *The Bosch Report*, Canberra, AGPS, 1984, p.29.

Parliamentary Scrutiny of Delegated Legislation

65. Parliament has regularly and extensively delegated to the Executive Government limited power to make certain regulations under the authority of an Act of Parliament. However, most parliaments seek to retain some oversight of delegated legislation, usually by requiring the delegated legislation to be tabled before each house of the parliament. Parliament has the right to call the responsible minister to account if it disapproves of the use being made of delegated power.²

66. The role of the Commonwealth Parliament in reviewing delegated legislation is covered by sections 48 and 49 of the *Acts Interpretation Act 1901*. The *Statutory Rules Publication Act 1903* governs the printing, numbering and sale of regulations, rules and by-laws. However, unless special provision is included in the empowering Act, these instruments are not subject to parliamentary review.

67. It is generally accepted that while the delegation of legislative power is strictly controlled, greater latitude is permitted if the delegation is administrative in nature. Whilst the distinction between what is administrative activity and what is legislative can become very fine in some cases, the essence of the distinction lies in whether a power is conferred to **make law** or merely to **implement it**.³

Delegated Legislation under the Air Navigation Act

68. Section 26 of the *Air Navigation Act 1920* gives the Governor-General broad power to make regulations. Under this Act the Government is granted one of the widest regulation-making powers in any Act.

²Pearce D.C *Delegated Legislation in Australia and New Zealand*, Butterworth, 1977, p. 28. Also refer Pettifer, J.A., *House of Representatives Practice*, Canberra, AGPS, 1981, pp. 394-7.

³*Toohy's Ltd v Minister for Business and Consumer Affairs* (1981) 36 ALR 64 at 73.

69. Unlike the *Navigation Act 1912*, which provides for sub-delegation by the Governor-General to the Minister to make orders, the *Air Navigation Act 1920* does not give the Governor-General power to empower the Minister to make orders per se. Section 26 as a whole together with section 31 devolves a wide power of delegation to the Minister and then of sub-delegation to the Secretary.⁴ Although new Regulations are tabled in each House with a period of disallowance, ANOs receive no such scrutiny.

70. All of the instruments made under the Act are effective at law if they are valid, that is, if the delegated functions are of an administrative rather than legislative nature and are in accordance with the guidelines laid down in the legislation. The instruments are enforceable by virtue of sub-section 3(2) of the Air Navigation Act, and the general offence provision in Regulation 312 of the Air Navigation Regulations.

71. In relation to sports aviation, a further step occurs. Private clubs or associations are required to adopt and enforce conditions set out in the instruments of delegation. These rules in the case of the ultralight movement, the AUF Operations Manual, are enforceable as a condition of membership. Effectively, the ultralight ANOs require ultralight operations to be in accordance with the AUF Operations Manual. As an internal club matter, they are not subject to external scrutiny or review as legislation, but require approval or agreement by the Department.

Scrutiny of Delegated Legislation made under the Air Navigation Act

72. Air Navigation Regulations (ANRs) made pursuant to section 26 of the Air Navigation Act are subject to Commonwealth Parliamentary scrutiny within the terms of section 48 of the Commonwealth Acts Interpretation Act. Air Navigation Orders (ANOs) made under Clause 8 of the Regulations have never been subject to parliamentary scrutiny. Since no provision is made to table ANOs, they are not subject to scrutiny nor disallowance.

⁴Commonwealth Parliamentary Library Legislative Research Service Discussion Paper — "Some General Principles Applying to Legislative Power Delegated Under the Legislative Power of the Commonwealth", C. Elliot, May 1985, LG11.

In contrast, Orders made under the *Navigation Act 1912*⁵, to which Air Navigation Orders could be compared, require tabling in Parliament and are subject to parliamentary scrutiny. It would appear that ANOs are of sufficient significance to warrant at least tabling in Parliament, in the same way as Navigation Orders, and be subject to disallowance.

73. The Committee concludes that the nature of ANOs is predominantly legislative rather than administrative and that the Secretary is given wide-ranging powers to make and enforce ANOs, not merely to implement them. The Committee believes that this delegation should be more strictly controlled, despite the large volume of ANOs, by allowing parliamentary scrutiny of the delegated power in the same way as Navigation Orders. Accordingly, the Committee recommends that:

the Minister for Aviation introduce legislation to amend the *Air Navigation Act 1920* to require the tabling of ANOs in each House, so that Parliament can oversight the use made of the delegated power.

Development and Issue of Air Navigation Orders

74. Since 1980 the Department has introduced a system of Aviation Regulatory Proposals (ARPs) to initiate regulatory change. ARPs are proposals to change the existing regulatory framework under which the aviation industry operates and drafts are generally released prior to any regulatory change. The impetus for ARPs may arise from various causes, such as Government policy decision, industry suggestion, finding of a review, a court decision or a legal opinion. The ARP should set out the reasons for the proposed change and its likely effects are required to be set out by the ARP guidelines. ARPs are the principal means by which the aviation industry is alerted to a proposed change in the legislative/regulatory framework and provided an opportunity to comment.⁶

⁵Orders made under Regulations pursuant to Section 425 (1)(f) of the *Navigation Act 1912* required to be published in accordance with section 5(3) to (3C) of the *Statutory Rules Publication Act 1909* and are subject to disallowance by Parliament.

⁶Department of Aviation Administrative Instructions. Admin. 21 — "Legal and Legislation Matters", March 1986., Admin. 23 — "Consultation with Industry", January 1986.

75. Evidence was taken that the procedure for developing Aviation Regulatory Proposals (ARPs) was unsatisfactory. The main complaints were the lack of consultation with user and industry representatives and restricted distribution lists. Most people in the ultralight movement had no knowledge of the existence of ARP 85/10, which proposes a new set of ultralight aircraft standards, yet 85/10 had been circulated to "defence and naval officers" who would apparently have little to do with ultralight aircraft.⁷ Even though there has been some consultation on ARP 85/10, the AUF has repeatedly cited the lack of consultation between the Department and the AUF in relation to ARPs and ANOs.⁸

76. Similar complaints have been made in relation to other sectors of the aviation industry. Mr Dick Smith has called the system of issuing regulatory proposals "The ARP Smokescreen" in his publication *Two Years in the Aviation Hall of Doom*.⁹ He claims the ARP system is "nothing but a giant sham which appears to allow industry participation but in practice does not".¹⁰

77. Given these problems, the Department of Aviation's statistical summary of the responses to ARP 85/10 is hardly surprising. "Predictably, the general response rate for internal distribution was high at 65%, whilst the industry response rate was relatively low at 23%. Overall response rate was considered to be exceptionally poor given the current level of public interest in the subject. The response from Australian-based ultralight aircraft manufacturers was almost non-existent with only two manufacturers responding, and then only after some prompting a verbal summary of comments was received from one company."¹¹

78. The Department of Aviation does not claim any industry input into the initial drafting of the ARP. The drafting is usually carried out by a parliamentary draftsman pursuant to instructions by the Department. Only after the ARP has been circulated within the originating branch and relevant

⁷Evidence, p. 921.

⁸Evidence, 421 is one example.

⁹Smith, Dick., *Two Years in the Aviation Hall of Doom*, December, 1984.

¹⁰Smith, Dick., p. 31.

¹¹Exhibit 11, p. 39.

divisional branches is it sent out for industry comment. At this stage, the Department claims to distribute the ARP to a chosen list of people thought capable of making a useful response, for example individuals or organisations having relevant skills and/or experience. If the incorporated changes are thought to necessitate a re-circulation of the ARP, the Department will respond to those in the industry who made "constructive" comments and ask for comments on the changes. Once the ARP process is complete, the proposal is signed by the delegate and becomes an ANO.¹²

79. The Department claims to invite interested and relevant industry representatives to comment on the ARP, however, the Department chooses these relevant organisations and does not appear to be under any obligation to give serious consideration to the industry's comments, or to give reasons for the incorporation or rejection of any suggestions. Much wider circulation of ARPs is required before proposed legislation becomes an ANO.

80. The Committee believes that a more open and accountable system would greatly improve relations between the Department and the aviation industry, particularly in the ultralight area. The ARP system would be more successful, the Committee suggests, if the Department of Aviation's procedure resembled the American situation, where each new rule (like the Australian ANO) is published in the *Federal Register*¹³, each comment on a new regulatory proposal receives a written response, reasons are given for the acceptance or rejection of industry comment and reasonable access is available to the Department's records.¹⁴

81. The Committee has already recommended that ANOs be made subject to parliamentary scrutiny (paragraph 73). The Committee believes each ARP should be actively circulated within the aviation industry and its existence publicised. Each comment should receive a written response outlining why it has been accepted or rejected. Notification in the *Gazette* and availabil-

¹²DoA Administrative Instructions. Admin 21 and Admin 22.

¹³The *Federal Register* in the US roughly equates with the Australian *Government Gazette*.

¹⁴Federal Aviation Administration. *Federal Aviation Regulations Volume 11* (July 1969). Part II — General Rule-Making Procedures.

ity through the Australian Government Publishing Service (AGPS), would overcome the availability problems outlined by witnesses.

Freedom from Legislation

82. Since the flying of ultralights is generally considered a sporting activity, the general consensus in the ultralight movement was firstly, that they should enjoy greater freedom and secondly, that any regulation be appropriate to the aircraft and to the sport. The AUF and some other witnesses question the government's right to protect people from themselves¹⁵ and the AUF told the Committee that other sports are not subject to such stringent regulations. However, other sports such as car racing are subject to tight regulation. Even though not federally imposed, strict safety requirements are specified for car racing. The Confederation of Motor Sport (CAMS) will not allow a car on the circuit unless the vehicle complies with strict safety standards, and the driver possesses a current medical certificate, approved racing suit, helmet and fireproof shoes etc.¹⁶ Whereas car racing occurs in areas away from the general public, sports aviation occurs in public airspace.

83. The AUF has indicated that it wishes ultralights to be treated in a similar way to other light aircraft and not as toys. A consequence of being granted greater use of airspace will be the need to accept greater safety regulation.

84. In the road transport area important precedents have already been set in risk protection and vehicle safety standards through the compulsory use of seat belts in vehicles and helmets by motorcycle riders. Deaths and injuries impose considerable social and economic costs on the community and no activity, whether sporting or otherwise, should be free of obligation to minimise the risk of accident or injury.

85. The Department of Aviation believes people have the right to consciously take risks in pursuit of their chosen sport as long as they do not

¹⁵Evidence, p. 424.

¹⁶Confederation of Australian Motor Sport *Manual of Motor Sports* 1986 Edition.

create a hazard to others.¹⁷ This belief is strongly reflected in the current regulations¹⁸ which emphasise the safety of other aircraft and persons and property on the ground, but which do not mention the safety of the pilot.

86. As a safety committee, this Committee must be concerned with the safety of the pilot as well as third parties and property on the ground. The Committee's concern for the safety of all airspace users is reflected in the recommendations throughout this report.

87. Public safety expectations must also be considered. The Committee feels that members of the public have a right to expect a certain standard if ultralights are likely to fly in their vicinity. This is not possible without minimal regulation covering places where ultralights can fly. Total deregulation is not practical, even though the AUF argued strongly for this early in the Inquiry.¹⁹

¹⁷Evidence, p. 8.

¹⁸Refer ANO 95.10 and 95.25.

¹⁹Evidence, p. 206.

Chapter 5

Regulation and Enforcement

Introduction

88. The primary function of air regulation is to achieve safety in aviation. Under the Air Navigation Act and other legislation, the Department perceives its regulatory function as the “formulation, implementation and oversight of operational standards and procedures for the safe conduct of flight operations”.¹

89. Traditionally, the Department has regulated to achieve four different levels of safety, in accordance with the classes of operation specified in Air Navigation Regulation 191. The highest standard applies to the fare-paying scheduled international and domestic passenger services, the second to charter operations, the third to aerial work operations and the fourth level applies to private operations.² Sports aviation would fall into the fourth category. The Department, however, does not seem to treat it as part of this category. In the relatively recent development of sports aviation, the philosophy of minimum departmental involvement has been adopted, provided that a suitable national body supervises the safety standards. In effect, this has created a category outside the four categories in Regulation 191.

¹Department of Aviation Annual Report, 1984-85, p. 3.

²Report of the Independent Inquiry into Aviation Cost Recovery, *The Bosch Report*, Canberra, AGPS, 1984, pp. 324-5.

90. The administration and practices of the Department of Aviation have been the subject of quite a deal of criticism recently in the "Bosch" Independent Inquiry into Aviation Cost Recovery,³ the House of Representatives Standing Committee on Expenditure Inquiry into the Darling Harbour Fiasco,⁴ and Dick Smith's book *Two Years in the Aviation Hall of Doom*⁵

91. Similar criticism was expressed by the sports aviation movement, particularly in relation to ultralights. Three major areas of concern were identified:

- inadequate consultation with the movement;
- self-regulation problems; and
- complete lack of enforcement of the regulations.

92. On 5 October 1984 the AUF undertook to provide a point of contact between the DoA and the AUF to assist the DoA in the oversight of persons operating ultralight aeroplanes and to promote compliance with the ANOs. It was called the Services Agreement 1984. Terms of agreement included the establishment and maintenance of a Pilot Certification Scheme, production of a training and operations manual and the issue of pilot and pilot instructor certificates. During 1984-85 the AUF was paid \$15,000 for the performance of these services.

93. The AUF believed its interests were not being considered or properly taken into account by the Department of Aviation (DoA). Since the AUF assists the Department in the oversight of ultralight activities under the Services Agreement, the AUF claims its views should at least be considered before it is expected to supervise and enforce the regulations.

³ *The Bosch Report*, p. 324.

⁴ Report of the House of Representatives Standing Committee on Expenditure, *No Port in A Storm*, AGPS, 1985.

⁵ Smith, Dick., *Two Years in the Aviation Hall of Doom*, 1984.

94. Self-regulation is designed to hand over much of the responsibility for regulation to the relevant national sporting body. Self-regulation of the ultralight movement, however, has not proceeded well. The AUF has had considerable difficulty in unifying a factionalised ultralight movement and in dealing with the DoA. An indication of the AUF's internal problems has been the delay in completing the Operations Manual, which was not finalised until 1986.

95. It became clear during the Inquiry that one of the major difficulties in the transition to self-regulation was conflict between the AUF office bearers and the Department. Recent changes in the AUF administration have improved relations between the two bodies. Self-regulation problems have been compounded by the fact that the Department has taken an inordinate length of time to formulate and promulgate ultralight legislation. Further legislation is still in the pipeline and work on it has ceased pending the outcome of this Inquiry.

Current Regulations

96. The regulation of certified aircraft falls into the 4 broad areas of:

- (a) use of airspace;
- (b) training and licensing of operators;
- (c) operational standards; and
- (d) design standards, maintenance and registration.

The regulation of ultralights covers the same categories, but with less rigorous requirements.

97. The Air Navigation Orders (ANOs) governing sports aviation are essentially a series of exemptions from various regulations under provisions of Regulation 329A. The exemptions are accompanied by conditions specified in Part 95 of the ANOs. The conditions include such things as maximum height of operation, area restrictions and restrictions on flying time. These restrictions are based on keeping the aircraft segregated from other aviation

and from persons and property on the ground, due to the absence of pilot training requirements.⁶ Part 95 of the ANOs calls up the AUF Operations Manual requirements.

98. Australia is the only country in the world to have two regulatory classes of ultralights.⁷ The two classes are governed by two ANOs; ANO 95.10 and ANO 95.25. The essential distinction between the two categories is that 95.25 has some airworthiness requirements, whereas 95.10 is exempt from airworthiness or design specifications. Only a weight restriction is applied to 95.10. For all practical purposes, the operational limitations for both ANOs are the same. Under existing regulations, ultralights do not require registration or pilots' licence, but 95.25 operations require a pilot certificate.

99. The current regulations enable a person to buy, or assemble and fly, a 95.10 category aircraft without any training or instruction. The aircraft is not required to satisfy any airworthiness or safety standards. It greatly concerned the Committee that the aircraft most readily available to the public is the 95.10 machine. Due to the absence of aircraft or pilot standards and the fact that it is usually powered by a characteristically unreliable two-stroke engine, it is the least safe of any aircraft. The majority of ultralight aircraft operating are those which have no standards. Although the legislation attempts to protect third parties, it fails to address the safety of the participants.

100. ANO 95.25 was promulgated in 1985 as interim legislation only,⁸ primarily to facilitate the approval of 2-seat aircraft for training purposes. ANO 95.25 is far more acceptable from a safety viewpoint, since it has some airworthiness requirements and implicit pilot training requirements through the AUF Operations Manual. Very few aircraft, however, have been certified to 95.25. Although the legislation was promulgated in March 1985, no aircraft had passed the certification package until March 1986. As at January 1987 only two models of 2-seat training aircraft have been approved; the Gemini Thruster and the Hughes Lightwing. This has resulted in 37 approved 2-seat aircraft available for training.

⁶Evidence, p. 1048.

⁷Evidence, p. 1048.

⁸Evidence, p. 77.

101. Criticism has been directed at the 95.25 category in terms of the prohibitive costs of certification and the legal liability faced by the engineer who must certify that the design has no unsatisfactory features using British design standard BCAR Section S “as a guide”. Many witnesses told the Committee that ANO 95.25 was impossible to meet in practice, however, some have now been approved and the AUF does not so strenuously oppose the regulations. Many ultralight enthusiasts did not expect such a comprehensive airworthiness standard, or understand its implications.

102. Airworthiness standards, operational limitations and the legal implications of both existing aircraft categories are examined in detail in the next chapter.

Proposed Regulations

103. The Department has always planned to replace the interim ANO 95.25 with a permanent set of ANOs for ultralights. The proposal is for a set of ANOs for a category called “Light Sports Aircraft”, which will consist of proposed ANOs 95.55, 100.55 and 101.55. These ANOs will include specification of operational standards, ultralight aircraft maintenance standards and a full certification standard, respectively. Draft ANOs 100.55 and 101.55 have been circulated for public comment as Aviation Regulatory Proposal (ARP) 85/10. A draft proposal for 95.55 has not yet been released.

104. The Department of Aviation informed the Committee that it will not proceed with the development of these ANOs until the Committee has presented this report. In fact, the Department contended “that perhaps 95.25 is not as bad by itself in terms of do we need to go to 101.55, 100.55 and a 95.55.”⁹ Given the prolonged criticism of 95.25, the few approvals to date and the amount of effort involved in the new set of ANOs, the comment surprised the Committee.

⁹Evidence, p. 1110.

Self-regulation

105. The Department's current approach to the regulation of sports aviation activities is to apply the least possible restrictions¹⁰ and then allow a suitable national body to supervise the agreed regulations. Departmental funding is provided to assist the relevant bodies in their supervisory task. No sector of sports aviation is completely deregulated. Differing levels of departmental regulation are complemented by a degree of self-regulation by the appropriate national body.

106. The ultralight movement has protested throughout its evidence at overregulation by the Department. It was claimed that overregulation and the imposition of regulations without consultation with or the agreement of ultralight representatives, has lowered the AUFs credibility with its members and hindered the self-regulation process. "Let the AUF develop its own airworthiness standards - independently of the DoA and stay OCTA (outside controlled air space), below 5000 feet etc. We have the expertise to do it. We don't need outdated, bureaucratic administration or regulation by unsympathetic DoA officers"¹¹ was a fairly typical statement from Mr Markey, AUF president at the time. It was obvious that the AUF saw any regulation of the industry as overregulation. Such attitudes and statements contributed to the difficulties between the Department and the AUF and the problems experienced with self-regulation.

107. Divergent interpretations of the meaning of self-regulation became apparent to the Committee. The AUF initially interpreted self-regulation as meaning the right to make its own regulations and to be totally "autonomous". The Department's oft-stated intention, was for the AUF to have a supervisory and administrative role. One witness equated self-regulation to de-regulation. Attempting to alleviate difficulties in interpretation, the Department began to refer to ultralight self-regulation as ultralight self-administration.¹²

¹⁰Evidence, p. 7.

¹¹Evidence, p. 397.

¹²Evidence, p. 1096.

108. The AUF's position on regulatory measures has changed since the beginning of the Inquiry when it wanted "total autonomy" and total freedom. The AUF is currently suggesting compulsory pilot certification, compulsory aircraft regulation, a testing procedure for all ultralight types and the introduction of 'airworthy' and 'specification' statements. The Committee believes the AUF is accepting the wisdom of some regulation and moving towards responsible self-regulation.

109. The Department's self-regulation policy has worked successfully in many areas of sports aviation. Gliding has been self-regulating since 1953 and hang-gliding since 1978. Throughout the Inquiry, gliding and hang gliding were used as models of the success of self-regulation. Both bodies claimed to enjoy a good working relationship with the DoA and have been satisfied that they have had an input into the regulatory process. However, both gliding and hang gliding experienced problems in their early days. Gliding owes much of its current success to over 30 years of experience. The more recently formed hang gliding movement has had to overcome a number of safety problems before achieving its current safety level.

110. Whereas other representative sports aviation bodies emerged naturally, the AUF was the brainchild of the Department. Until 1982, various ultralight clubs and individuals were lobbying the Department on ultralight regulation. The Department refused to deal with disparate individuals and would only negotiate with a national body.¹³ Internal factionalism and disunity has characterised the ultralight movement. Even after the AUF was recognised as the national ultralight body, rivalry between the AUF, the Sport Aircraft Association of Australia (SAAA) and the Queensland Flyers Association (QFA) continued¹⁴ and several groups have attempted to break away from the AUF. Some ultralight groups questioned the choice of the AUF as the national representative body. Relations have improved greatly since then. The SAAA and the AUF gave evidence together at the final hearing.

¹³Evidence, p. 40.

¹⁴Evidence, pp. 40, 436, 1020.

111. The Department doubts that self-regulation of ultralights will be as successful as for gliding, hang-gliding and parachuting, simply because ultralight flying is less conducive to club and group activity.¹⁵ Whereas sports such as gliding rely on group activity for towing and launching facilities, the flying of ultralights is usually an individual activity in an autonomous aircraft. Other sports aviation activities are essentially limited to a recreational nature, whereas small aircraft such as ultralights and gyroplanes readily lend themselves to non-recreational uses. The ready availability of kits, the unregulated sale of aircraft, plans and kits and the commercial possibilities of ultralights for agricultural purposes, have contributed to self-regulation difficulties.

112. Whilst hang-gliding is a similarly autonomous sport, the movement was able to organise itself at an early stage, with some prompting by the Department. The Department provided the Hang Gliding Federation of Australia (HGFA) with guidelines to reduce the bad accident record. The introduction of a pilot rating system, instructor training and the certification of gliders, has dramatically reduced the accident rate. Unlike the AUF, the HGFA has a tight-knit club structure which has greatly contributed to the success of the movement.¹⁶

113. The AUF does not have a strong club structure and has had considerable difficulty in attracting membership.¹⁷ A stronger club structure may have occurred, had the AUF not had so many problems in its formation. One of the main difficulties is that the majority of ultralights are presently illegal and owners will not join the AUF, let alone admit they fly an illegal aircraft, for fear of prosecution.¹⁸ More recently, however, the AUF has experienced a steady growth in membership. Unlike many older members who reject regulation, the new members are more willing to accept the regulations.¹⁹

¹⁵Evidence, p. 68.

¹⁶Evidence, pp. 540-543.

¹⁷Evidence, p. 432.

¹⁸Evidence, p. 1114.

¹⁹Evidence, p. 1128.

114. The Committee concludes that despite initial difficulties, the AUF is now moving satisfactorily towards self-regulation. The Department also feels the AUF is "becoming a viable national body which will be able to administer effectively the sport and recreational activities of ultralight enthusiasts and represent the views of its members to the Department".²⁰ The infrastructure is now in place and the AUF is offering benefits such as insurance, an approved flying training manual and an Operations Manual. Parallels can already be drawn between the AUF and the Gliding Federation of Australia when it first commenced operation.

115. Negotiation has re-commenced between the DoA and the AUF under the new administration. The new administration and leadership of the AUF is also more acceptable to various sections of the ultralight community,²¹ some of which to date have not wished to join the AUF. There is still dissatisfaction within the movement over the lack of consultation in the regulatory process. The Committee believes widespread consultation must be made a priority. Regulation must be acceptable to both the industry and the Department before the situation can improve.

116. The Committee does not find that ultralights are overregulated as the AUF claimed. The 95.10 category has virtually no standards apart from restrictions on operation. The regulatory impasse developed out of a combination of a naive and unstable movement, unreasonable departmental expectations and a lack of consultation.

117. Whilst the AUF has been receiving funds under the Grants-in-Aid Scheme,²² there have been allegations that this money was being withheld from the AUF because of personality clashes between some DoA officers and the immediate past president of the AUF, Mr George Markey. The issue was subsequently raised in a parliamentary question to the Minister for Aviation.²³ In his response the Minister pointed out that in providing \$55,000 financial assistance for 1985-86, the Department had asked the AUF

²⁰Evidence, p. 1049.

²¹Evidence, p. 1021.

²²Evidence, p. 11.

²³House of Representatives, *Parliamentary Debates* (Hansard), Canberra, AGPS, 20 May 1986, p. 3608.

to provide financial details of its operations. Not all the required information had been provided by the AUF 8 months after the request. The Minister said further payment would only be made when the remaining information was provided.

118. Without apportioning blame the Committee strongly feels that such conflicts can only damage the credibility of the AUF and raise questions about the Department's administration. The ultralight situation cannot be expected to improve until adequate funding is provided and a reasonable liaison established. No similar problems and no real dispute was raised by other sectors of sports aviation to their respective funding. The Committee believes the Department must foster the AUF in the same way as it has the hang-gliding movement, if the AUF is to achieve the success of other sports aviation groups. The Committee recommends that:

the Minister for Aviation examine the adequacy of funding provided to the AUF and make appropriate provision for financial assistance in future budgets.

Enforcement of the Regulations

Unsafe Aircraft

119. The Committee heard allegations of illegal and unsafe aircraft which continue to be manufactured and sold despite having been involved in fatal accidents and even after those accidents were attributed to design deficiencies. The Committee treated these allegations very seriously and spent much time and effort pursuing them. Whilst a number of aircraft and kits were alleged to have design deficiencies, the Committee decided to focus on one particular aircraft as a case study, to test the allegations and to ascertain the extent of Departmental involvement in regulating these matters.

120. The Department admitted it had been aware of the design defects inherent in this particular aircraft since late 1984.²⁴ A test flight was necessary to confirm these defects and the safety of the aircraft. However, a test flight has never been carried out.²⁵ The Department was unable to give

²⁴Evidence, p. 686.

²⁵Evidence, p. 728.

the Committee a valid reason for its prolonged inactivity or an undertaking that appropriate action would be taken against similar unsafe aircraft in the future.

121. The DoA received a defect notice in relation to the aircraft, drawing attention to design problems, pointing out the illegality of the aircraft because of its weight and recommending immediate grounding of the aircraft. The defect report was submitted under ANR 49G by Mr Ross Nolan, who is a Licensed Aircraft Maintenance Engineer, (LAME) required by law to report any unsafe registered aircraft. Although ANR 49G applies to registered aircraft, the aircraft in question did not qualify for exemption from registration, because it did not comply with either ultralight category.

122. Despite believing the aircraft to be unsafe and having received the defect notice, the Department claimed that the aircraft was outside its responsibility because it was unregistered, without airworthiness requirements and its operation was illegal. The Department's attitude was that "it is difficult to see how we can be under any obligation in regard to the airworthiness of these aircraft. However, in view of the information provided by Mr Nolan it is incumbent on us to ensure that the issues brought to our attention are addressed before any form of acceptance under ANO 95.25 is granted to the type".²⁶ Evidence given by the manufacturer led the Committee to believe that it is highly unlikely 95.25 approval will ever be sought and that the Department knows this.

123. The Department took no action itself, but forwarded the defect notice to the AUF, expecting it, to take some action under the Services Agreement.²⁷ However, the AUF asserted that it had been given no legal authority to act on the notice and claimed that investigation of the report was the Department's responsibility. It was also pointed out that the Department had issued permits for similar aircraft to fly at the Mangalore Airshow, the day after the DoA had forwarded the defect notice to the

²⁶DoA undated Minute signed by K.A. Bolonkin for M.D. Dunn, Assistant Secretary Airworthiness.

²⁷DoA letter Vic/Tas Region dated 4 April 1985 over the signature of T.C. Fincher for Regional Director.

AUF.²⁸ A fatal accident involving this make of aircraft occurred only one week later.²⁹

124. Under the circumstances, despite the administrative difficulties involved, the Committee concludes that the Department ignored its primary responsibility of ensuring aircraft safety. The Committee found the DoA to be evasive in its answers and lacking in its responsibilities. The Department defended its position by claiming that although it considered these aircraft outside its responsibility, it had taken as much action as it could by providing copies of the accident and airworthiness reports to the manufacturer and by asking the AUF to provide names of owners of that make of aircraft. At the final hearing on 22 October 1986, the Department had taken no further action in relation to either the aircraft or the manufacturer.³⁰ The Committee cannot accept the Department's attitude. Claiming a particular class of aircraft is outside its responsibility must raise questions about the very existence of both the Department or the regulations.

125. The Committee strongly believes that the Department should have taken action to ground the aircraft, particularly if the aircraft was known to be illegal and when the Department's own investigation report showed the aircraft to be structurally unsound. The Committee refers to internal DoA correspondence in December 1985, which indicates that a Q.C. was in the process of drafting a "show cause" action as to why the Department should not be held directly responsible for the death of the late Ray Carter.³¹

126. The Department repeatedly told the Committee that it was unsure of its legal powers to take action against unsafe and illegal aircraft. Legal opinions have been sought in relation to the extent of the Department's powers since 1984. ANR 315(1) specifies the Department's powers in this regard.

Where it appears to the Secretary that any aircraft is intended or likely to be flown in such circumstances that the flight would

²⁸Letter AUF to DoA, 9 April 1985 over the signature of A. Bridges.

²⁹Mr Ray Carter was killed on 15 April 1985. The BASI Accident Summary indicated the primary cause of the accident was propeller failure.

³⁰Evidence, p. 1069.

³¹Department of Aviation, internal minute, 13 December 1985.

involve an offence against these Regulations or be a cause of danger to persons in the aircraft or to persons or property on the ground, he may take such action by way of detention of the aircraft or such other action as is necessary for the purpose of causing the circumstances relating to the flight to be investigated or the aircraft to be inspected.

127. The Department has interpreted the ANR as meaning that the only way "we [the Department] can be assured that an aircraft has the intention to fly is to follow it to a point where it is about to take off and then stop it."³² The Committee believes that while waiting for legal clarification the Department could and should have taken action under consumer protection in the interests of aviation safety. The Committee is concerned that the Department has allowed two years to pass without being sure of its legal powers under the Regulations and has been unwilling to act against unsafe aircraft.

128. The latest legal advice from the Australian Government Solicitor in March 1986, clearly outlines the Department's powers. Whilst the Department does not have the power to control the manufacture or sale of aircraft, its powers are wide enough to prosecute a manufacturer where an aircraft does not comply with the requirements of the various ANOs. The opinion explains that where an aircraft does not comply with the 95 series of ANOs, the Department can either prosecute for breach of the conditions under Regulation 329A, or consider the aircraft to be outside the terms of the 329A exemption, treat it as a normal aircraft, and prosecute for offences against the regulations in terms of registration etc. Regulation 315 could be used as an adjunct to the latter prosecution action.³³

129. Even after receiving this opinion the Committee was told by the Department that "we are still in some doubt as to how we should handle people who perhaps manufacture aircraft with known deficiencies or suspected deficiencies"³⁴ and that the opinion "has left us in a certain degree of doubt . . . on exactly our position, in particular with respect to Regulation

³²Evidence, p. 709.

³³Evidence, p. 707.

³⁴Evidence, p. 713.

315 which makes reference to intention to fly ...”³⁵ The Committee finds this opinion quite specific regarding the Department’s powers to prosecute manufacturers of unsafe and illegal aircraft. Even with specific legal advice, the Department has failed to at least initiate some action against unsafe aircraft under the guise of a lack of understanding of its powers. The Committee is dismayed that a department charged with responsibility for aircraft safety, fails to use regulations at its disposal when faced with a safety risk of growing dimensions.

Overweight Aircraft

130. An AUF survey estimates that up to 85% of ultralights may be flying illegally.³⁶ They are illegal because they fall outside the weight specifications of ANO 95.10, but do not comply with ANO 95.25. Enforcement of the regulations in relation to these aircraft has been virtually non-existent. Solutions to the overweight problem will be discussed in the following chapter: only enforcement will be dealt with in this chapter.

131. The Committee heard from the ultralight fraternity that many of the existing overweight ultralights were built or purchased in anticipation of a proposed ANO 95.22. An empty weight of 150kg was suggested for 95.22, but the ANO was never promulgated. Quite a few aircraft were built to this weight, by persons who did not appreciate the implications of a formal airworthiness requirement, with the result that these aircraft do not comply with either ultralight category and have no airworthiness standards. Other aircraft were built in expectation of airworthiness regulations that would be workable for amateur builders.

132. The Department’s attitude to enforcement is that “the right and proper way was to encourage the effective development of a national organisation to control ultralight activities.”³⁷ Essentially, the DoA has expected the AUF to be responsible for enforcement of the illegal aircraft. This method has been successful in the gliding movement.

³⁵Evidence, p. 709.

³⁶Evidence, p. 1113.

³⁷Evidence, p. 712.

133. One difficulty with enforcement in the ultralight area has been the length of time taken by the Department to finalise the regulations. Although ultralights had been flying since 1976 under the only existing category for 8 years, ANO 95.10, further legislation was always expected. ANO 95.22 was aborted after considerable negotiation and ANO 95.25 was promulgated as interim legislation only, without AUF agreement. ANOs 95.55, 100.55 and 101.55 were expected to be the future ultralight standards, but are either unprepared or still in draft form. The Committee is aware that in mid-1986 the Minister for Aviation instructed his Department not to initiate any new legislative action pending the outcome of this Inquiry.

134. As a result of the above legislative problems and the fact that the AUF has taken considerable time to develop into a viable national organisation, the Department has “not been taking an active surveillance role of ultralight activities during this formative stage.” It also claimed that it does not have the resources to go out and comprehensively police ultralight operations.³⁸ A situation subsequently developed which has led to the uncontrolled proliferation of overweight aircraft. There are now too many aircraft for the Department to control.

135. The Committee was told that the movement, perhaps naively, expected the eventual approval of most overweights and expected an airworthiness standard suitable to amateur designers and builders to be developed. Knowledge that the Department was not enforcing the regulations allegedly contributed to the industry’s feeling of complacency.

136. The Department has expected the AUF to enforce the regulations: but for its part the AUF has indicated resentment about the lack of consultation at the draft stage. “We refuse to be either puppets or policemen for the Department of Aviation who wish to write laws concerning ultralight aircraft without consultation with the AUF”.³⁹ The AUF states it is reluctant to implement and/or police regulations that it and its members disagree with. However, since the AUF receives funding under the Services

³⁸Evidence, p. 684.

³⁹Evidence, p. 405.

Agreement for its assistance, its attitude has been quite parochial. An attitude of compromise on both sides would probably have avoided the overt conflict which has resulted.

137. Recently, after having given the movement 12 months to comply with the ANOs, the Department has begun surveillance and prosecution of illegal ultralight activities. It has "informally advised" regional offices and the AUF "that prosecution action will proceed against people blatantly ignoring the rules or deliberately drawing attention to themselves by flagrant behaviour."⁴⁰ The AUF confirms that the Department has increased its enforcement activities. At the final hearing the DoA told the Committee that it had grounded approximately 22 aircraft under ANR 315 and completed 3 successful prosecution actions.

138. From the evidence it was not clear to what extent the AUF was expected to be responsible for the enforcement of regulatory action against illegal ultralight aircraft. Ultimately however, the DoA must bear responsibility for ultralight safety, whether or not there is a Services Agreement. The AUF did not believe authority was delegated to it and did not believe it should bear responsibility for the Department's unpopular regulations. The Department has continued to expect the AUF to carry out enforcement. The consequence has been that for approximately 10 years the regulations were not enforced.

139. The Department is currently enforcing the regulations, but its stated policy is that the national organisation should control ultralight activities. To overcome these problems the Committee recommends that:

the Services Agreement be amended to incorporate a section which clearly delineates the specific responsibilities and lines of authority of the Department and the AUF.

140. An agreed framework of regulatory responsibility must be established before the illegal aircraft situation can improve. Compulsory aircraft registration, delineation of the authority and responsibilities of both DoA and

⁴⁰Evidence, p. 712.

AUF and implementation of the Committee's recommended solution to the overweight problem (paragraph 197) must be made a priority by the Department.



Figure 5.1: Inspection at Lovelybanks Airstrip, Geelong. Left to right: Mr Bruce Goodluck, MP, Mr Rod Birrell (AUF President), Mrs Elaine Darling, MP (Chairperson), Mr Colin Hollis, MP, Mr Ken Aldred, MP.

Chapter 6

Aircraft Safety

Introduction

141. Aircraft safety is traditionally divided into two major areas:

- operational safety; and
- airworthiness.

142. *Operational safety is concerned with the procedures necessary for the safe operation of aircraft such as use of airspace, pilot standards and pilot training. Use of airspace will be dealt with in this Chapter. Pilot safety, standards and training will be discussed in Chapter 7.*

143. Operational limitations have been placed on sports aviation activities, principally to protect the public, by restricting the height of operations and keeping sports aircraft away from people and buildings.¹ Operational restrictions for ultralights are specified in ANO 95.10 and ANO 95.25. Apart from ANO 95.25 requiring pilot certification, operating conditions for both classes of ultralight are virtually identical.

144. Airworthiness has been defined by the Department of Aviation as the establishment and implementation of adequate design standards commensurate with an aircraft's intended purpose. Continuing airworthiness can

¹Evidence, p. 42.

only be ensured through adequate maintenance and regular re-assessment of the aircraft's operating performance.² Whilst a great deal of evidence was taken by the Committee in relation to the airworthiness requirements for both existing and proposed ultralight aircraft categories, much of the evidence was subjective, emotive and reflected the views of various interest groups. In many instances the Committee found that although it had much information, the factual basis upon which to make recommendations was scarce.

145. Widespread discontent was expressed by witnesses on the majority of airworthiness requirements for categories under which ultralights can be built. Throughout the Inquiry the Committee questioned the safety of the existence of a category of aircraft which has no airworthiness requirements or safety requirements.

146. Although a certain overlap occurs between operational and airworthiness aspects of the legislation, they have been dealt with under separate headings.

Operational Safety

Height Restrictions

147. The majority of evidence on operational safety was in relation to the 500 feet height ceiling applying to ultralights under both 95.10 and 95.25. The Department's rationale for nominating an operational ceiling of 500 feet above ground level for ultralights is the protection of other registered aircraft users, whose lowest height of operation is 500 feet.³ The majority of witnesses, except the Department of Aviation, were of the opinion that the 500 feet height restriction was too low for safety. The Committee was told on numerous occasions that "height is safety in aviation"⁴ particularly for fixed wing operation. Operating under a 500 feet ceiling was compared by one witness to being required to continue diving into the shallow end of a swimming pool.⁵

²Evidence, p. 1049.

³Evidence, p. 689.

⁴Evidence, p. 211.

⁵Evidence, p. 211.

148. The glide ratio of an ultralight is generally accepted to be quite poor, at 8:1 to 12:1.⁶ This glide ratio is less than even the worst single-engine general aircraft machine.⁷ Gliders perform at a ratio of between approximately 20:1 to 40:1. The low ultralight glide ratio means that a plane at 500 feet altitude is able to travel 4,000 feet, that is less than a mile, in which to find an adequate landing strip. Ultralights are recognized as suffering a rapid loss of speed after a power failure.⁸ In cross country or unfamiliar areas, this low altitude is claimed to be particularly dangerous. The landing area available to a gliding aircraft changes mathematically as a square function of the factor change of the height,⁹ which means a doubling in the height leads to a 4 fold increase in the landing area. For example, the Committee was told that if a height of 1,000 feet made 12 square miles of potential landing area available, 2,000 feet would give 48 square miles and so on.

149. The Sport Aircraft Association of Australia objected to the 500 feet limitation, because in attempting to recover control of an aircraft within that altitude, the pilot may unwittingly exceed the strength of the aircraft causing structural failure.¹⁰ According to BASI accident summaries, many accidents have been caused by overstressing the aircraft. One ultralight manufacturer told the Committee that most ultralight fatalities have occurred after manoeuvres at altitudes of less than 100 feet.¹¹

150. A 500 feet ceiling leaves a negligible margin for aircraft parachutes. Airborne Windsports Pty Ltd told the Committee that whilst suitable backup parachutes are available for motorised hang-gliders and ultralights, parachutes require 150 to 300 feet to fully deploy.¹² Problems occurring under 300 feet derive no benefit from the addition of a ballistic parachute. Ballistic parachutes are not currently being widely used for ultralights, even though a number of models are available. Whilst the Committee is reluctant to recommend that the use of parachutes be made compulsory, the Committee

⁶Evidence, p. 345.

⁷Exhibit 13, Adviser's Report on Operational and Pilot Safety., p. 25.

⁸Evidence, p. 299.

⁹Evidence, p. 299.

¹⁰Evidence, p. 226.

¹¹Evidence, p. 299.

¹²Evidence, p. 579.

suggests that parachute usage be encouraged by both the AUF and the DoA through advertising and promotion of their benefits. If ballistic parachutes are to be fitted to ultralight aircraft, it is essential that the strength of the aircraft structure can adequately support the stress of an opening parachute.

151. Two-stroke engines are generally used in ultralights because of their low weight, but are statistically less reliable than a four-stroke or a heavily maintained GA aircraft engine. Engine failures have been common in ultralights.

152. In general aviation aircraft, stall/spin manoeuvres must be conducted at an altitude which will permit recovery by 3,000 feet above ground level.¹³ The same safeguard should be applied to such training in ultralights. Stall/spin training at 500 feet is totally unsafe. Stall/spin training is discussed in more detail in the following chapter.

153. Even though ultralight enthusiasts generally feel that low flying is a tremendous thrill, most are aware of the risks and would prefer to have the ceiling lifted. The Committee was concerned that, in some cases, witnesses argued for a higher operational limit to obtain greater flying freedom, rather than from a safety consideration. Apparently, regular breaches of the 500 feet ceiling already occur and the Department's procedure for granting height exemptions is unworkable.¹⁴

154. The advantages of higher flying are numerous:

- dramatic increase in the area available for a forced landing in the event of an engine failure;
- more time in which to attempt to rectify any problem, and manoeuvre the aircraft correctly for a landing;
- more time and space for recovery from inadvertent stalls, spins, dives or unusual attitudes;

¹³Exhibit 13, p. 25.

¹⁴Exhibit 13, p. 26.

- reduced exposure to the low level dangers associated with convective (heat) and orographic (wind/terrain) turbulence, wind shear, willy-willies and birdstrikes, all of which are far more dangerous to ultralights than to GA aircraft;
- the successful deployment of a ballistic parachute, in the event of an emergency such as a structural failure, would be very doubtful from 500 feet; and
- improved visibility for orientation and navigation purposes, obstacle avoidance, general manoeuvring, and the practice of emergency procedures.¹⁵

155. Other sports aviation activities are not subject to such stringent height limitations. Ballooning, gliding and hang-gliding are permitted to 10,000 feet, unlimited altitude, and 5,000 feet in uncontrolled airspace, respectively.¹⁶ Balloons require a radio for flights above 5,000 feet or in proximity to licensed aerodromes. The Department appears to have given these bodies more latitude because it feels confident that they are capable of ensuring safety and acting responsibly. Ultralights in America can fly to 2,000 feet above ground level.¹⁷

156. Alternative heights for ultralights proposed by witnesses ranged between 2,000 and 5,000 feet. Whilst the Committee is cognizant of the DoA's rationale of keeping ultralights away from registered aircraft users, the evidence overwhelmingly indicates that the current 500 feet height ceiling is a hazard to ultralight safety. The Committee therefore recommends that:

- (a) the height restrictions applying to ultralight aircraft be lifted to:
 - (i) 1,500 feet for aircraft which are registered; fitted with an approved, calibrated altimeter; and flown by a pilot who holds at least AUF pilot certification; and

¹⁵Exhibit 13, p. 25.

¹⁶Evidence, pp. 25, 28, 32.

¹⁷Evidence, p. 522.

- (ii) 3,000 feet for aircraft which, in addition to meeting the requirements in (i) are fitted with a radio to ANO 20.8; and that
- (b) the new height ceilings be reviewed, on application by the AUF, after a minimum period of 3 years.

Area Restrictions

157. Area restrictions for ultralights preclude them from flying within 8 kilometres of a Government or licensed aerodrome, within controlled airspace, near built-up or populous areas, at public meetings or gatherings, at night, in acrobatic manoeuvres or in poor flight visibility conditions. Although exemptions can be obtained from the Department for many of the above, no exemption is possible to restrictions on night flying, flight over populous or built-up areas, in poor visibility conditions or for acrobatic manoeuvres.

158. No real dispute was raised in the evidence against the area limitations, which are clearly for the protection of the non-participating public.

159. The Department has indicated that it is considering lifting some of the operating restrictions, dependent on the level of pilot training, but has not specified which restrictions may be eased. "In the longer term it is anticipated that it will be possible to ease some of the operating restrictions on ultralights. The key determinant in allowing ultralights to mix generally with other airspace users will be the level of airmanship that can be developed by ultralight pilots. The Department will continue to monitor standards in this area so that restrictions on ultralights can be eased when it is prudent to do so."¹⁸

160. The Committee suggests that some permanent exemptions from the area restrictions could be granted to ultralights meeting airworthiness standards. Exemptions could include the use of controlled airspace and licensed

¹⁸Evidence, p. 71.

aerodromes, providing the aircraft is fitted with a radio and the pilot is certified to an approved level. It may be appropriate to restrict operations to certain times of the day at those aerodromes where air traffic is heavier.

Airworthiness

161. The vast bulk of evidence presented to the Committee concerned airworthiness issues and the airworthiness requirements of the various aircraft categories under which ultralights may be built. There were almost as many different opinions as there were witnesses, but generally 95.10 was considered adequate and 95.25 too restrictive. Many witnesses desired a simplified airworthiness standard suitable for amateur-builders.

162. Aeronautical engineers believed that only they were qualified to design a safe aircraft and that a design by an aeronautical engineer is a necessary preliminary condition to aircraft safety.¹⁹ One aeronautical engineer made the comparison that "society does not allow a butcher to act as a brain surgeon yet increasingly it is allowing mechanics to act as engineers in the design of aircraft. This situation is pathetic."²⁰

163. The AUF, on the other hand, claimed that it was capable of defining and implementing airworthiness and safety standards for all ultralight aircraft. Yet it also strongly argued for retention of a 95.10 type category without any airworthiness requirements.²¹ The Committee needed to resolve the question of whether there was any safety justification for the existence of an aircraft category without airworthiness requirements, despite the fact that the activity is carried out in remote areas. The public expects the maximum level of safety, even though consistently high levels of overall safety are difficult and costly to achieve. The Committee had the task of examining all the aircraft categories relevant to ultralights, and the attendant airworthiness standards.

¹⁹Evidence, p. 125.

²⁰Evidence, p. 125.

²¹Evidence, p. 400.

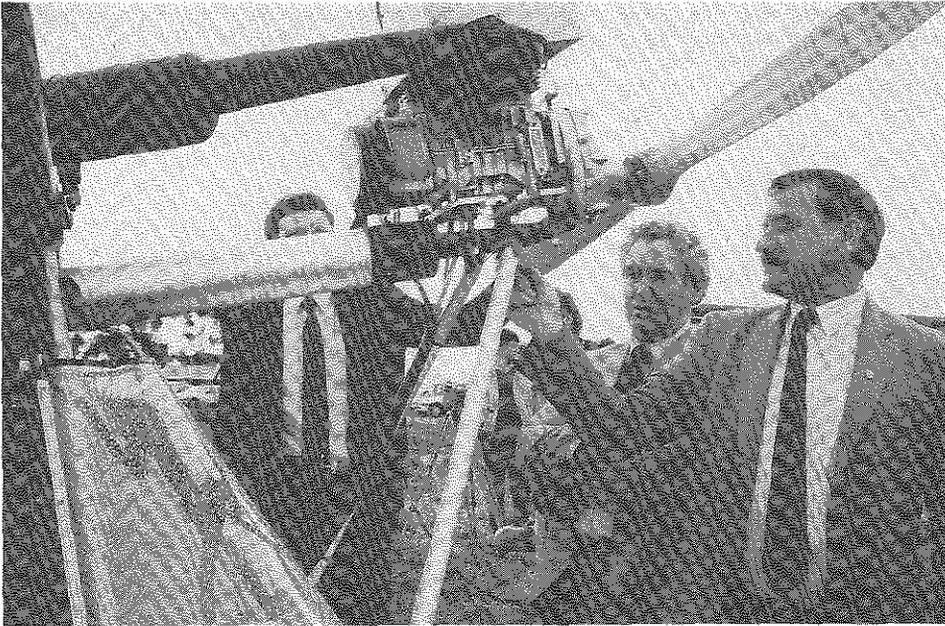


Figure 6.1: *The Committee examines a Gemini Thruster at Lovelybanks Airstrip, Geelong*



164. One argument often used against stringent airworthiness standards was that the flying of ultralights was a sport and “why hamstringing a voluntary sport with unnecessary conditions”.²² The Committee was told that aviation safety is unique, whether sporting or commercial, because the aeroplane is at risk of total disaster from the start to finish of any flight.²³ The consequences of a problem which may be relatively minor on the ground, for example engine failure, are much greater in the air and may ultimately be fatal. The Committee considers that the risk to third parties is higher for ultralights than, for example, recreational activities such as boating or cycling. Ultralight accidents involving property have already occurred.

165. Despite the fact that ultralight flying is considered a sport, the fact remains that all aircraft obey and operate according to the same natural laws and all have evolved similar flying characteristics. Similarly, all pilots have a similar range of abilities. Essentially, all aircraft ought to have similar control, stability, and handling characteristics. At the most fundamental level, aviation safety derives from four factors:²⁴

- a structural flight envelope of sufficient size to allow for manoeuvres, gust loads and speed excursions which may be expected to occur, accounting for intended purpose of the aircraft and level of pilot skill.
- safe handling characteristics of the aircraft so that the aircraft does not “fight” the pilot. An aircraft with poor handling requires a larger structural envelope.
- basic manipulative skill of the pilot, primarily attained by experience and confidence. Experience and confidence are based on training which includes conditions of stall, spin, crosswind turbulence etc, which are not possible in a self-teaching situation.
- the reliability of the aircraft structure and of its handling characteristics and pilot performance, which is essential if basic safety is to be maintained over time. Reliability is dependent on good initial design, adequate maintenance and pilot proficiency.

²²Evidence, p. 397.

²³Evidence, p. 823.

²⁴Llewellyn D.J. Discussion paper provided to the Committee on 25 November 1986.

166. All the above factors are interrelated and are fundamental to all aircraft. ANO 95.10 which contains no specifications of any kind and ANO 95.25 which ignores the factor of safe handling characteristics, demonstrate a neglect of the fundamental tenets of aviation safety.

167. Airworthiness standards do not and could not directly cover every possible operating situation and characteristic of an aircraft. Instead, they require consideration of nominated specific design cases. The adequacy of airworthiness requirements lies in choosing a specific number of loading and handling tests, which together cover all expected operating conditions of the aircraft with an acceptable probability.²⁵

168. It is feasible to produce simplified airworthiness standards for any size or category of light aircraft, providing a reduced probable level of safety is accepted. The Committee's task was to determine an acceptable level of ultralight safety for the participants and the community.

ANO 95.10 Aircraft Category

169. 95.10 aircraft are generally designed with little or no engineering calculations, do not have safe limits for their basic operating parameters (for example, maximum structurally-permissible weight, safe centre-of-gravity range, safe airspeed limits, safety manoeuvrability parameters) and do not comply with any comprehensive set of design/airworthiness standards.

170. Particular problem areas with these aircraft include:²⁶

- structural unreliability, that is, premature fatigue failure due to excessive stress levels in badly designed components; and
- aeroelastic instability, that is, flutter of the controls or even complete wings.

²⁵Exhibit 12, Adviser's Report on Airworthiness., p. 26.

²⁶Evidence, pp. 480, 481.

171. The general consensus of ultralight flyers was to leave ANO 95.10 largely as it stands, apart from a weight increase. Reasons given included: 95.10 permits the participation of owner-builders; it is the only category of aircraft which permits innovation in design; aircraft are relatively inexpensive; and provided the sport is conducted in a suitably remote area it has little or no potential for hurting anyone other than the direct participants. Participants admitted they were concerned with safety, but emphasise the fact that it is an adventure sport. However, evidence indicated a very real risk to the pilot, which as a safety committee, this Committee could not ignore.

172. One argument commonly put forward was that ultralight aircraft do not pose a significant safety problem,²⁷ that it was pilot error which was responsible for the majority of accidents. The Gliding Federation of Australia estimated the ratio of pilot-related accidents to airworthiness accidents at about 45:1²⁸ Whilst there were a few dissenting views, witnesses generally agreed that the major cause of accidents was due to pilot error, but that pilot error had often caused primary structural failure of the airframe. The Committee's adviser believes that ' "pilot error" . . . is still the most common single factor in aircraft accidents.'²⁹ Pilot error was raised by most witnesses and it was frequently suggested that the safety problems besetting ultralights could be largely overcome by pilot training.

173. Whilst the Committee does not doubt the significance of pilot error, pilot error can be overcome by training (refer to Chapter 7). Basic aircraft safety is more difficult to achieve and was of greater concern to the Committee both currently and in the longer term. The combination of both factors has resulted in the major ultralight safety problem which faced the Committee.

174. Another common argument put forward by the ultralight movement was that weight equated to safety. "Safety would be served far better by allowing heavier aircraft to be built and consequently stronger aircraft would

²⁷Evidence, p. 601.

²⁸Evidence, p. 340.

²⁹Exhibit 13, p. 2.

result ... I fail to see how safety is served by restricting the weight of an aeroplane - it actually has the reverse effect."³⁰ The AUF told the Committee that at the current 115 kg empty weight limit, the Australian designer has a choice of building a safe aircraft or a legal aircraft.³¹ It claims that some overweights are being made legal by compromising safety, for example, reducing weight by drilling holes in the fuselage, removing the seatbelts, taking off the exhaust, removing air filters.³² The Department of Aviation believes that the 115 kg weight limit is adequate to build safe ultralight aircraft³³ and that the weight limit should be kept low to reduce damage on impact with property.

175. Since the beginning of the Inquiry, the AUF has demanded increasing weights for the 95.10 category. Initially, an alternative weight of 150 kg was proposed,³⁴ more recently 175 kg has been proposed and a discussion paper by aeronautical engineer, Mr Walter Watkins, proposes a weight increase to 200 kg. The differences in weight were only a matter of one or two suitcases, according to the AUF. The AUF argued that had the weight of the 95.10 category been raised to 150 kg years ago, when weight was stabilising at 150 kg due to market forces, most of the current problems would have been overcome.³⁵ Lately, the AUF has acknowledged that an increase in weight should be accompanied by the introduction of airworthiness for future aircraft.³⁶ The Department of Aviation would agree with a weight increase to 150 kg "provided [the AUF] applied airworthiness to the standards" and the DoA would feel "much more comfortable if there were standards, however small...in the form of recognised aeronautical practices".³⁷

176. The safety of 95.10 aircraft is extremely difficult to quantify given the lack of standards and the unreliability of statistics. However, the Committee was able to ascertain that there was a significant variation in the overall quality of ultralight aircraft in this category. The extremes were exemplified

³⁰Evidence, p. 404.

³¹Evidence, p. 1140.

³²Evidence, p. 1140.

³³Evidence, p. 1104.

³⁴Evidence, p. 402.

³⁵Evidence, p. 402.

³⁶Evidence, pp. 1134, 1138.

³⁷Evidence, p. 1106.

by aircraft with design defects featuring in accidents and fatalities. Many witnesses agreed that there were many 95.10 aircraft with design defects.³⁸ A number of aircraft were named during the hearings. In contrast, there are 95.10 aircraft which demonstrate a high standard of design and construction. Some of these are being sold overseas.

177. The manufacturer of one of the aircraft named as defective, was called before the Committee to answer a number of allegations about his aircraft. The Committee found that this manufacturer had only a basic education and had never read a book on aeronautical engineering. When asked about his qualifications, he told the Committee "I looked at aeroplanes so often and studied them as they were on the ground and so forth and that gave me an idea of where I was going".³⁹ He also firmly believed he owed no responsibility whatsoever to the purchaser after his kit or aircraft left his workshop.⁴⁰ In a category without any airworthiness requirements, there will always be a number of people who will not comprehend the requirements of safe aircraft design, construction or operation, or who will sacrifice them for profit. Similarly, acceptance of legal or moral responsibility may not be fully understood.

178. The continuation of such a situation is unacceptable to the Committee. Existing regulations enable an unqualified person to build an aircraft of dubious safety and offer it for sale. Since these aircraft have no airworthiness requirements, the Department feels it has no responsibility for this class of aircraft. The Committee believes that the Department must take ultimate responsibility for these aircraft, and that its avoidance of this responsibility is a grave error of judgement.

179. The Committee can see no good reason for the existence of a category without any airworthiness requirements. The safety standard of such a category, the risk to the individual and potential risk to other airspace users is unacceptable. Accordingly, the Committee recommends that:

³⁸Evidence, pp. 426, 427.

³⁹Evidence, p. 655.

⁴⁰Evidence, pp. 651-2.

the existing 95.10 category of ultralight be replaced by a category limited to owner-designer-builders, covering single-place aircraft with a maximum empty take-off weight of 150 kg, together with basic airworthiness requirements to at least the standard specified in the AUF Technical Bulletins Nos. 1 to 4.

180. The most basic airworthiness requirements the Committee would be prepared to recommend are specified in the AUF Technical Bulletins Nos. 1 to 4. Providing the AUF supervises the process, the Technical Bulletins provide the fundamentals of structural strength, occupant restraint, aircraft weight and handling, and flight handling. The eventual level of safety would be similar to the current 95.25 category, but without the expense involved in a certification package. The Committee emphasises that this category does not apply to kits. All kits are expected to comply with ANO 101.55.

181. Whilst the Committee would prefer to see a more comprehensive standard — in the form of concessions against some of the requirements of proposed ANO 101.55 or the amateur-built category ANO 101.28 — the evidence constantly emphasises the demise of the ultralight aircraft movement if this were to occur. The Committee recommends that:

- (a) owner-designer-builders under the new 95.10 category be actively encouraged by the AUF and the DoA to use more comprehensive standards;
- (b) that construction of aircraft in this category be comprehensively supervised by a team of qualified inspectors and technical officers in the airworthiness area, as nominated by the AUF;
- (c) that sale of this category of aircraft not be permitted until a data package is presented to and approved by the AUF, including:
 - drawings, specifications and basic structural elements;
 - proof of compliance to acceptable structural loading tests;

- a signed statement by an AUF qualified person defining take-off weight, centre-of-gravity range, maximum speeds and power limits; and
 - a history of safe operation for over 50 hours.
- (d) the aircraft is clearly placarded as a limited airworthiness prototype and not be used for training purposes.

Overweight Aircraft

182. One of the major and most urgent problems confronting the Committee was the great number of overweight aircraft which neither meet the requirements of ANO 95.10 nor 95.25. As mentioned previously, the AUF estimates that up to 85% of ultralights may be flying illegally because they fall outside the 115 kg weight limit specified in ANO 95.10. Assuming a total of 1,500 ultralight aircraft, approximately 1,200 would be illegal. The Department has taken action against only 22 aircraft in the past 10 years. Whilst both the Department and the ultralight movement share responsibility for the growth of the problem, the large numbers of illegal aircraft now pose a resources problem for the Department and a considerable safety problem.

183. Overweight aircraft may have been built or purchased:

- in anticipation of legislative change and in the belief that approval for increased gross weight was imminent;
- in ignorance of weight limitations;
- in the knowledge that the regulations were not being enforced; or
- in total disregard of the regulations.

184. Although the Committee has no sympathy for the latter categories, it will be impossible to differentiate on intent and ultimately all overweights will have to be treated equally.

185. The AUF has posed two solutions to the problem of existing overweights. In June 1985, the AUF asked the Department for a 5 year moratorium on existing ultralight aircraft so that all heavier aircraft could be written off at 20% a year.⁴¹ There would theoretically be no uncertified overweight aircraft after 5 years. In practice, this may not have eventuated. The Department of Aviation did not agree to this proposal, largely because it did not know what it would be agreeing to in terms of numbers, design and construction, or safety record. The Committee agrees that an unqualified moratorium is not a viable option.

186. In January 1986, Mr Dafydd Llewellyn on behalf of the AUF, compiled a more workable proposal outlining registration and airworthiness requirements for all ultralight aircraft. Under this proposal existing overweight aircraft would be treated as amateur-designed aeroplanes, all would be registered, but under certain restraints. Only a limited number of pilots would be able to fly each aircraft and registration would not be transferable to any other owner or group of pilots unless the aircraft were to be upgraded in airworthiness to a higher level. This proposal depends entirely on the pilot's acceptance of total liability in case of accident.⁴² There is some precedent for this proposal in the development of the current gliding provisions. The Department of Aviation had not responded to this proposal by January 1987.

187. Many witnesses mentioned the benefits of a "history of safe operation" currently applicable to amateur-built aircraft under ANO 101.28. The Sport Aircraft Association of Australia (SAAA) told the Committee that amateur-built aircraft gain a history of safe operation by demonstrating 5 aircraft of the same type at 50 hours each, with no major airframe or component failures.⁴³ However, the Committee is aware that this is not the sole requirement in the amateur-built category. Aircraft must be built to approved standards, must be inspected twice during construction and are eventually type-certified and registered.⁴⁴ Overseas amateur-built designs are accepted more readily on a history of safe operation, but even so, this

⁴¹Evidence, p. 684.

⁴²Evidence, pp. 412-415.

⁴³Evidence, p. 213.

⁴⁴Refer ANO 101.28.

is not the sole basis for judging the safety of the final product. "An Experimental Category Certificate of Airworthiness in the amateur class for aircraft of US origin (or equivalent from other countries) is required; technical drawings are required; and assessment as to its suitability is made; regular inspections during construction are undertaken by Departmental officers; and flight handling tests are undertaken."⁴⁵

188. Acceptance of an aircraft through history of safe operation may take two or more years, according to aeronautical engineer, Mr Walter Watkins. After the two or more years taken by the prototype to complete 100 hours, a further 3-5 years may elapse before several other examples achieve a similar service history.⁴⁶ Whilst the Committee can see merits in a safe history of operation procedure, the Committee believes this should not be the sole basis of type acceptance.

189. A precedent has been set by the Gliding Federation, which currently administers a history of safe operation for gliders by using overseas experience. The DoA has delegated authority to the Gliding Federation to administer first-of-type procedure for kit-built or plan-built aircraft that can be justified by history of safe operation. Construction is supervised by an inspector system and regional technical officer system, with necessary adjustments made before the glider is able to fly. The GFA has administered the history of safe operation system since April 1983.

190. The overweight problem has not, in the Committee's opinion, been satisfactorily addressed by the Department of Aviation. The Department is "of the view that the starting point for addressing the problem of illegal ultralight aircraft would have to be some detailed census of the aircraft numbers involved including design and construction details. This is something which could ideally be carried out by the AUF. We believe that such information is vital if informed decisions about the future of such aircraft are to be made".⁴⁷ Yet, despite the Department's intentions, nothing along these lines has been done and a situation where overweights outnumber legal

⁴⁵Evidence, p. 685.

⁴⁶Evidence, p. 349.

⁴⁷Evidence, p. 685.

aircraft by 85:1, has been allowed to develop. Unfinalised legislation contributes to the expectation that many of these aircraft may eventually be registered.

191. The DoA has often referred to the costs involved in increased surveillance of safety standards⁴⁸ and that ideally the AUF should undertake these enforcement activities. The Department repeatedly claimed not to have any responsibility for the safety of aircraft in the 95.10 category.⁴⁹ The Committee, however, believes that the Department has a responsibility for the safety of all aircraft, since there are no exclusions in the Regulations.

192. The Committee concludes that the only fair way to solve the overweight problem is to grant a period of amnesty to existing overweight aircraft. Future aircraft however, must conform to the basic airworthiness requirements specified for the new 95.10 type category, must have a maximum take-off weight of 150 kg and bear registration markings. The Committee believes that most existing overweights will be embraced in the 150 kg, but stresses that the weight increase has not been recommended simply to sanction the majority of overweight aircraft. Rather, because evidence generally supported the opinion that this weight allowed the use of stronger materials and the fitting of safety equipment. The evidence does not indicate that a weight increase to 175 kg or 200 kg is justified. Aircraft exceeding 150 kg should meet the requirements of ANO 101.55.

193. It was argued by some witnesses that there should not be an empty weight specification, but rather a maximum take-off weight as exists in other aircraft categories.⁵⁰ However, the Committee concluded that providing the weight limit is reasonable, it represents an easily measured criterion and may prevent the aircraft from being used for purposes beyond the specifications of that category, for example addition of larger engines, seats and so on.

194. Many alternative airworthiness proposals were heard by the Committee. They ranged from: reasonably comprehensive testing proposals by

⁴⁸Evidence, p. 65.

⁴⁹Evidence, pp. 1024,1082

⁵⁰Evidence, p. 291.

Messrs Llewellyn⁵¹ and Whitney;⁵² a history of safe operation; to merely a combination of a centre of gravity test and a wing loading test. The AUF has already introduced the latter 2 tests for 95.10 aircraft. The Committee concluded from the evidence and the opinion of the Committee's engineering adviser, that the most appropriate solution to existing overweight aircraft was that outlined by Mr Llewellyn on behalf of the AUF. The proposal involves 4 categories of registration, each category requiring demonstration of certain airworthiness conditions which become more comprehensive for each higher category. All tests are to a recognised BCAR standard and acceptable methods of testing are given in AUF Technical Bulletins Nos. 1 to 4.

195. In summary:

- Category 1 requires the aircraft to be fitted with a four-point safety harness of at least automotive racing standard, accompanied by a clearly displayed warning that the aircraft complies with a limited airworthiness standard and that pilots fly at their own risk;
- Category 2 requires basic flight handling and structural testing in addition to the requirements of Category 1;
- Category 3 must meet all the requirements of category 2, with additional flight handling and structural testing together with some performance and fuel system requirements; and
- Category 4 extends to 2-seat aircraft and places an additional structural requirement.

196. Whereas Mr Llewellyn's proposal suggests that a maximum of 4 pilots be nominated by the owner for Category 1, the Committee firmly believes that Categories 1 and 2 should be strictly limited to flight by the owner only. This can however extend to syndicated ownership. The Committee does not believe that either Category 1 or Category 2 aircraft should be re-registered or sold without complying to Category 3 requirements, for reasons of safety and consumer protection. Registration should occur annually, which means the amnesty period will be for 12 months. The Committee has

⁵¹Evidence, pp. 412-5.

⁵²Evidence, pp. 127-30.

already recommended compulsory registration for all ultralights (paragraph 32). Aircraft exceeding 150 kg will not be eligible for amnesty until the aircraft's weight is shown to be 150 kg without compromising the aircraft's safety. The following recommendations apply only to overweight aircraft already in existence.

197. It is recommended that:

- (a) a 12 month amnesty be granted to existing overweight aircraft which have a maximum empty weight not exceeding 150 kg; and
- (b) this amnesty be in accordance with the requirements set out in Appendix C, with the additional conditions that flight in an aircraft below Category 3 is limited to syndicated ownership and that an aircraft can neither be re-registered nor sold until it meets the requirements of Category 3.

ANO 95.25 Aircraft Category

198. Widespread dissatisfaction was expressed over most of the airworthiness aspects of ANO 95.25. There were two recurring criticisms. Firstly, professional liability problems in making a declaration that an ultralight aircraft "exhibits no unsatisfactory features",⁵³ rather than the normal certification requirement, which is to show that an aircraft conforms to the appropriate standard. Secondly, the prohibitive cost of compliance with ANO 95.25.

199. All four approved aeronautical engineers appearing before the Committee were unhappy with the liability being placed on them. Professional liability in terms of sport aviation has yet to be tested in the courts. Under requirements of ANRs 27(2)(c), 40 and 41, design of and modification to an aircraft may be "approved" by "Authorised Persons." Apparently, authorised persons expose themselves to professional liability litigation for almost any aspects of the design they approve, even if they are only remotely related

⁵³Paragraph 4.1.1 (a), Appendix I, ANO 95.25.

to airworthiness standards, because the courts do not recognise compliance with the relevant statutory airworthiness standard as being the end of the matter. It was claimed that an authorised person who puts his approval stamp on a drawing,⁵⁴ lays himself open to liability for just about anything which can be caused or associated with the product depicted on the drawing. Compliance with ANO 95.25 may not be a defence against negligence in the design area,⁵⁵ particularly because the standard used, BCAR(S), is considered vague and requires the use of too much value judgement. Also BCAR(S) requires the support of other standards.

200. Authorised persons fear that the Australian situation will follow the US situation, where the whole problem of liability is much worse and where the doctrine of strict liability is more widely applied. Authorised persons have been extremely reluctant to become involved with ultralights because the potential liability risks are perceived as excessive.⁵⁶ One aeronautical engineer wrote to the DoA outlining reasons why he would not sign an ultralight approval under 95.25.⁵⁷ The Department responded that it “is not in the business of writing ANOs so as to minimise liability of aircraft designers.”⁵⁸ In the Committee’s opinion, this approach neither addresses the problem, nor assists in the approval of 2-seat training aircraft - the primary purpose of the legislation.

201. Airworthiness requirements for ANO 95.25 are based on BCAR Section S. The major objections raised in the evidence to BCAR(S) were that:

- it is non-specific and its application requires the exercise of too much value judgement, which unduly exposes the engineer to professional liability litigation;
- the absence of detailed handling and performance requirements;
- the absence of engine and propeller standards; and

⁵⁴Evidence, p. 471.

⁵⁵Evidence, p. 475.

⁵⁶Evidence, p. 479.

⁵⁷Evidence, p. 479.

⁵⁸Evidence, p. 479.

- it is an incomplete standard, in that it cannot stand alone, but requires support from other procedures and there are often difficulties in obtaining interpretations from an overseas authority.



Figure 6.2: *The Committee talking to Mr Charles Ligeti and inspecting his Stratos aircraft.*

202. The Committee was told that because BCAR(S) was an incomplete standard, the Department had to call on another overseas standard JAR22 to provide engine and propeller standards and itself set a perfor-

mance standard.⁵⁹ The DoA was criticised by a number of witnesses for using an overseas standard, rather than developing an Australian standard, and being overconservative and unoriginal.⁶⁰ Whilst this may be true, being conservative and seeking precedent is usually in the interests of safety, in this case the safety of ultralights.

203. One of the only solutions to improve 95.25 presented to the Committee was that a more concise and complete airworthiness standard could be produced by a collation of existing standards, together with interpretive guidance material all in the one document, which was able to be checked against the source material.⁶¹ A carefully drafted pro forma compliance document which could be issued to manufacturers, would further reduce the scope of litigation.

204. Early in the Inquiry, claims were made by several witnesses that the cost of certification to ANO 95.25 was prohibitive. Dissatisfaction by the ultralight fraternity and by manufacturers was largely based on cost, the main arguments being:

- small scale manufacturers could not afford the cost of an engineer to certify the aircraft;
- first-of-type certification requires the virtual destruction of the prototype; and
- imported aircraft are cheaper than those of Australian design because of the cost of the certification process.

205. Evidence given by some aircraft manufacturers left the Committee in doubt that these manufacturers fully understood the implications of aircraft certification. There will always be some who will deliberately sacrifice safety in favour of profit. The cost of employing an aeronautical engineer for design certification was often claimed to be above the reach of the small-scale manufacturer. Manufacturers shared the view that they could not afford \$20,000 - \$30,000 engaging aeronautical engineers. However, these

⁵⁹Evidence, p. 492.

⁶⁰Evidence, p. 214 is an example.

⁶¹Evidence, p. 492.

costs are an essential part of the design and must be considered as such. In other manufacturing areas, costs incurred in the initial development of a design are generally amortised when the product is offered for sale. The Committee firmly believes that if an aircraft is to be offered for sale, its safety must be assured.

206. Estimates of certification cost varied widely. One engineer estimated \$10,000 - \$30,000,⁶² the Department estimated \$8,800 for a professionally designed aircraft, but admitted that an aircraft which had not been professionally designed or had inadequate documentation could cost significantly more,⁶³ the AUF estimated \$30,000 - \$60,000.⁶⁴ The AUF told the Committee that the minimum cost per aircraft would be \$10,000 and that most of the aircraft currently flying would be different enough to require individual certification.⁶⁵ Engineers and the ultralight community claimed the DoA estimates were unrealistically low and that a realistic figure was closer to \$20,000. Although these figures vary widely, the discrepancy between the quoted certification costs was related to the level of analysis performed. As the Department pointed out, certification costs for a professionally designed aircraft may be \$8,800. However, the manufacturer of this aircraft would already have spent a considerable amount on professional design.

207. The Committee heard that mechanical or civil engineers are able to perform structural analysis and approve the structural integrity of the aircraft in place of an aeronautical engineer. One manufacturer, a civil and mechanical engineer by profession, told the Committee he had designed and stress analysed his aircraft as a structural engineer.⁶⁶ The Committee is aware that there are very few Regulation 40 approved engineers in Australia. There is only one north of Sydney, Mr Whitney,⁶⁷ and there may be as few as 6 privately operating aeronautical engineers in Australia. There are about 10,000 structural engineers who could test and approve the structural integrity of an aircraft.⁶⁸ Due to the low numbers of approved aeronautical

⁶²Evidence, p. 474.

⁶³Evidence, p. 319.

⁶⁴Evidence, p. 1139.

⁶⁵Evidence, p. 403.

⁶⁶Evidence, p. 383.

⁶⁷Evidence, p. 131.

⁶⁸Evidence, p. 383.

engineers, the Committee sees merit in the proposal that at least some testing could be undertaken and approved by a mechanical or civil engineer. The Committee recommends that:

the Department of Aviation examine and document the areas where a civil or mechanical engineer could perform structural tests and approvals for ultralight aircraft.

208. Many witnesses criticised BCAR(S) for its lack of performance and handling characteristics. Messrs. Deryck and Arthur Graham of Composite Industries Pty Ltd, said in their submission that "ANO 95.25 calls for no demonstration of flight handling or performance characteristics. This permits inadequacies in basic flying qualities such as stall behaviour, stability, control feel and response, to be tolerated in this class of aircraft. Such deficiencies in fundamental handling characteristics are probably the major contributor to fatalities in ultralight aircraft. I propose that all new design ultralight aircraft should demonstrate satisfactory handling characteristics when tested to the amateur built aircraft flight test schedule."⁶⁹

209. It is accepted that ultralights have handling and performance characteristics which are substantially different to the GA range. "Ultralights tend to have a narrower performance envelope, far less power to weight and far more drag. One significant consequence of this is that their inertia is nothing like that of a GA aircraft; thus, when the throttle is closed or the engine stops, the loss of airspeed is far more rapid than is the case with a GA machine. Additionally, when you operate at speeds of around 20 knots, the effects of wind and/or terrain even a 5 knot gust or a single tree - can produce alarming control problems for the unwary."⁷⁰

210. The Committee concluded that in order to promote aircraft safety in ultralights, which have a narrow performance envelope and a rapid response rate and which even pilots well experienced in other aircraft find difficult to fly; specific provisions for acceptable control, stability and general handling characteristics in the legislation are essential.

⁶⁹Evidence, p. 767.

⁷⁰Department of Aviation, *Aviation Safety Digest* 124 — "Ultralights aren't easy", p. 6.

211. Composite Industries Pty Ltd argued that handling requirements should be set at minimum limits rather than maximum limits. It claimed the legislation did not address the safety issue of how an aircraft handles itself to get out of trouble and claimed that restricting power is restricting safety. If there are design limits and if the design is approved, there should be no speed limitation.⁷¹ Composite Industries favoured minimal requirements for climb, roll rate and manoeuvre speeds.⁷² The Department, in turn, has argued that it has set maximum speed requirements to minimise the possibility of flutter and to minimise energy attenuation in an impact accident.⁷³ In relation to ultralight aircraft, the Committee prefers the imposition of maximum limits so that testing to specified limits can occur. However, the Committee suggests that should the Department receive a justified aircraft data package which exceeds these limits, the package should not be rejected merely on the ground that it exceeds the limits.

212. Another criticism of ANO 95.25, consequently BCAR(S), is that there is no provision in the regulations for a glide ratio for ultralights. Glide path ratio is a most important consideration in case of engine failure, which, with a 2-stroke engine is a constant possibility. The importance of the glide ratio was discussed earlier in this chapter under the section 'height restriction'. The Committee heard that a minimum requirement for glide path ratio is essential for an ultralight aircraft which has peculiar flight characteristics.⁷⁴ The Committee agrees with this proposal.

213. The Committee also heard that there is nothing in the legislation that addresses the safety of the occupant(s), that is, no requirement for "safety protection of the pilot"⁷⁵ The Committee believes that safety protection of the pilot is essential, particularly in an aircraft which has limited airworthiness requirements. The fitting of seatbelts and parachutes, together with an appropriately strong basic structure, would constitute the necessary requirements to ensure occupant safety.

⁷¹Evidence, p. 754.

⁷²Evidence, p. 763.

⁷³Department of Aviation Minute, 14 October 1986, Mr N.B. Aubury to Mr M.D. Dunn.

⁷⁴Evidence, p. 765.

⁷⁵Evidence, p. 83.

214. Many witnesses suggested that in addition to BCAR(S), certification to other recognised standards such as the American standard FAR 23 or the British Standard BCAR(K), should be permitted. Whilst BCAR(S) is again specified as the standard for Australian manufactured aeroplanes under ANO 101.55, the Department has given verbal assurance to at least one engineer that other higher standards such as FAR 23, BCAR(K) and JAR22 would be allowable. From the evidence available to the Committee, the cost of certification to FAR 23 could be relatively low. One engineer quoted his fees as \$5,000 - \$6,000 for certification.⁷⁶ The evidence also suggested that these alternative standards contained specific handling requirements. Airworthiness of aircraft can be achieved using a number of internationally accepted design standards.

215. One of the main areas greatly concerning the Committee, was that despite the fact that ANO 95.25 is interim legislation, specifically for the approval of 2-seater ultralights for training, only one aircraft had been certified to the standard within 12 months.⁷⁷ As at January 1987, 37 2-seater aircraft have been approved to 95.25 standards.⁷⁸ The Committee believes that approval of 2-seater training aircraft should be a priority, especially in light of the peculiar handling characteristics of ultralights and since evidence indicates that pilot training in a suitable 2-seat aircraft may have prevented many accidents. The Department should have taken some measures to alleviate the liability problems which were hampering approval of training aircraft. The fact that the DoA was aware of the need for approved 2-seat training is exemplified by the introduction of specific legislation for the approval of 2-seat training aircraft.

216. Had the Department alleviated some of the liability problems by issuing an amendment to 95.25 or allowing approval to recognised overseas standards, many of the existing problems could have been overcome before they reached critical levels. Evidence indicates that there was no lack of interest by manufacturers in producing ultralights. At least 31 manufacturers were interested in manufacturing ultralights. Now the figure is estimated to

⁷⁶Evidence, p. 133.

⁷⁷Evidence, p. 683.

⁷⁸Evidence, p. 1057.

be closer to 6 or 7.⁷⁹ Manufacturers blamed the unyielding attitudes of the Department and the fact that the regulations were not in final form, which meant continually re-designing to proposed regulations.⁸⁰ Some manufacturers, however, had unrealistic expectations.

217. At the final hearing, the Department told the Committee that there had been “considerable progress in the administration of the AUF” and that 29 2-seaters were now approved. It is quite clear that the AUF could have done little to expedite approvals of 2-seaters, given the liability problems with BCAR(S) and the legislative uncertainty. The Department’s responsibility is safety in aviation; 2-seat ultralight trainers were essential to safety.

218. It is imperative that not only 2-seat training aircraft, but local Australian design, should be fostered by the DoA. Whilst the use of more complete design standards and amendment of the declaration required should overcome liability problems, the Department should ensure that professional liability problems are minimised. Approvals of 2-seater aircraft under 95.25 have been painfully slow. The Department should have provided much more assistance to facilitate approval and production of 2-seat aircraft.

219. Despite the fact that quite a deal of work has been put into proposed ANOs 100.55, 101.55 and 95.55, the Department indicated to the Committee “that perhaps 95.25 is not so bad by itself in terms of do we need to go to 101.55, 100.55 and 95.55”.⁸¹ The Committee believes the legislative uncertainty should come to an end as soon as possible. The Committee concluded that a significantly restructured ANO 95.25, incorporating normal compliance declarations, specific handling and performance requirements, engine and propeller standard, and a specified glide ratio, would be adequate to promote aviation safety. However, for reasons outlined in the following sections, the Committee recommends that the Department proceed with ANO 101.55.

⁷⁹Evidence, p. 309.

⁸⁰Evidence, p. 308.

⁸¹Evidence, p. 1110.

Proposed Aircraft Category (ANO 101.55,100.55, 95.55)

220. Evidence suggests that a lot of the deficiencies in 95.25 will be corrected in the process of changing to the ANO 55 series. The certification package will be more specific and will allow cost savings to be made in:

- (a) the use of non-type-certificated engines; and
- (b) the use of commercial quality materials and components.⁸²

221. Allowing the use of non-type-certificated engines will have some impact on safety, but it is possible to offset this by:

- (a) restricting flight to low-density population areas; and
- (b) limiting the stall speed of the aircraft to, say, 40 knots.⁸³

222. ANO 101.55, the design standard for the proposed regulations, is a full certification standard for commercially manufactured ultralight aeroplanes. A certification package including drawings and specifications, stress and/or structural test reports, weight and balance, flight handling and performance etc, will be required to be held in an available form by the AUF. Rather than being submitted to the Department, the Department will accept certification from "a person or persons favourably known to the Department."

223. ANO 101.55 is not a simplified airworthiness standard that is appropriate for people who have existing aircraft, or those who wish to design and build their own in the future. It is a standard for the commercial manufacturer not the amateur builder. Whereas the Department has been criticised in the past for relying on existing airworthiness standards, it has written a new standard for ANO 101.55. One engineer applauded the Department, saying it is an innovative standard in the world sense and the first constructive standard of this nature that he has seen.⁸⁴

⁸²Evidence, p. 474.

⁸³Evidence, p. 474.

⁸⁴Evidence, p. 431.

224. Very little evidence was received on ANO 100.55, the proposed set of ultralight aircraft maintenance standards. Apart from cost, there appeared to be no real dispute with the requirements. Since it is accepted that continuing airworthiness is dependent on the adequacy of the maintenance the aircraft receives, the Committee agrees that adequate maintenance requirements are essential.

225. The proposed ANO 95.55, the operational ANO, has not yet been released for public comment. Whilst the Committee is unable to address ANO 95.55, recommendations on operational limitations for ultralights have already been made earlier in this Chapter (paragraph 156).

226. The Committee concludes that a restructured ANO 95.25 which included handling and performance requirements would be very similar to the proposed 101.55. Despite the Department's comments that ANO 95.25 may be adequate without the need for the new 55 series, the Committee concludes that, for commercial production ANO 101.55 is a more competent standard. The Committee strongly believes that aircraft produced for sale should meet the highest safety standards. Whilst the Committee also believes that the development of ultralight legislation has been far too slow and uncertain, it believes that ANO 101.55 will assure a high safety standard and overcome many of the problems associated with 95.25. It is therefore recommended that:

the Department give priority to the finalisation and promulgation of 101.55 incorporating a provision for a glide path ratio of at least 15:1 and incorporating specific requirements for performance and handling standards and engine and propeller standards.

227. The Committee also recommends that:

in addition to the use of BCAR(S) as the design standard for ANO 101.55, the Department of Aviation prepare a list of recognised overseas equivalent or higher standards which would be accepted as alternatives under ANO 101.55.

228. The standards suggested by the Committee are FAR 23, BCAR(K) JAR 22 and possibly BCAR(E), providing requirements for powerplants are specified in an alternative standard such as JAR 22. Existing aircraft approved to these agreed standards, or as tested by a recognised testing authority, to be determined by the AUF, should be certified and able to fly in Australia under the operational limitations of this category.

229. Aircraft which have been approved to ANO 95.25, and have expended considerable time and effort in the process, should not be required to go through the certification process again for ANO 101.55. The Committee believes they should be given some dispensation and is pleased that the Department has already indicated that aircraft which have met 92.25 "will in all probability meet the final design requirement currently being proposed in the Aviation Regulatory Proposal on 101.55."⁸⁵

Kits and Imports

230. The Committee has already recommended that owner designed and built aircraft are covered by a new ANO to replace 95.10 (paragraph 179). All manufactured aircraft are expected to comply with ANO 101.55. Where aircraft are supplied in kit form for the purchaser to construct, the Committee believes that the manufacturer should be required to demonstrate that the completed aircraft complies with ANO 101.55. The Committee therefore recommends that:

**manufacturers of all ultralight aircraft sold in kit form
be required to demonstrate that the completed aircraft
will comply with ANO 101.55.**

231. The Committee was also disturbed by allegations that unsafe ultralight aircraft can be imported into Australia. The Commonwealth has clear control over imports and the Committee believes this power should be used to regulate against the import of unsafe ultralights including kits.

⁸⁵Evidence, p. 687.

232. The Committee therefore recommends that:

on advice from the Department of Aviation, import controls be exercised to ensure that imported ultralight aircraft, kits and components comply with the relevant Air Navigation Orders.

Consumer Protection

233. The Committee is concerned that the present legislative and administrative arrangements are inadequate in controlling the sale of unsafe aircraft. The *Trade Practices Act 1974* covers a number of aspects which could be applied to the sale of ultralights. There are some gaps in the coverage of the Trade Practices Act due to constitutional limitations, but these gaps are generally covered by state consumer protection legislation. The main features that might be applied to ultralights are :

- (a) the prohibition of misleading claims for a product;
- (b) a product must be fit for the purpose for which it is sold; and
- (c) a product safety standard can be declared for particular kinds of goods to ensure that they comply with this standard.

234. These matters are administered by state consumer affairs authorities which have no airworthiness expertise. In prosecution against breaches of (a) and (b) the Department of Aviation will need to provide much more technical assistance to the state authorities than it has to date. This applies particularly to complaints received and to the initiation of action when an authority becomes aware of airworthiness or safety deficiencies.

235. Although these avenues are available, the Committee believes that a more comprehensive approach would be for a product safety standard to be declared. There is no appropriate standard available for ultralight aircraft, such as are issued by the Standards Association of Australia, and there would appear little hope of such a standard in the foreseeable future. The appropriate standards in this instance are the relevant ANOs for the type of aircraft. Compliance with the vehicular requirements of the ANOs



Figure 6.3: Mr Colin Hollis, MP, preparing to take off in a Gemini Thruster, the first approved 2-seater ultralight trainer.

is required for flight and is an appropriate standard for governing the safety of such goods when sold.

236. The Committee therefore recommends that:

the Attorney-General, under the Trade Practices Act, declare the airworthiness provisions of the revised ANOs as product safety standards for the two categories of ultralight.

Overseas Airworthiness Standards

237. The Australian ultralight situation is unique it is the only country to provide for two standards of ultralight aeroplanes.⁸⁶

⁸⁶Evidence, p. 1048.

238. In the United States, the FAR 103 ultralight category is comparable to the Australian 95.10 category. Single-occupant powered ultralights weighing less than 115 kg, having a fuel capacity of 5 US gallons or less and not capable of more than 55 knots calibrated airspeed, are not required to meet any airworthiness certification nor required to be registered or marked and pilots are not required to hold any qualifications.⁸⁷ However, the US is fast moving towards stricter regulation of ultralights and the introduction of standards. During hearings before the Transportation, Aviation and Materials Sub-committee of the United States House of Representatives Science and Technology Committee, evidence indicated the need for the introduction of airworthiness standards, pilot licensing and aircraft registration.⁸⁸ Although an airworthiness certificate is not currently required to fly an ultralight, the US Federal Aviation Administration (FAA) has retained the right to regulate vehicles further.⁸⁹

239. However, in the US situation at least, other categories of aircraft are available for the construction and manufacture ultralights. Considerable use is made in the US of the Experimental Category⁹⁰ which, providing an aircraft is at least 51% owner-built, has no weight or airworthiness requirements. The aircraft can be registered with the local FAA office if it appears adequate in construction. After a history of safe operation, the FAA sets maximum speeds based on the owners report of performance characteristics. The Committee understands that the majority of ultralights are built to this standard in the US.

240. The comparable Australian category, the "developmental" category is quite different in that it is restricted to the test-flying of prototypes under a number of restrictions and substantial reporting is required.

⁸⁷US. Department of Transportation, Federal Aviation Administration, Federal Aviation Regulations (FAR), Part 103.

⁸⁸"Ultralight Study Likely to Generate Stricter Regulation", *Aviation Week and Space Technology* 122, June 25, 1984, p. 233.

⁸⁹Morris, D.M., "Licensing Pilots of Ultralight Vehicles", *Pacific Law Journal*, 15 July 1984, p. 1024.

⁹⁰US Department of Transportation, Federal Aviation Administration, Advisory Circular AC 20-27C, "Certification and Operation of Amateur-built Aircraft", January 1983.

241. Ultralight aviation is governed rather differently in New Zealand. Ultralight aircraft are registered in the Restricted Ultralight Category and must meet airworthiness standards set by the Ministry of Transport. The rules permit ultralights to use airports, but pilots must be licensed, although a student licence is sufficient. The NZ attitude did solve the insurance problems that faced Australian flyers. Like all registered aircraft, New Zealand ultralights are required to be maintained to an airworthy standard.⁹¹

242. Ultralights in Canada currently require no certification standards.⁹² Like the US, the UK had signalled its intention to stiffen attitudes towards the application of standards for ultralight aircraft.⁹³

243. Many countries, including the United States, United Kingdom, South Africa and some from the Middle East, and South America are studying Australian ultralight legislation and awaiting the findings of this Committee.⁹⁴

Alternative Categories under which Ultralight Aircraft can Currently be Built

244. Under existing arrangements, ultralights in Australia can be built under a number of categories, one of which has had no airworthiness requirements at all, before reaching the normal light aircraft category (for example Cessna and Piper) of ANO 101.22. It is currently possible to build ultralights under ANO 95.10, ANO 95.25, the amateur-built category, (ANO 101.28) and the developmental category, (ANO 101.31). According to aeronautical engineer Mr Llewellyn, the "correct place for limited airworthiness standards is amateur-construction only."⁹⁵

245. Ideally, it is desirable to retain a significant similarity between airworthiness requirements for all categories of aircraft, from the fully certificated

⁹¹ *Aircraft*, August 1984 p. 58.

⁹² Evidence, p. 404.

⁹³ Evidence, p. 687.

⁹⁴ Evidence, p. 768.

⁹⁵ Evidence, p. 517.

general aviation aircraft to the smallest ultralight. All aircraft operate according to the same natural laws and have similar flying characteristics. The similarity between aircraft should be emphasised at all times.

246. Witnesses were generally against the proliferation of aircraft categories. There is already a multi-tiered structure of airworthiness requirements ranging from hang-gliders, ultralights, gliders, balloons, amateur-built etc, to the airliners. The Department claims the situation has developed as the Department had tried to cater for individual or group requirements for freedom.⁹⁶ The unique situation of 2 Australian ultralight categories has already been mentioned.

247. The differentiation of aircraft categories on a weight basis was criticised by many witnesses. However, the Committee agrees that provided the weight is set at a reasonable and effective value, it represents an absolute and easily measured criterion.⁹⁷

Amateur-built category (ANO 101.28)

248. Whilst the amateur-built category provides an opportunity for an amateur to design and build an aircraft, there are strict controls throughout the construction process. Amateur-built aircraft are built to approved design standards, either BCAR(K) or FAR 23, and are required to undergo two inspections by a government inspector during construction. Upon completion, the aircraft must have a documented safe history of operation of several examples of the type; each of which have completed near 100 flight hours. Once completed, an accepted amateur-built aircraft is fully certificated and registered, and with some exceptions, can be flown under the same conditions as other registered light aircraft.

249. One aeronautical engineer told the Committee that the statistical world-wide safety performance for amateur-built aircraft is as good as that

⁹⁶Evidence, p. 688.

⁹⁷Exhibit 12, p. 24.

for commercially built light aircraft.⁹⁸ This has been confirmed by the Aircraft Owners and Pilots Association.⁹⁹

250. Witnesses claimed there was a double standard in the amateur-built category between imported and Australian aircraft. It was claimed that under 101.28 an overseas design without any design standards can be brought into Australia on a documented safe history of operation.¹⁰⁰ Statutory declarations must be produced from at least 6 owners of at least 100 hours in each aircraft. The Department may under the ANO require an acceptable set of drawings and for deficiencies to be corrected if the aircraft is considered deficient. In contrast, it was claimed that Australian-built aircraft must go through the full engineering and testing procedures for a production aircraft, which will enable certification to a standard of another country (typically FAR 23 or BCAR(K)) and then any other requirements of the DoA in Australia. Alternatively, the amateur Australian manufacturer can build his aircraft overseas, show history of safe operation for 6 aircraft, then return to Australia once they are certified, before he can build them here.¹⁰¹ The amateur-built process may cost up to \$60,000.¹⁰²

251. The Committee concludes that although the present amateur-built category provides the opportunity for an amateur to build an aircraft, the *Australian requirements are more complex than those existing for imported aircraft from the USA.* Evidence indicates that the safety records in both countries, however, are very similar.

252. Based on the American amateur-built safety record, the inequitable situation between local and overseas design and the time required to complete the acceptance of type for the amateur-built category; the Committee recommends that:

- (a) the Department of Aviation eliminate the current inequities in the acceptance of local design

⁹⁸Evidence, p. 257.

⁹⁹Evidence, p. 260.

¹⁰⁰Evidence, p. 911.

¹⁰¹Evidence, p. 254.

¹⁰²Evidence, p. 955.

under the amateur-built category, ANO 101.28;
and

- (b) for ultralights built under the amateur-built category, delegation should be given to approved organisations or individuals, such as the AUF and approved engineers, to administer the process in a similar way to that currently operating in the Gliding Federation of Australia.

253. Successful self-regulation of this category will require the establishment of a network of experienced volunteers, with the time, dedication and ability to supervise the process. The Department should assist with the establishment of a regulatory organisation.

Developmental category

254. The intention of the developmental category under ANO 101.31 was claimed by the ultralight fraternity to be very similar to the 'experimental' category in the United States, where an aircraft built to an approved design, using a variety of construction techniques, can be operated with little limitation by a licensed pilot. ANO 101.31 provides for the operation of an Australian designed or modified aircraft before full certification paperwork is complete.¹⁰³ In essence, the developmental category is a "transient" category. The ANO enables a prototype to be built and tested, but to remain in use it requires recertification in another category.¹⁰⁴

255. Aircraft built under the American experimental category, providing they are 51% built by the owner for non-commercial purposes, have no weight or airworthiness requirements and if the aircraft appears to the US Federal Aviation Administration (FAA) to be adequate in construction and materials, it can fly in remote areas. Once it has accumulated 70 flying hours, the FAA sets maximum speeds on the owners report of performance characteristics. The aircraft is then free to fly anywhere. However, it must be permanently placarded as 'experimental' and not used for training purposes.

¹⁰³Evidence, p. 959.

¹⁰⁴ANO 101.31, p. 1.

256. The developmental category in Australia is limited to the test-flying of prototypes with substantial reporting requirements basically for aircraft which are for purposes of research and development.¹⁰⁵ The Committee was told that it was introduced to foster the Australian aircraft industry.¹⁰⁶ However, only one lightweight aircraft has successfully been certified under this category in Australia, the Corby Starlet. In the USA, 23,000 aircraft have been presented as 'Experimental' in only 2 decades.¹⁰⁷ Dissimilarities between the two categories were pointed out to the Committee on several occasions.

257. One witness, a Licenced Aircraft Maintenance Engineer (LAME), told the Committee that he has attempted to design aircraft to export overseas for 10 years, and has watched Australia's technical lead being eroded away.¹⁰⁸ He was very critical of the developmental category, saying that under the developmental category, the aircraft's parameters are so restricted, that the final product is an aircraft which flies slowly, has little power, little fuel capacity, costs \$100,000 and which no-one would want to buy.¹⁰⁹

258. The same witness claimed that the Department denied the existence of the developmental category to "avoid responsibility for its officers and because its officers do not have the experience in this area".¹¹⁰ Whilst the Committee is unable to verify the truth of these allegations from the evidence, it is clear that ANO 101.31 has not fostered the Australian aircraft industry, whether or not that was its original intention.

259. The Committee was unable to determine the safety record of this category, but understands the US 'experimental' category does not have an enviable safety record.

260. Although it appears possible to build a one-off ultralight under the developmental category, the provisions are obviously not designed for the

¹⁰⁵ ANO 101.31.

¹⁰⁶ Evidence, p. 922.

¹⁰⁷ *Sky Sports* p. 10.

¹⁰⁸ Evidence, p. 923.

¹⁰⁹ Evidence, p. 923.

¹¹⁰ Evidence, p. 936.

ultralight situation and are far more stringent than those applying to the US experimental category. Due to the dubious safety record of the US experimental category, the Committee does not see the introduction of such a category in Australia as a possibility. Modification of the developmental category is obviously necessary if it is intended to be available to the ultralight builder/manufacturer. Based on the limited evidence available, the Committee is unable to make specific recommendations.

Maintenance

261. An aircraft's continuing airworthiness depends on the adequacy of maintenance it receives. However, little factual evidence was received on the extent or adequacy of maintenance for ultralight aircraft. Ultralights are built for fun and recreation, particularly those in the 95.10 category, which has no airworthiness requirements. Enthusiasts believe that rules spoil the fun and would rather abandon the project than be bound by rules and specifications. This naive approach has contributed to many of the accidents.

262. "All AUF members do their own maintenance" according to the AUF Operations Manager, Mr Bill Dinsmore.¹¹¹ The capability of ultralight owners to do their own maintenance was not able to be ascertained by the Committee. The DoA Queensland Region told the Committee that one of the factors contributing to ultralight accidents was poor maintenance.¹¹² Another was ignorance of basic aeronautical procedures and practices. The Queensland Region's opinion was that ultralight builders "will take the short cut every time and that is the danger with aviation".¹¹³

263. Many maintenance/construction short cuts resulted in fatalities which were preventable. Examples such as fitting a propeller which was of an incorrect pitch; and of blocked carburettor jets caused by the remains of an earwig which had entered the system via unfiltered vent ports, were given by the Queensland region.¹¹⁴ The use of materials which were not of adequate strength was also common.

¹¹¹ Australian Ultralight Federation, Supplementary Information, 10 November 1986.

¹¹² Evidence, pp. 1006-7.

¹¹³ Evidence, p. 1038.

¹¹⁴ Evidence, pp. 1010-11.

264. Many of these accidents are preventable through education in design, construction and maintenance. The forum for such education should be through clubs, which provide an information base and peer pressure. However, the AUF club situation does not yet provide many technical services to its members, and does not have a strong club structure. The Gliding Federation of Australia has a network of regional technical officers for airworthiness and operations. The Committee believes the AUF should give priority to establishing a similar system of regional technical officers. Regional teams of experienced people must be readily available to provide assistance and technical advice.

265. The Committee believes that many maintenance problems will be overcome when the proposed set of maintenance standards (ANO 100.55) is introduced. A combination of specific maintenance standards, a network of regional officers and education, will ensure the reduction of maintenance and construction related accidents.

Use of Ultralights for Agricultural Purposes

266. Witnesses agreed that the use of ultralights for agricultural purposes, such as fence and bore inspection, mustering and stock spotting, etc was widespread, despite the fact that the regulations limit ultralights to recreational use. A pastoralist, representing the Pastoralists and Graziers Association of Australia Inc., estimated that 90% of all stations would be interested in obtaining an ultralight, because aerial work is an essential part of their operation.¹¹⁵ Of his 6 neighbours only one does not own an ultralight.¹¹⁶ It has been estimated that the use of an ultralight can save a pastoralist \$2-3 per head per year on a sheep property. Savings to Australia, with its many sheep properties, was estimated to run into tens of millions of dollars.¹¹⁷

267. The Committee was told that in many cases agricultural activities were less demanding on the aircraft and the pilot than use for recreational or

¹¹⁵Evidence, p. 791.

¹¹⁶Evidence, p. 793.

¹¹⁷Evidence, p. 761.

“thrill seeking” purposes. Agricultural operations were straight line operations whereas the sports enthusiast would be weaving in and out of trees, in amongst gorges and doing all sorts of stunt flying.¹¹⁸ However, the Committee fails to see how cattle mustering or stock inspection can be a straight line operation. Whilst agricultural activities may be less demanding, describing them as straight line operations is an over-simplification.

268. One of the main reasons why ultralights are being used for agricultural purposes, such as stock spotting, fence and bore inspections, is that the cost of an ultralight is much less than the cost of light aircraft.¹¹⁹ Some manufacturers are seeking expanded markets by selling ultralights on the basis of their potential agricultural usage.¹²⁰ Ultralights are being advertised, shown on ABC’s *Countrywide* and other TV programs, for their agricultural usefulness and former Minister Beazley apparently tried to foster their acceptance in this area.¹²¹

269. The Queensland Flyers Association told the Committee that there are an “enormous number of cattle properties around Australia that are using ultralight aircraft as a part of their normal operational day. We have knowledge of one particular property which has seven such aircraft . . . operating six and eight hours a day for seven days a week . . . for the last three years.”¹²² The DoA Queensland Region estimated that as many as 30 aircraft were being used for agricultural operations in Queensland alone.¹²³

270. The Department has said that it sees no real problem with ultralights being used for fence or bore inspection, or stock spotting providing it is on an owner’s own property. It does not sanction employees being coerced into operating ultralights as part of their job, nor the use of ultralights for aerial chemical spraying.¹²⁴ The Department stressed that airworthiness and operational standards which have been established for ultralights are

¹¹⁸Evidence, p. 792.

¹¹⁹Evidence, p. 761.

¹²⁰Evidence, p. 1052.

¹²¹Evidence, p. 761.

¹²²Evidence, p. 114.

¹²³Evidence, p. 1018.

¹²⁴Evidence, pp. 1052-53.

based on recreation usage. It is apparent however, that this restriction is being blatantly disregarded.

271. Internationally recognised agricultural standards have already been established for the use of aircraft for agricultural activities. Commercial agricultural aircraft are required to manage higher stress loads, to have a higher level of crashworthiness and the safe storage and removal of chemicals.¹²⁵ Agricultural pilots receive very specialised training and are regularly checked to ensure they maintain their proficiency.¹²⁶ Ultralight aircraft are not designed for such application and no ultralight has yet demonstrated compliance to international agricultural standards. No specialised training is offered to ultralight pilots engaging in agricultural activities.

272. The overseas situation is in accord with the Australian situation. The United States, United Kingdom, New Zealand and Canada do not permit ultralights to be used for aerial spraying.¹²⁷

273. There is currently a Department of Aviation review of ANR 191, which classifies aircraft operations into private aerial work, charter airline etc.¹²⁸ The Committee understands that a regulatory proposal has already gone to the industry and hopes specific national guidelines will result from this review.

274. The Committee does not consider aircraft being used by the owner of a property for routine inspection purposes such as fence/bore inspection or stock spotting as constituting a hazard to safety.

275. However, the Committee is aware that ultralight aircraft are already being used, and more contemplated, for use in aerial crop-spraying. Whilst the Committee sees merit in and acknowledges the savings that can be made by farmers and graziers using ultralights aircraft for chemical spraying, the Committee is not convinced that farmers are aware of the risks and safety

¹²⁵Evidence, p. 1052.

¹²⁶Evidence, p. 1052.

¹²⁷Evidence, p. 1052.

¹²⁸Evidence, p. 1060.

implications of chemical sprays or their aerial application. In view of the potential human and environmental risks, the Committee concludes that ultralights should not be used for this purpose.

276. Enforcement and supervision of ultralights for agricultural purposes must be made a priority by the AUF and the Department. Because of the widespread and remote nature of this activity, the Committee is concerned that the use of ultralight for aerial spraying may not be preventable. The Committee suggests that an education campaign stressing the human and environmental risks together with increased surveillance be the first steps.