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THE PARLIAMENT OF THE COMMONWEALTH OF AUSTRALIA

PARLIAMENTARY STANDING COMMITTEE ON PUBLIC WORKS

R E P O R T

relating to the proposed

DEVELOPMENT OF AIRFIELD PAVEMENTS AND EXTENSIONS  
TO TERMINAL BUILDING

at

ADELAIDE AIRPORT

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## PARLIAMENTARY STANDING COMMITTEE ON PUBLIC WORKS

### DEVELOPMENT OF AIRFIELD PAVEMENTS AND EXTENSIONS TO TERMINAL BUILDING AT ADELAIDE AIRPORT

#### R E P O R T

By resolution on 20 September 1967, the House of Representatives referred to the Parliamentary Standing Committee on Public Works for investigation and report, the proposal to further develop airfield pavements and to extend the terminal building at Adelaide Airport.

The Committee have the honour to report as follows:

#### THE COMMITTEE'S INVESTIGATION

1. The Committee received submissions and drawings from the Departments of Civil Aviation and Works and studied a model of the proposed extensions to the passenger terminal. The Minister for Civil Aviation made available to the Committee, on a confidential basis, the report of the departmental Committee of Enquiry into Airline Timetables.
2. Evidence was taken at hearings in Adelaide from departmental witnesses and from representatives of Trans-Australia Airlines and Ansett-A.N.A. We inspected the existing airfield pavements and passenger terminal facilities at the Airport, including the areas in which the proposed work is to take place.

#### THE PROPOSAL

3. The proposal submitted to the Committee is broadly of two parts. The first comprises -
  - (a) extending the 44<sup>0</sup> runway at the south-western end by 1,150 ft to 8,000 ft at a width of 150 ft with 25 ft shoulders;

2.

- (b) extending the taxiway serving the 44° runway to the new end of the runway; and
- (c) constructing 200 ft long blast areas at either end of the 44° runway.

4. The second part includes the following works in the terminal area -

- (a) extending and altering the passenger terminal building;
- (b) constructing an additional 30,000 sq yds of terminal apron; and
- (c) floodlighting the apron.

The estimated cost of all work is \$1.78 million.

ADELAIDE AIRPORT

5. Site and Pavements The airport is located about two miles from the sea and four miles from the centre of Adelaide. The site which was originally flat and swampy with some sandhills and has a generally organic clay subsoil was developed by levelling the sandhills and filling the low areas with sand.

6. Adelaide Airport on this site was first opened to airline traffic in 1955. At that time the north-east/south-west or 44° runway was 6,850 ft in length and the north-west/south-east or 118° runway was 5,420 ft long. The runways were served by a taxiway complex leading to the apron and terminal building area.

7. As constructed, the 44° runway was 200 ft wide, the 118° runway 150 ft wide and the taxiways 75 ft wide. The pavements were generally built of 10 inches of fine crushed rock with a bitumen treated surface, but on the 44° runway, concrete ends, 500 ft long and 12 inches thick were laid down. At least 3 ft of sand filling was used beneath the pavements. The original pavements were designed for regular use by aircraft up to about 120,000 lbs all-up-weight, i.e. about the size of the Electra.

8. The terminal apron constructed in 1956 was extended in 1960 and again in 1964 and now covers about 40,000 sq yds. Taxiway improvements were made in 1956 and in 1960. Apart from some small concrete aircraft parking areas constructed on the apron, these pavements were all similar to the original construction.

9. A programme of progressively resurfacing the aircraft pavements with bituminous concrete commenced in 1958, and since then about one inch has been applied to all pavements except the 118<sup>0</sup> runway and two short sections of taxiway. These will be treated within the next few months.

10. The pavements in their present condition are strong enough for the regular operation of aircraft up to the weight of the Boeing 727 (all-up-weight 160,000 lbs and tyre pressure of 145 lbs per square inch) and occasional use by larger aircraft, such as the Boeing 707-338 (336,000 lbs and 165 lbs per sq in) and Britannia (185,000 lbs and 170 lbs per sq in).

11. Terminal Facilities The passenger handling facilities at Adelaide are in a combined terminal, operations and administration building which was opened in 1957. The Committee were told that this building was designed to meet airline passenger traffic needs for about a ten-year period and to accommodate the Department of Civil Aviation's air traffic control and airport administration activities. The ground floor of the terminal provides 16,000 sq ft of accommodation including space for the airlines' facilities, passenger handling, and for the catering and other minor concessions.

12. At each side of the terminal building, T.A.A. and Ansett-A.N.A. have built, at their own expense, services buildings to accommodate cabin catering and other aircraft servicing and freight handling facilities.

AVIATION ACTIVITY AT ADELAIDE

13. Both Ansett-A.N.A. and T.A.A. operate, through Adelaide, services east to Melbourne and Sydney, west to Perth and north to Alice Springs and Darwin. In addition, Airlines of South Australia, a subsidiary of Ansett-A.N.A., has services to South Australian centres including Kingscote, Port Lincoln, Ceduna, Cleve, Whyalla and Woomera.

14. There are occasions when overseas charter flights call at Adelaide or scheduled overseas flights are diverted there due to weather conditions at other airports.

15. Although general aviation activity in the Adelaide area is largely carried out from Parafield, there are some charter operations from Adelaide Airport and commuter services have recently been started to such places as Coober Pedy, Renmark and Port Augusta.

16. The steady growth of air traffic at Adelaide in the last five years is shown in the following table of passengers and aircraft movements.

| <u>Year</u> | <u>Passengers</u> | <u>Aircraft Movements</u> |
|-------------|-------------------|---------------------------|
| 1962        | 437,952           | 16,090                    |
| 1963        | 488,739           | 17,002                    |
| 1964        | 569,923           | 19,224                    |
| 1965        | 681,726           | 18,300                    |
| 1966        | 751,983           | 19,619                    |

17. The Committee were informed that based on these figures, it has been estimated that by 1976  $2\frac{1}{2}$  million passengers will pass through Adelaide Airport each year and that by 1981 this figure will have grown to  $3\frac{1}{2}$  million.

NEED FOR ADDITIONAL PAVEMENTS

18. At the present time, Boeing 727s can take off from the main runway at a full all-up-weight, in no-wind conditions, up to a temperature of 68°F.

The corresponding temperature for a Douglas DC9 is 60°F. These aircraft can thus operate under full or near all-up-weight conditions during the cooler months, but with weight restrictions in the warmer months.

19. When the proposed extension of the runway to 8,000 ft is completed, Boeing 727s will be able to operate at full all-up-weight with no wind at 100°F and DC9s at 95°F. This is satisfactory to the airlines which are prepared to accept the minor disabilities imposed on the relatively few occasions when temperatures exceed these figures and there is no wind.

20. The restrictions imposed by the present runway length are more severe on DC9 operations than on those of the Boeing 727. The Committee were told that the proposed extension aims principally to permit the more efficient and flexible operation of DC9s from Adelaide, not only when restrictions apply because of local conditions, but when operational limitations are set by the weather at destinations such as Alice Springs, Sydney and Perth. In the latter connection, we noted that it is not the intention of the airlines to operate DC9s regularly to Perth, but to use them only in special circumstances such as on charter, at holiday periods, or when substituting for other aircraft.

21. To properly serve the extended runway and connect the end of it to the taxiway system, it is proposed to extend the taxiway parallel to the 44° runway. The extension of the taxiway, which will be 75 ft wide with 10 ft shoulders and of the same general strength as the runway extension, will necessitate a minor diversion of the perimeter road used by vehicles for the maintenance and operation of the airfield and facilities.

22. A 200 ft long blast area, which will also serve as a stopway at the south-west end of the extended runway and a blast area, also 200 ft long, but of lesser strength, at the north-east end of the same runway, are required to obtain maximum utilisation from the runway as extended.

23. The Committee agree that there is a need for the pavement works in this reference.

THE PROPOSED AIRCRAFT PAVEMENTS

24. The new pavements will be designed for the regular daily operation of aircraft up to the size of the Boeing 727. However, they will be satisfactory for spasmodic use by aircraft as large as the Boeing 707-338.

25. The runway and taxiway extensions will comprise 2 inches of bituminous concrete on 10 inches of fine crushed rock on a base of not less than 3 feet of sand. About 200,000 cubic yards of filling will be required for the associated earthworks. The shoulders of the runway extension will be 6 inches of bitumen sealed fine crushed rock.

26. The blast area at the south-western end of the 44<sup>0</sup> runway, will be of the same construction as the runway, so that it can form part of a future runway lengthening in this direction. The blast area at the north-east end will be of similar construction to the shoulder pavements with a one inch bituminous concrete surface.

27. Minor works associated with the runway pavements will comprise:

- (a) overlaying the concrete at the south-west end of the 44<sup>0</sup> runway with bituminous concrete;
- (b) diverting the perimeter road;
- (c) filling the landing strip for the runway extension and grassing the flanks of the new pavements; and
- (d) minor drainage and provision of ducts for electrical and control cables.

The last item will include altering the spacing of the runway lights on the 44<sup>0</sup> runway from 200 ft to 150 ft in accordance with current design requirements.



28. The Committee recommend the construction of the aircraft pavements in this reference.

#### NEED FOR ADDITIONAL TERMINAL FACILITIES

29. An analysis of the rapid growth in the number of passengers handled in the terminal at Adelaide Airport or of the annual traffic statistics is not complete without an examination of the nature of the traffic. Adelaide is a key point in the network of Australian domestic air services connecting not only the eastern capitals with Western Australia, but also with Alice Springs and Darwin. Because of the high proportion of flights arriving at Adelaide which connect with services to other destinations, this traffic converges on Adelaide at various times during the day creating isolated but pronounced traffic peaks.

30. The requirement for terminal accommodation at Adelaide is determined by these peaks. The factors influencing the extent of the need for space in the terminal are the number of aircraft loaded and unloaded during the period of the peak, the size of passenger loads in individual aircraft and the friend to passenger ratio expected at the airport. We noted that the traffic peaks at Adelaide are caused by the largest domestic aircraft operating in Australia - Boeing 727s and DC9s - and on present schedules this occurs three times a day. It is also important that Adelaide Airport attracts a higher friend to passenger ratio than experienced in most other airports in Australia. It seems that this is due to the close proximity of the city and to the relatively longer flights to Darwin and Perth from Adelaide.

31. Because of these factors and the general growth in traffic, the passenger terminal facilities at Adelaide Airport have become badly overcrowded and there is a need now for additional accommodation for passengers, the airline operators and the public.

32. Because of the exaggerated traffic peaks that occur, terminal facilities have little or no use for lengthy periods during the day. We therefore examined the possibility of staggering flights through Adelaide to obtain greater utility from the terminal facilities provided. Evidence was taken from departmental and airlines representatives who stated, inter alia, that a broadening of the traffic peaks would, at this stage, result in inconvenience to the travelling public and a disruption of the accepted patterns of airline services. Whether this is correct or not, it is still obvious that there is an urgent need for additional terminal accommodation.

#### EXTENT OF WORK IN TERMINAL AREA

33. The Committee were told that in determining the size of the terminal extensions to meet the needs of the 7 to 10 year period after the completion of the new facilities, a traffic concentration of eight large aircraft of the Boeing 727 or DC9 type and eight smaller aircraft, similar to the Fokker F27, has been assumed. Having regard to the recent rate of traffic growth and future predictions, this assumption seems reasonable.

34. To accommodate these aircraft and to compensate for the loss of terminal apron caused by the extension of the terminal building, it is proposed to provide about 30,000 sq yds of additional apron pavement for aircraft parking and movement.

35. In determining the size of the terminal building, calculations have been based on an average load factor of 70% for aircraft traffic at Adelaide and on a friend to passenger ratio of 1.5 to 1. The number of persons to be accommodated in the terminal building at one time is thus estimated at 2,000, including about 750 passengers.

36. The space proposed for these people is 28,000 sq ft in the public areas on the ground floor and 2,000 sq ft in the observation lounge on the first floor. Of the space at ground floor level, 10,700 sq ft is proposed

for passenger assembly and for checking points for airline companies, the remainder being available for lounges in the general movement and assembly areas.

37. Proposed Additional Accommodation The additional accommodation in the terminal building is to be obtained in four ways, viz,

- (a) minor alterations on the eastern side of the terminal to provide additional accommodation and covered open space;
- (b) extending the terminal to the west by 44 ft;
- (c) building to the west (and projecting onto the existing terminal apron) a concourse measuring 300 ft by 96 ft; and
- (d) providing an observation lounge at first floor level overlooking the apron and concourse.

38. Alterations in (a) are designed principally to provide larger areas near the exit for passengers reclaiming baggage and to enable operators to manoeuvre their service vehicles. Some space will also be gained inside the building.

39. Re-modelling the accommodation in the terminal and extension (b) will provide larger airline traffic offices. The areas currently occupied by the airline traffic offices will be converted to additional concourse area for passengers and the public.

40. Outward bound passengers will enter the terminal at either end as at present and proceed to airline traffic counters for disposal of baggage. They will then move to the centre of the building and through the new concourse (c) to the appropriate assembly points for their flight. Friends will be able to accompany them to the checking point and then, if they wish, wait in one of the two public lounges located in the centre on each side of the concourse or near the passenger assembly areas. A public

viewing area is also planned in front of each lounge.

41. Inward bound passengers will enter the building through the assembly areas at points convenient to the parked aircraft and thence move through the concourse to the baggage reclaim area or the bus shelters.

42. Concessions In the re-arrangement of the ground floor accommodation, the area of the dining and light refreshments concession is to be increased from 700 sq ft to 1,700 sq ft and space for two other business concessions is planned.

43. It is also proposed to provide at the first floor level above the concourse an observation lounge. This will be leased as a concession for the provision of refreshments ( (d) above).

44. Toilets In addition to the facilities already provided, public toilets are planned in the concourse and on the first floor adjacent to the observation lounge. Special toilet compartments are to be provided for physically handicapped users of the terminal.

45. Departmental Accommodation Space is to be provided where migrants arriving in Adelaide on domestic flights can be received by the Department of Immigration and where the Department of Customs and Excise can clear passengers and goods from special flights. The South Australian Department of Agriculture will also have an office and storage for fruit quarantine purposes.

46. Airline Operators Space in the rebuilt and extended terminal for operators for traffic offices, baggage handling and vehicles is designed to meet the requirements of the airlines and is considered reasonable for their needs. The accommodation is being provided by the Commonwealth but the expense of equipment, furniture, furnishings and fitting out is the responsibility of the operators.

47. Future Expansion Although the terminal as extended is planned to handle traffic expected at peak periods during the 7 to 10 year period after completion, the building can be further expanded if necessary by extension of the concourse and assembly areas laterally and by some expansion at first floor level.

#### THE BUILDING PROPOSALS

48. Design Approach An open planning concept has been adopted for the terminal areas to be used by passengers. This will provide open space and sub-divisional flexibility through the use of simple area dividers such as furniture or rope barriers. An economical light steel column and beam construction is proposed to facilitate future additions or alterations if required. This approach to the design, besides satisfying functional criteria, will also meet the need to integrate the new construction with the existing building. The unit type of air treatment system proposed will allow the additions to be made without affecting services in existing areas.

49. Externally, the perimeter galleries will provide a simple arched treatment of base, columns and roof line. This feature is also to be repeated in the two-storey section housing the observation lounge and the apron wall of the extension on the western side of the existing building. The additions on the road side of the building will match the existing work.

50. Internally, the new passenger areas will have exposed columns, beams, lighting and air treatment units carefully detailed to provide a simple interior supplemented by furnishings and planting.

51. Sun Protection The concourse extension will have north and south aspects on the major elevations. The perimeter galleries on each side of the concourse will provide sun protection to these elevations. To protect the windows at the western end of the concourse, anti-actinic glass screens

are to be located at the outer edge of the gallery. Windows to the western elevations of the observation lounge and the airlines areas will be sheltered by external solar mesh screens.

52. Other Design Features For convenience and as protection against the weather, automatic doors are planned for the entrances to the terminal from the public road. Doors to the concourse area will be protected from wind and jet blast by glazed screens opposite these openings at the outer edge of the perimeter galleries.

53. The transmission of aircraft noise into the building will be minimised by the use of heavy glass in flexible mountings in windows facing the apron and by sound insulating material in the roof.

54. The needs of the physically handicapped have been considered in the design of the building including the provision of appropriate toilets in the concourse area and the use of ramps at all changes in level on the ground floor.

55. Materials and Finishes In selecting materials, consideration has been given to the requirements of economical maintenance consistent with the function of the building and an attractive appearance, particularly in public areas.

56. Externally, the exposed structural columns, beams, pressed metal facias and soffits, timber window and door frames will be painted. External galleries and passenger viewing areas will be paved with non-slip concrete and the exposed edge of the base and ramps will be cement rendered. New brickwork will match that in the existing structure. Pre-coloured infill panels will be used in sections of the external walls of the observation lounge and in the western extension of the existing terminal. A galvanised steel roof deck will be provided to all new areas.

57. Internally, finishes to the alterations in the original building will match the existing work. Steel columns and beams, ceilings, fibrous plaster and concrete block walls will be painted. The floor in public areas will be covered with vinyl tiles and in the toilets ceramic tiles will be used.

58. Structure The beams and columns of the steel frame of the single storey extension will be universal type sections. The beams will span 24 ft, 32 ft and 36 ft as required and support the air treatment units on the roof. Lateral stability under wind load will be provided by portal bracing in the transverse direction and by diagonal roof and wall bracing longitudinally. The two-storey section will be of steel frame construction with reinforced concrete floors.

59. Engineering Services The evaporative cooling and heating plant and the control tower air conditioning plant will be retained to serve their present areas. The new accommodation will be served by roof mounted evaporative cooling units fitted with hot water coils for heating and exhaust fans. Hot water baseboard convectors will be installed below large window areas for supplementary heating.

60. Additional hot water boiler plant will be provided in an extension of the boiler house.

61. Electrical Services The high voltage electricity supply from the Electricity Trust of South Australia will be extended to a substation in the new building. Power will be reticulated to new areas by low voltage mains integrated with the existing system. Power and light for essential electrical services will be extended from the existing emergency system.

62. General purpose power outlets will be provided as required and artificial lighting will generally be from fluorescent fittings.

63. The fire detection system in the existing building will be retained. New areas will be protected by a similar system connected to the switchboard in the Airport Fire Station.

64. Towers and floodlights are to be provided for illumination of the terminal and apron areas.

65. Hydraulic Services The existing water and sewerage services will be extended into the new toilet and concession areas.

66. Apron Extensions The apron extensions will comprise 2 inches of bituminous concrete on 10 inches of fine crushed rock on a base of not less than 3 feet of sand.

67. The Committee recommend the construction of the proposed works in the terminal area.

#### PROGRAMME

68. The Committee were told that after the approvals to proceed are given for the runway pavements and terminal extensions, the preparation of working drawings and tender documents, invitation of tenders and letting a contract are expected to take about six months.

69. The pavement works are expected to take 12 months to complete and aircraft operations will not be affected while this work is being done.

70. The building work is scheduled for completion 18 months after a contract is signed. We noted that careful consideration has been given to staging this phase of the work to minimise inconvenience to users of the building while the work is in progress and that progressive occupation of completed sections of the building will be possible during construction.

71. The completion of drawings and documents for the additional apron area will take only two months and construction, which is to be mainly by Department of Works day labour is expected to be completed in four months.



This work will thus be finished about the time the terminal extensions are due to start. Airline schedules will not be interrupted as the apron work proceeds but some re-arrangement of standing positions will be necessary.

#### ESTIMATE OF COST

72. The estimated cost of the work when referred to the Committee was \$1.78 million. The components of this figure are -

##### Runway and Taxiway Works

|                                             |                 |           |
|---------------------------------------------|-----------------|-----------|
| - Earthworks                                | \$550,000       |           |
| - Aircraft Pavements                        | \$200,000       |           |
| - Shoulders, drainage,<br>ducts, blast area | <u>\$80,000</u> | \$830,000 |

##### Terminal Works

|                                            |                  |                    |
|--------------------------------------------|------------------|--------------------|
| - Building Work                            | \$420,000        |                    |
| - Mechanical and<br>electrical             | \$180,000        |                    |
| - Floodlighting and<br>miscellaneous items | \$100,000        |                    |
| - Apron Extensions                         | <u>\$250,000</u> | <u>\$950,000</u>   |
|                                            |                  | <u>\$1,780,000</u> |

73. The Committee were gratified that in view of the high Commonwealth expenditure on airport facilities in Australia the cost of the proposed terminal facilities will be comparatively low for the area provided.

#### FUTURE TERMINAL BUILDING

74. We took evidence that the proposed extension of the terminal facilities is designed to meet the needs of Adelaide Airport for the period between 7 and 10 years after the proposed work is completed,

i.e. to about 1980. At that time, it is expected that a new terminal will be required and that the existing facilities will then be used for other purposes. The long term plan is for a new passenger terminal to be located almost due south of the existing building closer to the junction of the two runways. We noted that planning and construction of the new building will take about five years.

75. Because there is an urgent need now for additional space in the terminal at Adelaide, it is imperative that the accommodation in this reference be completed without delay to alleviate the very uncomfortable conditions at peak periods. However, owing to these poor conditions and the fact that the new terminal would require at least three years more to complete than the current proposal, the Committee considered that they had been placed in a difficult position in considering the present reference. We took this view, because had we recommended that it was not expedient to proceed with the proposed extensions and that the permanent terminal should be built, the progressively deteriorating conditions in the terminal could not have been improved until about 1972 or 1973. We therefore had no alternative but to recommend the present short term proposals which are now, in fact, the only appropriate way of providing the required space.

76. As the trends in increasing passenger traffic and the worsening conditions in the terminal have been evident for some time, we concluded that planning of terminal accommodation at Adelaide has not proceeded as quickly as might have been expected in the circumstances. In other words, it was clear that proposals for relief from the overcrowded conditions in the terminal at Adelaide should have been referred to the Committee for investigation two to three years ago.

RECOMMENDATIONS AND CONCLUSIONS

77. The summary of recommendations and conclusions of the Committee is set out below. Alongside each is shown the paragraph in the report to which it refers.

|                                                                                                                                                                          | <u>Paragraph</u> |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| 1. THERE IS A NEED FOR THE PAVEMENT WORKS IN THIS REFERENCE.                                                                                                             | 23               |
| 2. THE COMMITTEE RECOMMEND THE CONSTRUCTION OF THE AIRCRAFT PAVEMENTS IN THIS REFERENCE.                                                                                 | 28               |
| 3. THE PASSENGER TERMINAL FACILITIES AT ADELAIDE AIRPORT HAVE BECOME BADLY OVERCROWDED.                                                                                  | 31               |
| 4. THERE IS A NEED NOW FOR ADDITIONAL ACCOMMODATION FOR PASSENGERS, THE AIRLINE OPERATORS AND THE PUBLIC.                                                                | 31               |
| 5. THE CONSTRUCTION OF THE PROPOSED WORKS IN THE TERMINAL AREA IS RECOMMENDED.                                                                                           | 67               |
| 6. THE ESTIMATED COST OF THE WORK WHEN REFERRED TO THE COMMITTEE WAS \$1.78 MILLION.                                                                                     | 72               |
| 7. PROPOSALS FOR RELIEF FROM THE OVERCROWDED CONDITIONS IN THE TERMINAL AT ADELAIDE SHOULD HAVE BEEN REFERRED TO THE COMMITTEE FOR INVESTIGATION TWO TO THREE YEARS AGO. | 76               |

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