INTRODUCTION

1. The purpose of this document is to set out the requirements for grooving of aircraft runway pavements.

2. This policy should be read in conjunction with the Friction Policy.

BACKGROUND

3. The wearing course of a runway must provide good wet frictional characteristics (see Friction Policy for more information). This is achieved by stipulating a required surface texture depth.

4. Both ICAO (Annex 14) and CASA (MOS 139) require that runways used by jet aircraft have a surface texture depth of at least 1 mm. This texture depth can be achieved by the following four different methods for asphalt:
   a. Aggregate Seals;
   b. Open graded asphalt wearing course;
   c. 20 mm Nominal size (or greater) asphalt wearing course; and
   d. Grooving.

5. This requirement applies for Australian Defence Force (ADF) runways that are regularly used by the following aircraft types:
   a. Military jet fighter aircraft; and
   b. Military jet transport and maritime aircraft (KC-30B MRTT and B737 variants).

6. ADF Airfields that do not meet the requirements above will be assessed by DEEP and the Operational Airworthiness Authority (OAA) on a case by case.

GROOVING

7. Grooving must be in the transverse direction IOT provide the most efficient path for the removal of water from under an aircraft tyre at speed and subsequently reduce the risk of aquaplaning.

8. Grooving should extend in the longitudinal direction for the full length of the RWY between the RWY End Markings, unless;
   a. There is a turning node (in this case grooving is to cease prior to the commencement of the turn or 80m from the THR, IOT prevent the risk of loose aggregate being scuffed from groove edges and the consequent risk of FOD to aircraft);
   b. There is an ORP (in this case grooving is to cease at the end of the ORP);
   c. There are concrete THR and these meet the surface texture depth requirements;
d. There is inset AGL (this is addressed in section “Aeronautical Ground Lighting” of this policy); and

e. There are arrestor systems (this is addressed in section “Arrester Systems” of this policy).

9. Grooving should extend in the transverse direction for the full width of the RWY between the inside edges of the RWY edge markings.

10. Grooving shall not extend across ORP’s or on to TWY’s (it should cease in line with the RWY edge marking).

11. At a RWY intersection, where both RWY’s are to be grooved, the normal transverse grooving is to continue through the intersection on the ‘Primary RWY’ (further information on determining a Primary RWY can be found in section “Primary and Secondary Runways” of this policy). On the other RWY (the ‘Secondary RWY’), transverse grooving is to stop approximately 50mm form the edge of the grooving on the Primary RWY. There must not be any overlap of grooves.

12. Grooving must not be undertaken until the following conditions have been met:

   a. A minimum of 4 weeks has elapsed since the placing of the asphalt or concrete (as applicable); and
   
   b. For asphalt, it has cured to the extent that the grooves can be cut cleanly without aggregate being torn from the surface or groove edges.
   
   c. For concrete, it has cured to the extent that the grooves can be cut cleanly without spalling of the surface or chipping of the groove edges.

13. Grooving shall be continuous with the following dimensions:

   a. Width: 6mm. Tolerances: minus 0.0mm, plus 1.5mm; and
   
   b. Depth: 6mm. Tolerances: plus/minus 1.5mm and the depth of 60% of the total length of all grooves must not be less than 6mm; and
   
   c. Spacing between grooves: 38mm. Tolerances: minus 3.0mm, plus 0.0mm; and
   
   d. Spacing from transverse joints in concrete pavement: minimum 80mm, maximum 120mm. Grooves may be cut across longitudinal joints in concrete pavement provided the sealant is not affected.

14. Grooves are to be perpendicular to the centreline of the RWY. At the edge of the RWY, the maximum deviation from perpendicular shall be 80mm for a 45m wide RWY and 50mm for a 30m wide RWY.
AERONAUTICAL GROUND LIGHTING

15. Where inset light fighting exist in the pavement, grooving shall cease such that there is an un-grooved square centred on the light fitting. Grooves shall be sawn not closer than 150mm and not more than 300mm from the edge of the light fitting.

16. Where this is not practical, and in the interest of constructability, the grooves may cease at the completion of the nearest full width grooving run, provided this is no more than 300mm from the edge of the light fitting.

17. Where inset AGL cabling exists, grooving shall cease no closer than 150mm from the slot and not further than a full width grooving run or 300mm from the slot.

ARRESTOR SYSTEMS

18. Where there are permanent arrester installations or footings for temporary systems, the grooving shall cease not less than 1m (at the completion of the nearest full width grooving run) from the nominal arrester cable location on both sides of the arrester system.

19. Careful consideration of grooving in the tapered areas around the arrester, including the shoulders, should be undertaken to prevent any grabbing of the tape during engagement.

20. The implementation of a deployed arrester does not require any modification to the existing grooving.

HIGH SPEED EXIT TWY’S

21. Grooving of High Speed Exit (HSE) TWY’s is not required if the RWY does not require grooving. If the RWY is grooved, then grooving of the HSE TWY is to be based on a risk assessment considering the following factors:

   a. the aircraft types, operating frequencies and maximum speed on the HSE TWY;
   b. frequency and intensity of rainfall;
   c. wet frictional values and characteristics of the surface of HSE TWY;
   d. grading and drainage performance of HSE TWY and intersection;
   e. geometry of TWY and TWY and RWY intersection;
   f. precedent and previous experience; and
   g. other contributing factors.

22. The risk assessment will require sign off by DEEP (technical authority), IDA-AF (infrastructure authority) and ACAUST (Operational Airworthiness Authority- OAA).

23. Grooves are to be cut transversely, perpendicular to the centreline of the HSE TWY, and extend continuously between the inside edges of the TWY edge markings. The minimum deviation from perpendicular at the edges of the HSE TWY shall be 50mm for a 23m wide TWY and 30mm for a 15m wide TWY.

24. At the intersection of a HSE TWY and a RWY, grooves may be cut perpendicular to the centreline of the RWY so that groove cutting is not interrupted at the edge of the RWY.
PRIMARY AND SECONDARY RWY’S

25. A primary runway is generally the runway that receives the most or largest sized traffic. For the purposes of grooving, at the intersection of two runways, the selection of the primary runway will normally be dictated by the surface drainage (grading) characteristics of the particular intersection. For example, if the grading of the intersection is such that transverse grooves cut on one of the runways would not drain freely after rain stops, then that runway should be the secondary runway (i.e. grooves would be cut in a direction so that they have longitudinal fall). In some cases, a layout of grooves that are neither parallel nor perpendicular to the direction of aircraft travel may be necessary to allow the water in grooves to drain off the runway intersection.

26. In the case where there is no distinct drainage characteristic at the intersection which clearly identifies which runway should be “primary”, runway operational criteria should be used to decide the primary runway. Guidance is provided in ICAO Aerodrome Design Manual, Part 3 Pavements, Clauses 5.3.3.11 to 5.3.3.18.

REFERENCES

27. The following references contain guidance on grooving and were considered in developing this policy document:


c. Civil Aviation Safety Authority (CASA) Manual of Standards Part 139 - Aerodromes;

d. United States Department of Transportation, Federal Aviation Administration (FAA) Advisory Circular, Aircraft Arresting Systems on Civil Airports, AC150/5220-9A; and