AD 0.

AD 0.1 PREFACE - Not Applicable

AD 0.2 RECORD OF AIP AMENDMENTS - Not Applicable

AD 0.3 RECORD OF AIP SUPPLEMENTS - Not Applicable

AD 0.4 CHECKLIST OF AIP PAGES - Not Applicable

AD 0.5 LIST OF HAND AMENDMENTS - Not Applicable

AD 0.6 TABLE OF CONTENTS

AD 1. AERODROMES/HELIPORTS - INTRODUCTION

AD 1.1 AERODROMES/HELIPORTS AVAILABILITY

1. INTRODUCTION

1.1 Information concerning aerodromes within Australia is published by CASA in the *Manual of Standards Part 139* – Aerodromes, and the *AIP*. The former is intended for aerodrome owners and operators and contains specific details and requirements, whereas the latter is intended for pilots and thus contains more general information.

1.2 The aerodrome directory is published as *En Route Supplement Australia (ERSA)* which lists domestic aerodromes and helicopter landing sites, and contains other dynamic information that is frequently required by pilots during a flight.

2. CIVIL USE OF MILITARY AIR BASES

2.1 Aircraft operating in military CTRs released to civil ATS units must not use the surface of any military airfield unless specifically approved by the relevant military authority (*CAR 92 (1) (c)*).

3. LOW VISIBILITY OPERATIONS

3.1 **Approval required**

3.1.1 Aircraft operators may conduct a low visibility operation (LVO) only if specifically approved by CASA. Approvals for LVO are granted in the form of an exemption to the standard IFR take-off and approach minima.

3.1.2 CAAP 247-EX-01 contains specific information and guidance on gaining approval to conduct LVO operations.

3.2 **Low Visibility Procedures**

3.2.1 Low Visibility Procedures (LVPs) are applied at controlled aerodromes for protecting aircraft operations during conditions of reduced visibility or low cloud. LVPs are initiated when the visibility on an aerodrome becomes insufficient for ATC to control aerodrome traffic by visual surveillance. Low visibility protection measures are progressively implemented at the weather deteriorates.

3.2.2 Pilots will be notified that low visibility procedures are in force by ATIS broadcast or directed transmissions.

3.3 **Protection of ILS critical and sensitive areas**

3.3.1 ATC provides differing levels of protection for ILS critical or sensitive areas depending on the type of approach or departure, the position of an approaching aircraft, and the prevailing weather conditions at the time the approach is commences. The different scenarios and protection levels are described in the following table:

Type of operation	Weather Conditions	Level of ILS critical or sensitive area protection
Any ILS approach	– Cloud ceiling > 600FT or – Visibility > 2,000M	ILS critical and sensitive areas **are not protected.**
Any ILS approach	– Cloud ceiling ≤ 600FT, but ≥ CAT I minimums; or – Visibility ≤ 2,000M but ≥ CAT I minimums.	ILS critical area is protected except: – When a preceding aircraft enters the critical area while landing or vacating; or – For the time prior to the approaching aircraft passing the ILS OM, or, if no OM, is within 4NM of threshold. Sensitive area is not protected.
SA CAT I, SA CAT II, CAT II and CAT III	Cloud ceiling or visibility < CAT I minimums.	– ILS critical are is protected when the arriving aircraft has passed the OM, or if no OM, is within 4NM of touchdown. – ILS sensitive area is protected when the aircraft is within 2NM of touchdown.
Localiser guided take-off	Visibility < 550M	– Localiser critical and sensitive are protected until the aircraft has completed its take-off.

3.3.2 **Caution:** Pilots may experience the ILS beam bends and other interference in the circumstances where ATC is not protecting the ILS critical area or ILS sensitive area.

3.3.3 In weather conditions where the ceiling and/or visibility are above CAT I minima, pilots should inform ATC about any intention to conduct:

a. an approach with minima less than standard CAT I; or

b. an autoland procedure.

This information must not be taken as a request for or expectation of the protection of the ILS but to enable ATC to inform the flight crew of any known or anticipated disturbance.

3.3.4 ATC will inform pilots that the relevant protection measures are in place by reporting 'LVP in force' on the ATIS or by direct advice.

3.3.5 At start up, pilots should inform ATC about any intention to conduct a guided take-off that requires guidance provided by an ILS localiser.

Note: Localiser guided take-offs are generally supported on runways which have published CAT III approaches.

4. AERODROME MARKERS AND MARKINGS

4.1 Boundary Markers

4.1.1 Gable and/or cone markers are used to indicate:

a. the graded surface of a runway strip,

b. the edges of an apron and/or taxiway where such are not clearly defined, and

c. the limits of the movement area.

They take the form shown in *Figure 1*.

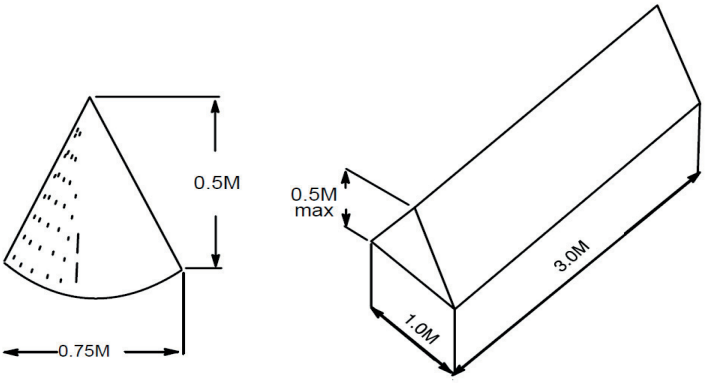


Figure 1 - Boundary Markers

4.1.2 When used to mark the graded portion of runway strips, cone markers are spaced at not more than 90M intervals along the limits of the runway strip, and gable or flush markers are spaced at not more than 180M intervals. Two gable markers are used at corners.

4.1.3 When used to mark the definition of aprons or taxiways the markers are spaced at not more than 15M intervals.

4.1.4 Boundary markers are white coloured, except those associated with the limits of ill-defined aprons and taxiways, which are yellow. Where a threshold is permanently displaced, dun-coloured cone markers are used to denote the area prior to the displaced threshold.

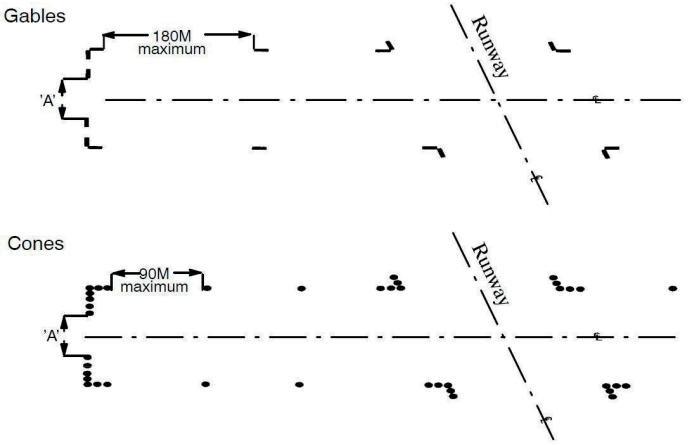


Figure 2 - Runway Strip Markings

4.2 Runway Markers

4.2.1 Runway Markers are provided on runway edges, at minimum intervals of 60M, along both sides of the runway where there is a lack of contrast between the runway and the adjacent runway strip. Where the runway strip is maintained to the same standard as the runway across its entire width, only runway end markers are used. Runway markers may be either:

- runway cone markers,
- inverted white plastic buckets,
- white PVC road safety cones,
- flush markers.

4.3 **Unserviceable Areas**

4.3.1 An aircraft must not operate on any area of an aerodrome which is declared Unserviceable: *CAR 166(3)*.

4.3.2 **Partial Unserviceability.** Except for instances of total unserviceability or restricted operations, unserviceable areas on the movement area are indicated by the display of unserviceability cross markers.

a. An unserviceability cross marker, normally coloured white, consists of a cross, with arms at least 6M long, 0.9M wide and not more than 0.15M high.

b. The limits of unserviceable areas are delineated by white cone markers painted with a 0.25M wide horizontal red band.

4.3.2 **Total Unserviceability.** When an aerodrome that does not have 24 hour ATC coverage is completely unserviceable for all operations, an unserviceability cross marker is displayed in the signal circle.

4.4 **Restricted Operations**

4.4.1 When operations at an aerodrome which does not have 24 hour ATC coverage are confined to hard surface runways, taxiways and aprons, a dumb-bell marker is displayed in the signal circle. A dumb-bell marker is white and takes the form shown in *Figure 3.*

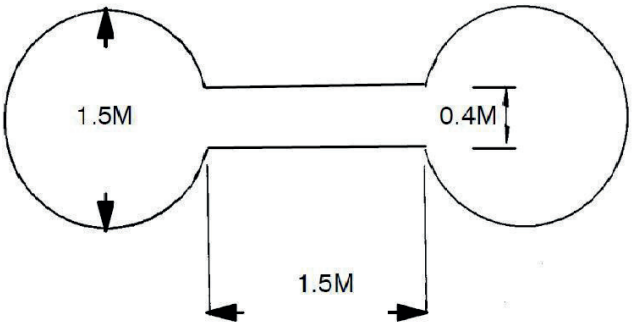


Figure 3 - Restricted Operations “Dumb-bell” Marker

4.5 **Runway Markings**

Runway markings are normally white, but may be edged in black to improve definition.

4.5.1 **Runway Threshold Markings.** Wherever a threshold marking is displayed, it marks the commencement of the permanent or declared landing distance.

4.5.2 **Permanent Threshold.** Threshold markings consisting of parallel longitudinal white lines resembling “piano keys” are used at the ends of sealed or concrete runways of 30M or greater width. For runways less than 30M wide, the markings may be used.

4.5.3 **Permanently Displaced Threshold.** “Piano key” markings displaced from the runway end indicate that the normal approach is obstructed by a permanent obstacle, or that a permanent hazardous surface condition exists near the end of the runway.

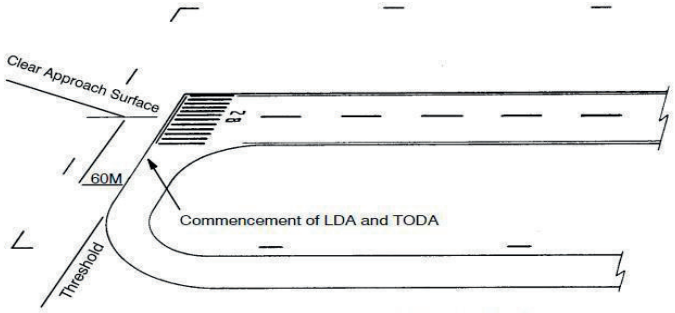


Figure 4 Permanent Threshold Marking

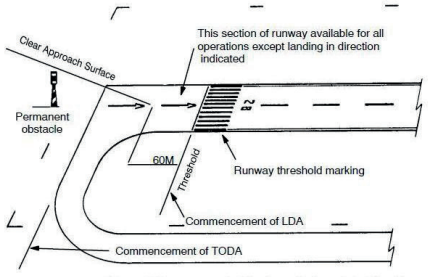


Figure 5 Permanently Displaced Threshold Marking

4.5.4 **Temporarily Displaced Threshold Markers and Markings.** When a threshold is temporarily displaced it will be shown either by lights or by the following:

a. a series of inverted "V" markings (white) painted across the runway (*Figure 6*); or

b. one, or two, Vee-Bar markers (white) situated on both sides of the runway (*Figure 8*); or

c. at military controlled aerodromes, for periods of short duration, when military operational requirements dictate, four white cones situated on both sides of the runway.

Note: Strobe lights may be used instead of Vee-Bar markers. Permanent "piano key" and runway designation number markings will be obliterated where the duration of the temporary displacement exceeds 30 days; however, for shorter periods all existing runway markings remain.

4.5.5 Other markers or markings which may be associated with temporarily displaced thresholds are:

a. unserviceable cone markers (white and red) which, when placed across a runway between the permanent and temporary threshold markings, denote the start of the take-off run available;

b. road safety cones or "witches hats" (orange) which, when placed across the full width of the runway strip, denote the manoeuvring limits for plant and equipment involved in works;

c. unserviceable cross markers (white), which indicate any part of the movement area not available for operations;

d. centreline arrows (white) to draw the pilot's attention to the displaced threshold. Unless otherwise indicated by unserviceable markings, the length of a runway containing centreline arrows is available for take-off in the direction of the arrows (see diagram) and for both take-off and landing in the other direction.

Note: Relevant NOTAM advice is provided on the length of the displacement, anticipated duration and type of temporary threshold provided.

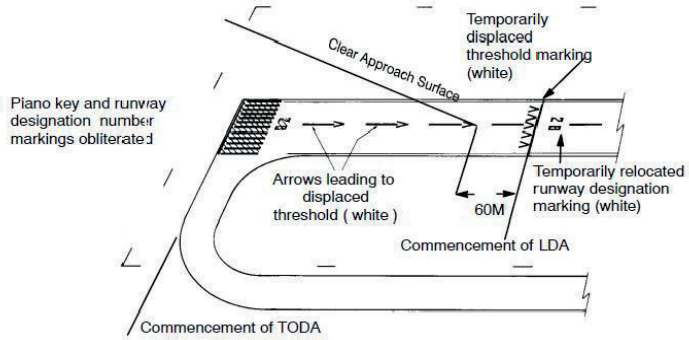


Figure 6 - Markings for a temporarily displaced threshold due to obstacle infringement of the approach path for a period in excess of 30 days.

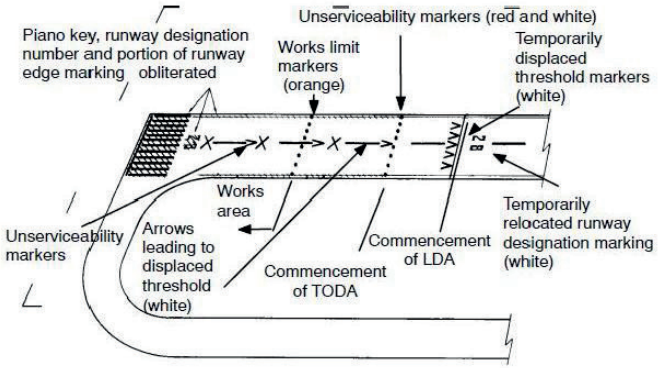


Figure 7 - Markings for a temporarily displaced threshold due to works on a runway for periods in excess of 30 days.

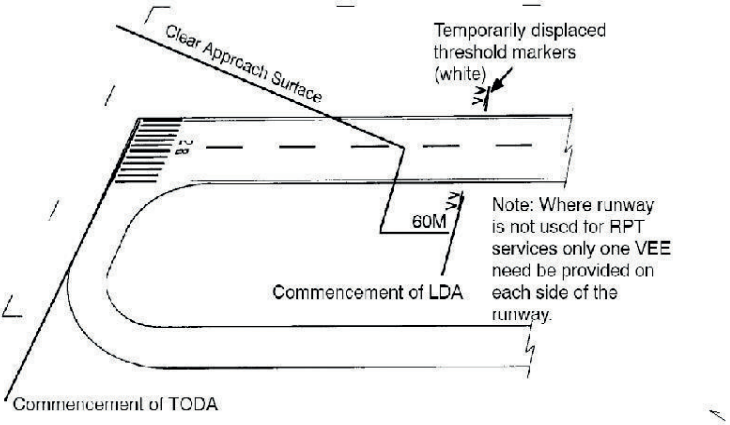


Figure 8 - Markings for a temporarily displaced threshold due to obstacle infringement of approach surface for a period of 30 days or less.

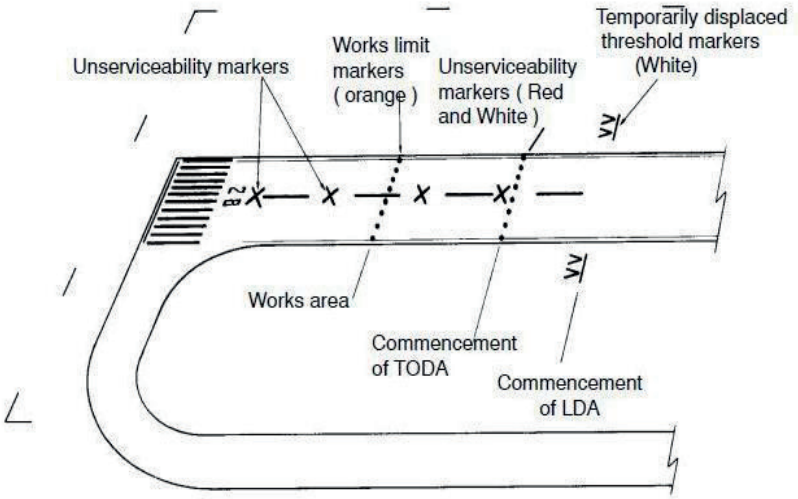


Figure 9 - Markings for a temporarily displaced threshold due to works on the runway for a period of 30 days or less.

4.5.6 **Runway Side Stripe and End Marking.** Solid white lines delineate the edges of the full strength pavement on sealed or concrete runways.

4.5.7 **Sealed Area Beyond the Runway**. A sealed area beyond the runway end that is not suitable for normal use by aeroplanes is marked for its entire length by yellow Vee-Bars. A sealed Stopway or blast area that is not suitable for taxiing is defined by the white line delineating the edge of the full strength pavement. *Refer to Figure 13.*

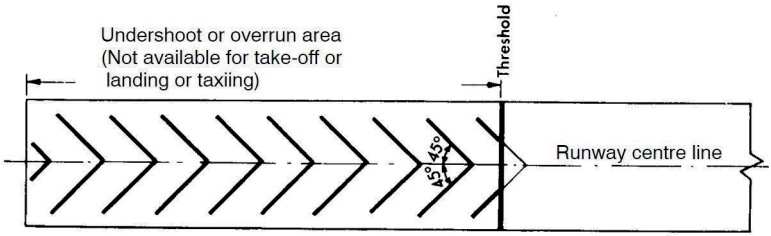


Figure 10 - Markings of Areas Beyond Runway Ends.

4.5.8 **Runway Centreline Markings.** These markings indicate the centre line on all sealed or concrete runways whose width is 18M or greater and consist of a solid 30M long white line followed by a 30M gap repeated for the full length of the runway. Refer to *Figure 13*.

4.5.9 **Aiming point and touchdown zone markings.** These markings may be used on both ends of sealed or concrete runways to provide visual guidance whilst landing. Two forms of touchdown zone and aiming point markings may be used:

a. **Aiming point and simple touchdown zone markings**. These markings are used for most runways and consist of three pairs of stripes as shown in *Figure 11.*

b. **Aiming point and ICAO 'A' basic pattern touchdown zone markings.** These markings are progressively being implemented on precision approach runways and may also be used for other runways. These markings consist of varying numbers of stripes (depending on runway length as shown in *Figure 12.)*

Note: aiming point markings were formerly known as fixed distance markings.

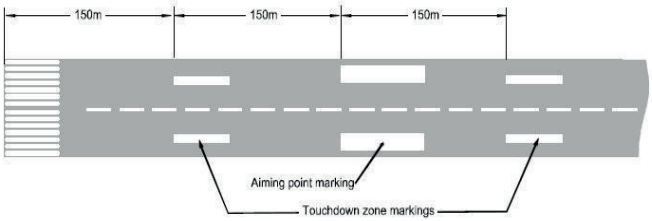


Figure 11 - Aiming point and simple touchdown zone markings

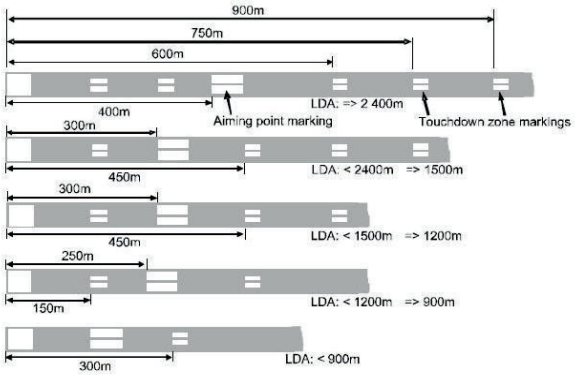


Figure 12 - Aiming point and ICAO 'A' -
basic pattern touchdown zone markings.

4.5.10 **Runway Numbers.** Two digit numbers are used on sealed or concrete runways to identify the runway and are derived from the magnetic heading of the runway. Where two or more runways have a number which may be confusing, the runway number may not reflect the magnetic heading.

4.5.11 **LAHSO Hold-Short Position Markings.** Taxi-holding position markings (see *para 4.8.4*) are used to mark runway hold short positions for LAHSO.

4.5.12 **Hold Short Position Markings - Runways used for Taxiing.** Taxi-holding position markings (see *para 4.8.4*) are used for runway/runway intersections where one runway is used as part of a standard taxi route.

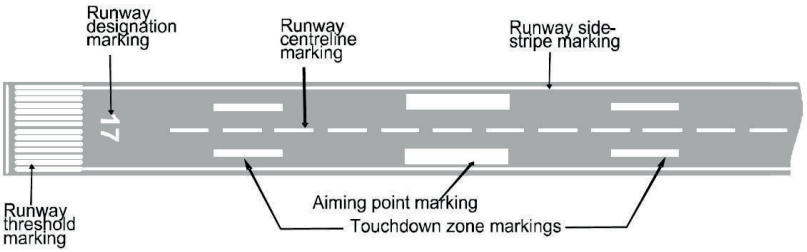


Figure 13 - Combined Runway Markings

4.6 **Runway Strip Markings**

4.6.1 Runway strip markings consisting of white cone, gable or flush markings indicate the limits of the graded portion of a runway strip.

4.7 **Stopway Markings**

4.7.1 Stopways are not marked and end at least 60M before the strip end.

4.8 **Taxi Guide-line Markings**

These markings provide position guidance for pilots, and are normally painted yellow.

4.8.1 **Taxiway-edge Markers and Markings.** On unpaved taxiways, where the edges are not visually distinct, yellow taxiway-edge cones are provided. For gravel taxiways, yellow taxiway-edge marking strips may be used.

4.8.2 **Taxiway Pavement-Strength Limit Markings.** These markings are painted in at the entrance to an asphalt, sealed or concrete taxiway which has low strength pavement.

4.8.3 **Old Taxi-holding Position Markings.** The type of marking illustrated in *Figure 14* is currently used on taxiways, holding bays and aprons to indicate holding or parking positions. Except for aprons, where the aircraft is parked with the main wheels on the marking, aircraft must be held with the nose short of the marking. This marking is yellow.

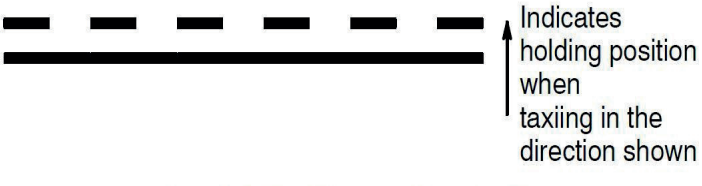


Figure 14 - Old Holding Position Marking
(Taxiway/Runway Intersection)

4.8.4 **New Taxi-holding Position Markings.** The type of markings illustrated in *Figure 15 (a)* and *(b)* will be progressively introduced at Australian aerodromes. *Figure 15(a*) will replace the existing marking shown in *Figure 14*. This marking will be used when there is only one holding position. *Figure 15(b)* is an additional holding position marking which may be used to protect a runway available for Cat I, II or III precision approach operations. Where provided, *Figure 15(b)* will be further from the runway than *Figure 15 (a)*, and will only be applicable when advised by ATC or the ATIS. These markings are yellow.

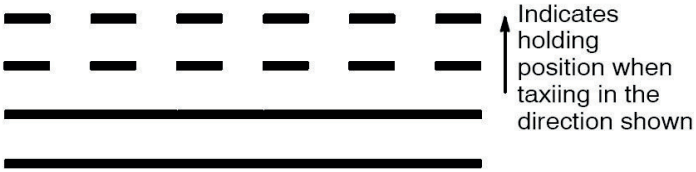


Figure 15(a) - New Holding Position Marking
(Taxiway/Runway Intersection, and LAHSO Hold-Short Position)

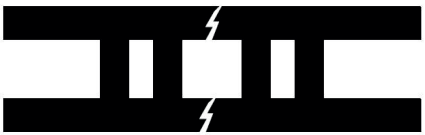


Figure 15(b) - New Additional Holding Position Marking Associated with CAT I, II or III Precision Approach Runways

4.8.5 Where a holding position protects a taxiway crossing, only a broken yellow line is provided.

Figure 16 - Holding Position Marking
(Taxiway/Taxiway Intersection)

4.9 **Holding Bay Markings**

4.9.1 Holding bay markings consist of taxiway guide-line and holding position markings.

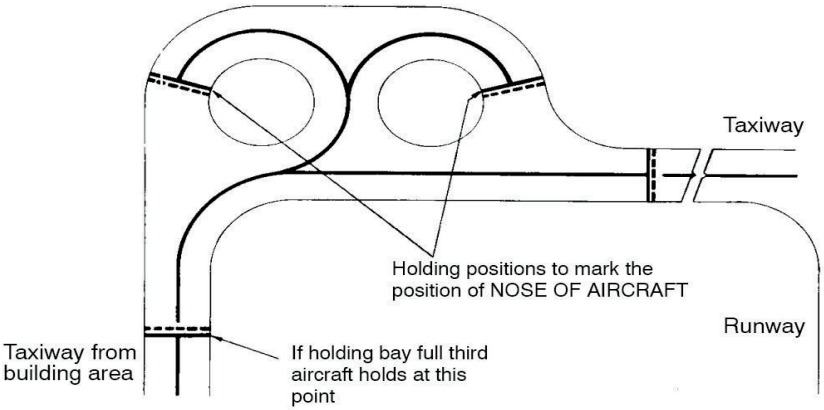


Figure 17 - Holding Position Markings

4.10 **Apron Markings**

On aprons accommodating aircraft 5,700KG and above, taxi guide-lines and aircraft parking position markings are provided. Other aprons may be unmarked.

4.10.1 **Apron Edge Markings.** Where aprons are provided with aircraft parking position markings, apron edges may not be marked. On other aprons where low strength shoulders are provided adjacent to apron pavements and the visual differentiation between these surfaces is inadequate, a further marking is provided in critical areas.

This marking consists of two 0.15M wide continuous yellow lines 0.15M apart along the edge of the full strength apron pavement. Where pavement is visually uniform but varies in strength, the boundary of the change in strength is delineated by a broken yellow line with informative wording such as “MAX 2300 KG”.

4.10.2 **Aircraft Parking Position Markings.** When apron parking position markings are provided, pilots must access the parking positions via the taxi route identified by continuous yellow guide lines.

4.10.3 **Primary Position Taxi Guide Lines.** Primary aircraft parking positions are identified by a continuous yellow taxi guide line.

4.10.4 **Primary Position Markings.** Primary parking position markings comprise two straight yellow lines. One line, the alignment line, shows the required orientation of the parked aircraft. The second line, the stop line, shows the point at which the aircraft is to be stopped.

4.10.5 **Marshaller Stop Line.** Where the pilot is guided by a marshaller, a marshaller stop line is located where the aircraft nosewheel is to stop. It is at right angles to the alignment line, painted yellow, and located on the right hand side of the alignment line as seen by the marshaller looking at the aircraft. The aircraft type designation is painted below the stop line. The lettering, being for the marshaller, is small and upside down when viewed by the pilot.

4.10.6 **Pilot Stop Line.** Where a pilot is not guided by a marshaller a yellow pilot stop line is located so that, when the aircraft is stopped, the line is immediately to the left of the pilot. The aircraft type is written in yellow below the bar.

4.10.7 **Alignment Line.** The yellow alignment line extends from the location of the nose wheel in the parked position backwards under the body of the aircraft. It also extends forward in the alignment of the parked aircraft. A short stripe is located along the alignment bar.

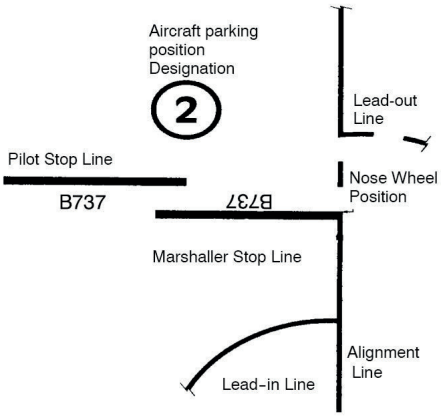


Figure 18 - Primary Aircraft Parking Position Markings

4.10.8 **Secondary Position Guide Lines.** Secondary aircraft parking positions are identified by a line of yellow dots.

4.10.9 **Secondary Position Marking.** These yellow lines may be painted white to avoid confusion where the secondary position overlaps the primary position.

4.10.10 **Keyhole Marking.** Where the secondary position can accommodate aircraft with a wing span of 15M or greater, it will be identified with a keyhole marking, consisting of an alignment line terminating in a ring in which the nose wheel is to be parked.

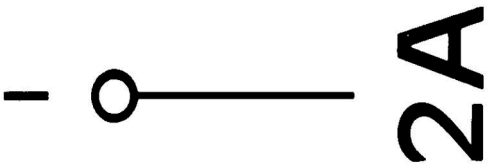


Figure 19 - Keyhole Marking

4.10.11 **Triangle Marking.** Where a secondary position can not accommodate aircraft with a wingspan of 15M or greater, it will be identified with a triangle marking consisting of an alignment line terminating in a triangle in which the nose wheel is to be parked or, in the case of tail wheel aircraft, above which the nose of the aircraft is to be positioned. Triangle markings are also used to mark aircraft run-up positions at secondary aerodromes.

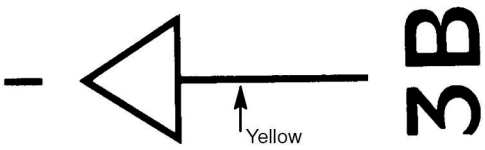


Figure 20 - Triangle Marking

4.10.12 **Lead-out Line.** The parking position lead-out line comprises a broken yellow line commencing at the forward end of the stripe along the alignment line.

4.10.13 **Taxi Guide-line Designation Marking.** Where an apron has more than one parking position, each individual parking position lead-in line is provided with appropriate designation markings where it diverges from the common taxi-guide-line. There are three types of designations: viz, parking position number, aircraft type and aircraft weight.

4.10.14 **Position Designation.** The parking position designation indicates the aircraft parking position to which the taxi guide-line, or lead-in line leads. Where a lead-in line leads to several positions, the designation indicates the first and last numbers of the parking positions served by each line. The designations comprise 2M long yellow characters.

4.10.15 **Type Limit Designations.** Aircraft type limit designation characters are painted yellow and 2M long. Where an apron contains parking position(s) which can only accommodate aircraft smaller than the largest aircraft using the apron, appropriate aircraft type limitations are provided at the lead-in line for each restricted position.

Where a parking position is restricted to use by a particular aircraft type, a designation marking such as “F27 ONLY” or “NO B727” is used. If the parking position is restricted to helicopters then “H ONLY” is provided on the guide-line.

4.10.16 **Weight Limit Designation.** Aircraft weight limit designations are provided to identify the maximum weight limitation at a parking position. Where the apron contains parking position(s) which can only accommodate aircraft of a lighter weight than the heaviest weight allowed elsewhere on the apron then appropriate yellow weight limitations are painted on the relevant lead-in lines.

4.10.17 **Parking Limit Lines.** These lines are provided to assist in ensuring that no part of a parked aircraft infringes taxiways or vehicle access roads. The markings consist of two parallel lines 0.1M wide, separated by a red line 0.1M wide. Suitable yellow labels are painted along the line at not more than 50M intervals. The continuity of the line may be broken where normal access is required and aircraft may taxi across the line where necessary.

4.10.18 **Other Apron Markings.** Other apron markings which may be seen at major airports are:

- tug push-back lines - broken white
- tow disconnect markers - white
- lease lines - green (not used when coincident with parking limit lines)
- equipment limit lines - red, edged in black and suitably labelled
- apron road markings - red, edged in black. These markings are used to define roadways which may be used by uncontrolled vehicles transiting aprons.
- passenger path markings - white on black.

4.11 **Obstacle Marking**

4.11.1 Inconspicuous obstacles penetrating the obstacle limitation surface of an aerodrome, or which are present on the movement area, are obstacle-marked unless they are shielded by a conspicuous or marked obstacle. Obstacle painting is either in chequered patterns or alternate bands of orange and white or red and white except where such colours would merge with the background. High intensity lighting may be used for tall structures.

4.11.2 In areas away from aerodromes, constructed obstacles between 90m and 150M in height are normally marked only if considered a significant hazard to aircraft. Constructed obstacles above 150M in height are normally marked, unless considered not to be a hazard.

4.12 **Aerodrome Information Signs**

4.12.1 Aerodrome information signs have black lettering on a yellow background or yellow lettering on a black background. They provide location and direction information at an aerodrome with a complex taxiway layout. The following information signs may be seen:

a. **Taxiway Location Sign.** A location sign indicates the designation of a taxiway. This sign is often installed in conjunction with a taxi-holding position sign or a direction sign.

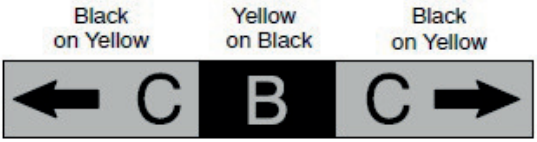
Yellow on Black

b. **Destination Sign.** A destination sign provides directional advice to pilots to proceed to various facilities on the aerodrome. Where abbreviations are used, they have the following meaning:

RAMP or APRON	General parking, servicing and loading areas.
PARK or PARKING	Aircraft parking only areas.
CIVIL	Civilian areas of joint-use aerodromes.
MIL	Military areas of joint-use aerodromes.
CARGO	Freight or cargo handling areas.
INTL	International areas.
DOM	Domestic areas.
RUNUP	Run-up areas.
ACP	Altimeter Check Point.
VOR	VOR Check Point.
FUEL	Fuel or service areas.
HGR	Hangar or hangar areas.

Black on Yellow

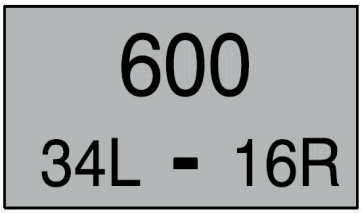
c. **Direction Sign.** A direction sign is normally installed before a taxiway intersection indicating the taxiways ahead.



d. **Runway Exit Sign.** A runway exit sign indicates the designation of the taxiway for aircraft exiting the runway. This sign is placed on the taxiway exit side of a runway.

Black on Yellow

e. **Distance To Go Sign.** This sign is provided on runways used for LAHSO where a pilot may have difficulty seeing the intersecting runway during the landing roll due to an obstruction such as a hump in the landing runway. This sign is placed on the left hand side of the runway. The numbers shown indicate the distance <u>in metres</u> from the sign to the Hold Short Line.



Black
on Yellow

Note: Defence aerodromes also provide Distance To Go signs. The distance shown on these signs is <u>in feet</u> and is the distance from the sign to the end of the runway.

4.13 Aerodrome Mandatory Instruction Signs

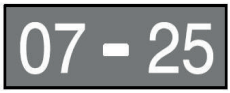
4.13.1 These signs have white lettering on a red background and must not be passed without clearance to do so from ATC. However, at an aerodrome where the control tower is not in operation, these signs may be passed at the discretion of the pilot in command. The following mandatory signs may be seen:

a. **Taxi-Holding Position Sign at a Taxiway/Runway Intersection**. This sign consists of the designation of the runway and is placed abeam the taxi-holding position marking. A taxiway location sign is normally provided in conjunction with this sign. At a runway end, the taxi-holding position sign will show only the designation of the runway end concerned. At an intermediate taxiway, the taxi-holding position sign will show both ends of the runway designations. However, old taxi-holding position signs consisting of the word "HOLD" may still be seen at some aerodromes.

b. **Taxi-Holding Position Sign at ILS Category I Runways.** At ILS Category I runways, an additional taxi-holding position sign may be seen further from the runway. This sign has the words "CAT I" besides the runway designation and will be illuminated when the aerodrome is operated under CAT I conditions.

c. **Taxi-Holding Position Sign at ILS CAT II Runways.** Where an ILS CAT II holding position exists at a runway/taxiway intersection, the taxi-holding position sign will have a CAT II inscription.

d. **Runway Intersection Sign.** This sign is normally provided at a runway used in LAHSO to show the designation of the intersecting runway. A sign is placed on both sides of the runway at the Hold-Short Line (75M to the intersecting runway centre line). These signs are illuminated for night operations. An ATC take-off or landing clearance constitutes clearance to pass such signs except when a landing clearance specifically directs that the aircraft hold short of the intersecting runway during the landing run.



White on Red

e. T**axi-Holding Position Sign at Other Locations**. A taxi-holding sign may be installed at other than taxiway/runway intersections where there is a requirement for mandatory holding at that location.

White on Red

f. **Aircraft NO ENTRY Sign**. This sign is placed near an exit where entry is prohibited; e.g. at a one-way taxiway.


White on Red

5. LIGHTING

5.1 Permanent Threshold Lights

5.1.1 Permanent Threshold Lights are green and the following patterns are in use:

a. Standard Pattern: a row of six lights evenly spaced across the threshold which may, at larger aerodromes, be augmented by one or two extra wing-bar lights at each end;

b. Alternate Standard Pattern: two barettes each of three lights, one each side of the threshold; and

c. an obsolescent pattern of five or six lights which still exists on some runways.

5.1.2 The Alternate Standard Pattern is generally installed at aerodromes used predominantly by aircraft having a maximum take-off weight of less than 5,700KG.

5.1.3 At runways equipped with ILS, the Standard Pattern is used. When intensity stages 4, 5 or 6 are selected, this pattern is increased to give a 3M spacing between the lights.

5.1.4 Threshold lights across the runway show green in the approach direction only, except for the single lights on either side of the runway, in line with the runway edge lights, which are omni-directional.

5.2 **Runway Threshold Identification Lights**

5.2.1 Where a runway threshold needs to be made more conspicuous, two flashing white lights (strobes) are provided, one on each side of the runway, in line with the threshold.

5.2.2 These lights flash at a frequency of between 60 and 120 flashes per minute and are visible in the approach direction only. They can be used in both day and night, and are occasionally used during daylight hours to indicate a temporarily displaced threshold.

Note: When runway threshold identification lights are used to indicate a displaced threshold, V-bar markers may not be displayed.

5.3 **Displaced Threshold Lighting**

5.3.1 Where the threshold is temporarily displaced, temporary displaced threshold lights are used to indicate the new threshold location at night. The pattern consists of two groups of five lights showing green, one group on each side of the runway. If the runway width is 30M or less, groups of 3 lights per side may be used.

5.3.2 If any length of runway prior to the displaced threshold is available for taxiing or for take-off from that end of the runway, or for landing or take-off from the other end of the runway, the runway edge lighting on this part of the runway will show red in the direction of approach to the displaced threshold, and show white in the opposite direction. (see *Figure 1*)

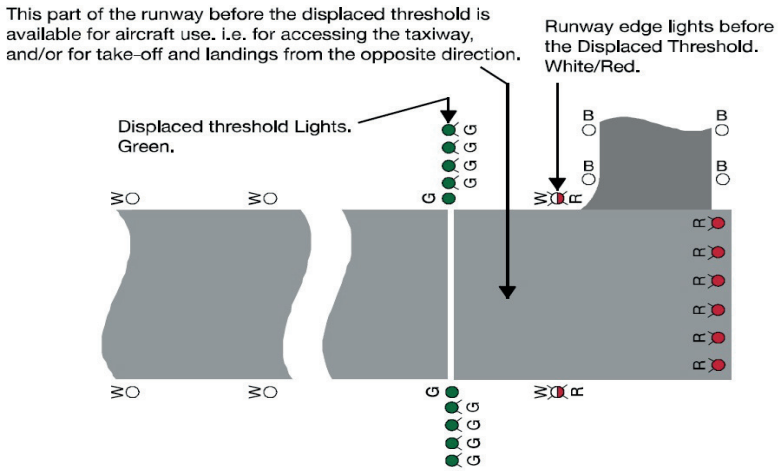


Figure 1 - Example of Displaced Threshold Lighting: Runway Before Displaced Threshold Serviceable.

5.3.3 If the alteration to the threshold location is caused by an unserviceable area of the runway, all runway edge lights on this part of the runway will be extinguished. Unserviceability lights, showing red, will be placed across the runway at the entrance to the closed area. Work Limit lights, showing amber/yellow/ orange, are provided to indicate to persons associated with the works organisation, the limit of the works area. (*see Figure 2)*

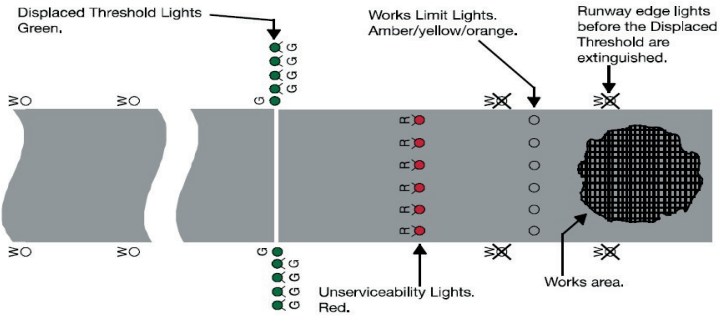


Figure 2 - Example of Displaced Threshold Lighting: Runway Before Displaced Threshold Unserviceable

Note: Figure 1 and 2 show examples of Displaced Threshold Lighting. They are not the only possible configurations.

5.3.4 During daylight hours runways used by international jet RPT aircraft will be equipped with one strobe light on each side of the displaced threshold. Strobes may be used in lieu of V-bar markers in other instances.

5.4 **Runway Edge Lighting**

5.4.1 Runway edge lighting has longitudinal spacing of 60M for instrument runways but may be up to 90M for non-instrument runways and for non-precision approach runways at country aerodromes.

5.4.2 Runway edge lights are white, except that, in the case of a displaced threshold, will show red in the approach direction.

5.4.3 For Precision Approach runway Category I or II the lights in the final 600M of the runway show yellow.

5.4.4 Runway edge lights are omni-directional on intensity stages 1, 2 and 3 in order to provide circling area guidance. Stages 4, 5 and 6 are unidirectional.

5.4.5 For runways less than 30M in width, the lateral spacing of runway edge lights is based on that of a 30M wide runway.

5.5 **Runway End Lighting**

5.5.1 Runway end lighting normally comprises six evenly spaced, uni-directional red lights. Where the runway end and the threshold are collocated, bi-directional red/green lights in either the Standard or Alternate pattern may be used.

5.6 **Runway Centreline Lighting**

5.6.1 Centreline lighting is colour-coded to be white from the threshold to a point 900M from the end of the runway, then alternate red and white to 300M from the runway end, and then red for the last 300M.

5.7 **Runway Touchdown Zone Lighting**

5.7.1 Touchdown Zone Lighting is provided for runways intended for precision approach Category II or III operations. The lighting consists of a series of fifteen pairs of uni-directional, white barrettes for the first 900M of the runway. Six stages of intensity are available.

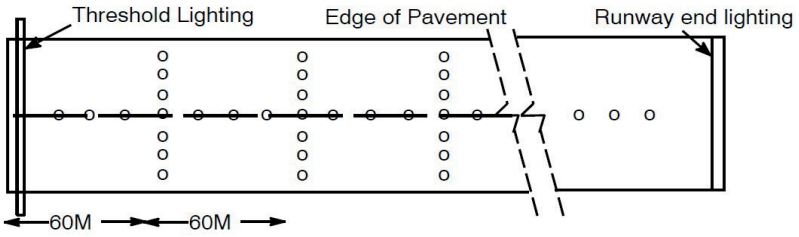


Figure 3 - Centreline and Touchdown Zone Lighting

5.8 **Partial Unserviceability Area Lighting**

5.8.1 At aerodromes where night operations are permitted, the limits of unserviceable portions of the movement area are marked with steady red lights during the hours of darkness.

5.9 **Stopway Lighting**

5.9.1 Stopway lighting is provided where the runway is less than 1,500M. The lighting consists of side and end red lights, screened so as not to be visible to an aircraft approaching to land over the Stopway.

5.10 **Taxiway Lighting**

5.10.1 Two types of taxiway lighting are used:

a. **Edge Lighting:** fixed lights showing blue on both sides of the taxiway.

b. **Centreline Lighting:** fixed lights showing green along the centreline of the taxiway.

5.10.2 **Apron Exit Lights.** Where there is an extensive system of taxiways, the taxiway lights at the exit from the apron are flashing the same colour as the taxiway lights.

5.10.3 **Runway Exit Lights.** On runway exit taxiways, the centreline taxiway lighting is extended to the runway centreline by lights spaced at 15M intervals. Alternate green and yellow lights are used for that section of the exit taxiway up to the taxi-holding position lighting.

5.10.4 **Rapid-Exit Taxiway Lights.** On rapid-exit taxiways, the centreline lighting is extended to the runway centreline by lights at 15M intervals. This spacing is continued until the high speed taxiway becomes incorporated into the normal taxiway system.

5.10.5 **Taxi-Holding Position Lights.** Holding point lights consists of three lights showing yellow in the direction of the approach to the runway. When taxiway sidelighting is provided, the holding point lights consist of a pair of yellow lights in line with the holding point.

5.10.6 **Intermediate Holding Position Lights.** On a taxiway equipped with centreline lights, the intermediate holding position lights consist of at least three (3) lights showing yellow in the direction of the approach to the intermediate holding position marking or the taxiway intersection marking, as appropriate. When taxiway edge lighting is provided, the intermediate holding position lights consist of a pair of yellow lights in line with the runway holding position marking, intermediate holding position marking or taxiway intersection marking, as appropriate (see *Figure 4*).

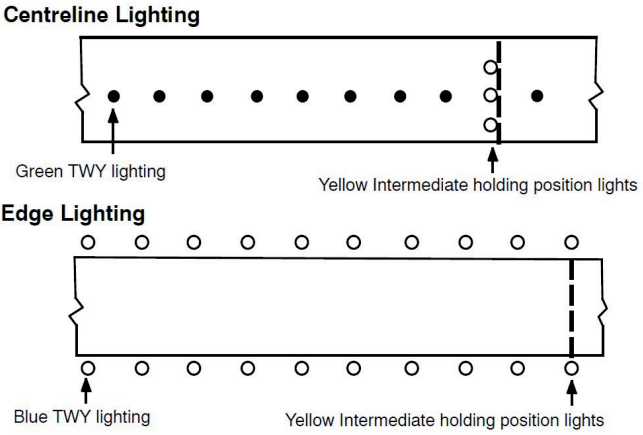


Figure 4 - Intermediate Holding Position Lights

5.10.7 **Stop Bars.** A stop bar is unidirectional and shows red in the direction of approach to the stop bar from the taxiway. The stop bar lights are spaced 3M apart and 0.3M before the point at which it is intended that traffic approaching the runway must stop.

The stop bar lights are at right angles to the taxiway centreline. When a stop bar is on at night or when low visibility procedures are in force, any taxiway centreline lights immediately beyond the stop bar are switched off for a distance of at least 90M; once the stop bar is switched off the centreline lights beyond the stop bar are switched on.

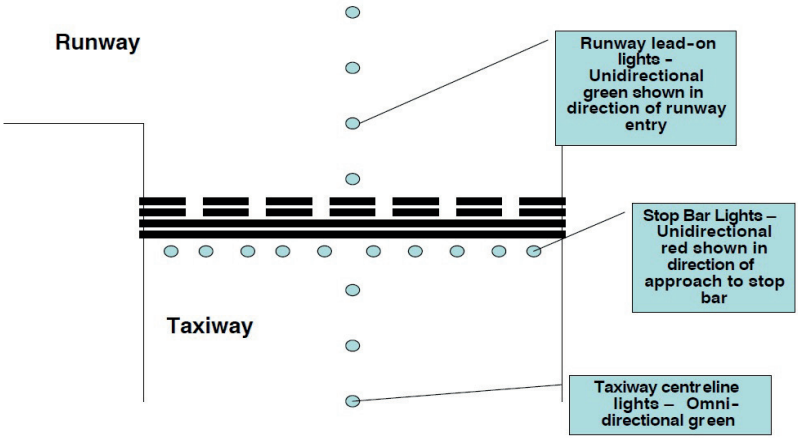


Figure 5 - Stop Bar Lights

5.10.8 **Runway Guard Lights.** On standard taxiways, runway guard lights consist of a pair of alternating flashing yellow lights located either side of the holding position. On wide throat taxiways, runway guard lights consist of a line of flashing yellow lights spaced 3M apart across the taxiway at the holding position. All lights are unidirectional and visible to the pilot of an aircraft taxiing to the holding position. They are illuminated day and night.

5.10.9 **Hold-Short Lights.** Hold-short lights are installed on all runways used for LAHSO. The lights indicate the position of the hold-short line (no closer than 75M from the intersecting runway centre-line) and are additional to the runway intersections signs and hold-short position markings. They consist of a line of six white, unidirectional lights occulting at approximately 30 times per minute, installed across the runway.

During LAHSO, the lights will be on and occulting, but an ATC clearance to take-off, to land without a LAHSO instruction or requirement, or to cross the intersection after completing a LAHSO, constitutes a clearance to cross the lights.

5.11 **Apron Lighting**

5.11.1 Apron floodlighting provides illumination on all apron service areas with a minimum of glare to users and a minimising of shadows.

5.12 **Approach Lighting**

5.12.1 There are several forms of approach lighting systems that may be used on a runway, depending on the type of runway and kinds of approach made to that runway.

5.12.2 For a non-precision approach runway or a non-instrument runway used at night, a Simple Approach Lighting System (SALS) may be provided (see *Figure 6)*.

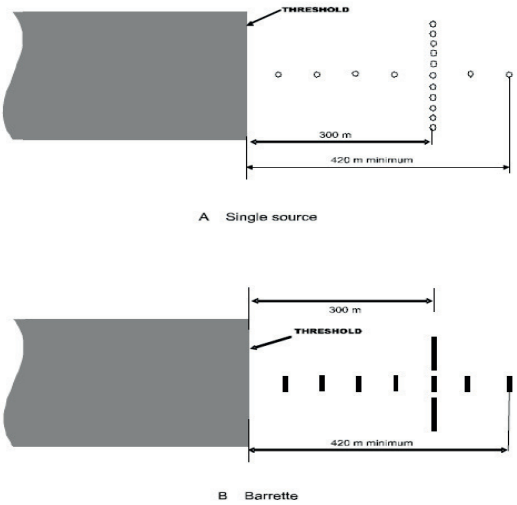


Figure 6 - Simple Approach Lighting

5.12.3 For a precision approach runway on which CAT I approaches are conducted, 2 types of approach lighting system may be provided:

a. **Precision approach CAT I lighting system; distance coded centreline.** This type of approach lighting system is also known as the 'Calvert' system (see *Figure 7.*).

b. **Precision approach CAT I lighting system; barrette centreline.** This type of approach lighting system is also known as Approach Lighting System with Sequenced Flashing Lights (ALSF). As its other name implies, this type of approach lighting system includes a 'running rabbit' array of sequenced flashing lights (see *Figure 7*).

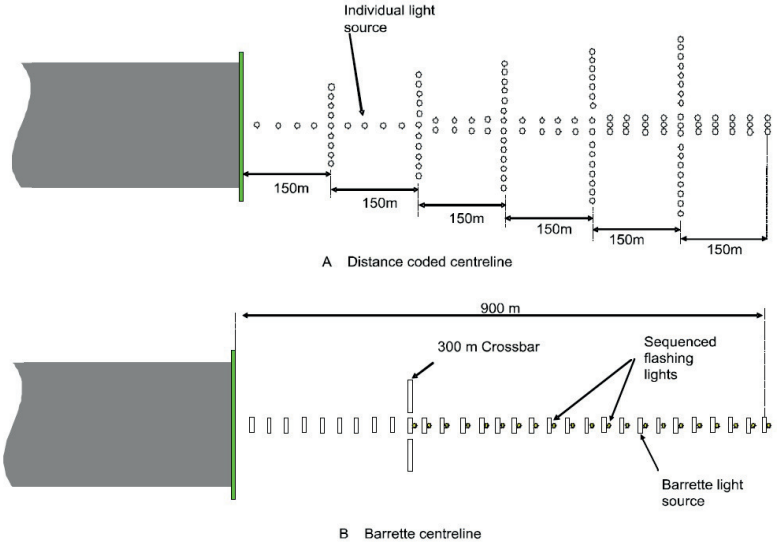


Figure 7 - Precision Approach CAT I lighting system

5.12.4 For a precision approach runway on which CAT II or III approaches are conducted an approach light system similar to one of the types shown in *Figure 8* will be provided.

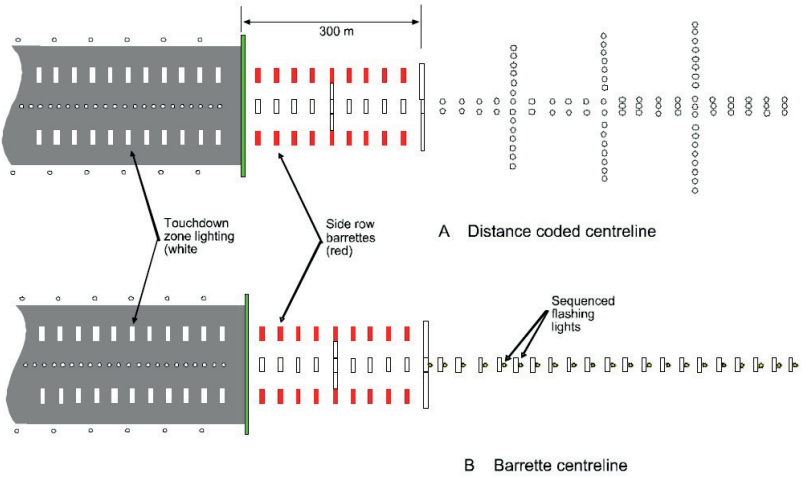


Figure 8 - Precision Approach CAT II and III lighting system

5.12.5 **Operation of Multi-stage Intensity Approach and Runway Lighting.** Precision Approach Runway lighting has five or six stages of intensity and other multi stage systems have three. Intensity commences with Stage 1 with the first three common to all systems. Details are shown on the aerodrome landing chart. Multi-stage intensity approach and runway lighting is operated as follows:

a. the initial intensity is normally selected by the tower controller;

b. variation to the intensity is on pilot request with an expectation that the pilot will request a lower intensity as the aircraft nears the runway to reduce dazzle;

c. pilots are advised when the equipment is operating in a visibility of 5,000M or less; and

d. when requesting a change in intensity the pilot need only ask for a higher or lower stage.

INTENSITY TABLE		
Visibility	**Intensity Stage**	
	Day	**Night**
Not greater than 2,000M	6	4
Greater than 2,000M but not greater than 4,000M	5	3
Greater than 4,000M but not greater than 5,000M	4	2
Greater than 5,000M	-	1

5.13 **Wind Direction Indicator Lighting**

5.13.1 At aerodromes intended for night operations, the primary wind indicator, and maybe others, are illuminated. Unless indicated to the contrary in *ERSA*, wind direction indicator lighting is included in the PAL system.

5.14 **Aerodrome Beacons**

5.14.1 Aerodrome beacons are designed to be visible from at least 8KM at altitudes from 1,000FT to 5,000FT in restricted visibility.

5.14.2 Beacons may show white flashes alternating with green flashes or white flashes only. Beacon details are promulgated in *ERSA*.

5.14.3 At locations where an ATS unit is established, the beacon is operated at night and during conditions of reduced visibility, by day whilst the unit is open. When the aircraft traffic does not warrant continuous display, the beacon will be operated for known aircraft movements. The beacon is available on request.

5.15 **Obstacle Lighting**

5.15.1 At an aerodrome where night operations are permitted, constructed obstacles and significant terrain which penetrate the obstacle limitation surface of an aerodrome, or which are on the movement area, are obstacle-lit unless shielded by an obstacle which is already lit. Three types of lights are used:

a) low intensity STEADY RED light for most situations;

b) medium intensity FLASHING RED light (hazard beacon) for early or special warning; and

c) flashing WHITE (strobe) light for day/night marking of tall structures.

5.15.4 In areas away from aerodromes, constructed obstacles that would be marked in accordance with *para 5.15.1* above will normally be lit.

5.16 **General Aviation Aircraft Lanes of Entry**

5.16.1 Certain light aircraft lanes located near major airports have strobe lights that mark the centreline of the lane. These lights are depicted on the appropriate VTC.

5.17 **Pilot Activated Lighting (PAL)**

5.17.1 PAL installations provide a means of activation of aerodrome, runway, taxiway, apron, VASIS and wind indicator lighting. The lighting is activated using coded carrier wave only VHF transmissions within a short range of a PAL equipped aerodrome. The method of activating PAL is detailed in *ERSA INTRO*. PAL frequencies are included for applicable aerodromes in *ERSA FAC*.

5.17.2 PAL will remain illuminated for 30 to 60 minutes depending on the installation timer setting. The wind indicator light will flash continuously during the last 10 minutes of lighting illumination to warn users that the lights are about to extinguish. To maintain continuity of lighting, repeat the activation sequence.

6. VISUAL APPROACH AND DOCKING GUIDANCE SYSTEMS

6.1 Visual Approach Slope Indicator Systems (VASIS)

Two types of VASIS are approved for use in Australia: T-VASIS, a high intensity system for use by day or night; and Precision Approach Path Indicator (PAPI), a colour discrimination system usable by day or night. The standard installation aims to provide an obstacle clearance of at least 11M above a 1.9° slope, within the azimuth splay of 7.5° either side of the runway centre line for a distance of 5NM from the threshold (7NM for a runway equipped with an ILS). When the installation differs from the standard, details are promulgated in the aerodrome documentation.

6.1.1 T-VASIS

The cross-bar indicates on-slope and deviations appear as one, two or three lights above or below the cross-bar. The sensitivity is similar to the “dot positions” on an ILS glide path.
Increased eye-height over the threshold can be achieved by flying the approach with one or more of the “fly-down” lights visible.

APPROACH SLOPE INDICATION	EYE HEIGHT ABOVE THRESHOLD
3 Lights fly up	0 to 7FT
2 Lights fly up	7 to 25FT
1 Light fly up	25 to 41FT
ON GLIDE SLOPE	**49 feet**
1 Light fly down	57 to 75FT
2 Lights fly down	75 to 94FT
3 Lights fly down	94 to 176FT

Note 1: The night azimuth splay is normally increased to 30° to permit T-VASIS to be visible on base leg. However, obstacle clearance is not guaranteed until the aircraft is within the runway approach obstacle limitation surface. Accordingly, T-VASIS should not be used for approach slope guidance until the aircraft is aligned with the runway.

Note 2: The presence of a thin layer of ground fog or mist may produce abnormal T-VASIS indications, including:

a. erroneous fly-down or fly-up signals; or

b. other fly-up or fly-down lights together with the correct lights (which are usually much brighter than the erroneous lights). Consequently, pilots should exercise caution when using the T-VASIS in ground fog or other conditions conducive to light reflection or refraction.

The above requirements may vary by 15FT depending on the location of the system.

The intensity of the system may be varied at the request of the pilot.

An abbreviated version of T-VASIS (AT-VASIS) is used at some locations, with the equipment located on only one side of the runway (usually the left).

6.1.2 **PAPI**

An installation consists of a set of four light boxes placed in a line at right angles to the runway, abeam the touchdown point and usually on the left hand side. Each box radiates both red and white light.

The transition between the red and white will appear instantaneous to the pilot (3 minutes of arc change); however, light changes between adjacent boxes will not occur unless the approach slope changes by about 0.25°. A one degree progressive incremental spread from the outermost to the innermost light unit about the standard approach angle provides the visual guidance shown in *Figure 1.*

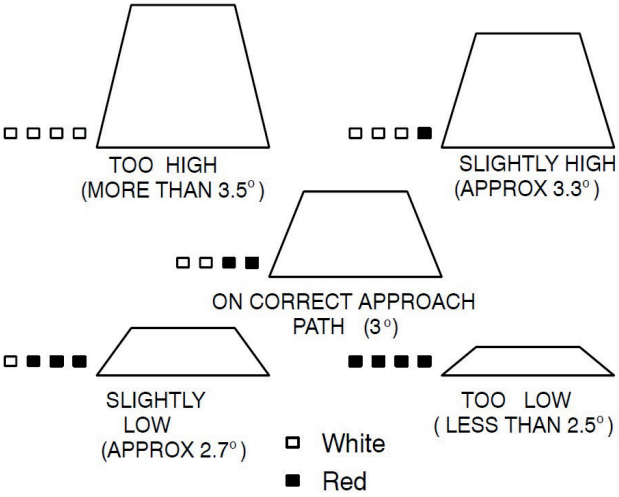
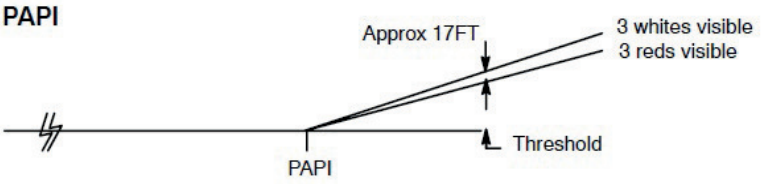


Figure 1 - PAPI Signals

The correct approach slope is shown to a ± 10 minute tolerance when two red and two white lights are seen. The two-red indication is always closest to the runway, irrespective of which side of the runway the PAPI is installed.

Unlike T-VASIS, PAPI is a point source aid. Thus a non-standard approach will not significantly alter the threshold crossing height; only the approach angle will change. This is illustrated in *Figure 2.*

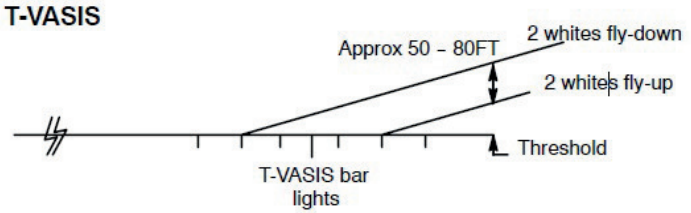


AIMING POINTS: Same

APPROACH ANGLES: Different (by up to 1° between the approaches illustrated)

THRESHOLD CROSSING HEIGHTS: Small differences (approx 17FT between the approaches illustrated)

FOUR WHITES: HIGH ON APPROACH



AIMING POINTS: Different

APPROACH ANGLES: Very small differences

THRESHOLD CROSSING HEIGHTS: Large differences possible (approx 50FT between the approaches illustrated)

FOUR (BAR) WHITES: ON-SLOPE

Figure 2

Note: An aircraft descending through the PAPI signals into the four red zone will receive no additional clues as to further downward displacement from the approach slope - the four reds may remain visible to ground level.

Since the meaning of a four-white PAPI indication is significantly different to the same T-VASIS indication, pilots should verify which system is installed prior to conducting the approach.

Condensation on PAPI lenses is known to be a cause of colour distortion. Therefore, PAPI systems should be activated at least ten minutes prior to use so that any condensation that may have formed on the lenses is evaporated before use.

6.1.3 **Control**

When controlled by ATS, the operation of the relevant VASIS will be activated as follows:

a. whenever night landing facilities are activated;

b. by day, for all approaching RPT, jet, and military aircraft; and

c. by day, on request by other aircraft.

When PAL is used to activate the runway lighting, the VASIS at both ends of the runway will be activated unless otherwise indicated in ERSA.

6.2 **Visual Docking Guidance Systems**

6.2.1 Visual Docking Guidance Systems used in Australia are Nose-In-Guidance (NIG) systems which provide both azimuth and stopping information for specific aircraft types. There are five (5) systems in general use, and these are described separately.

6.2.2 **The first NIG system** contains the following five elements whose locations are shown in *Figure 3*:

a. Position Identification Light,

b. Aerobridge Retracted Indicator,

c. Centreline Guidance Light,

d. Side Marker Board, and

e. Side Marker Light.

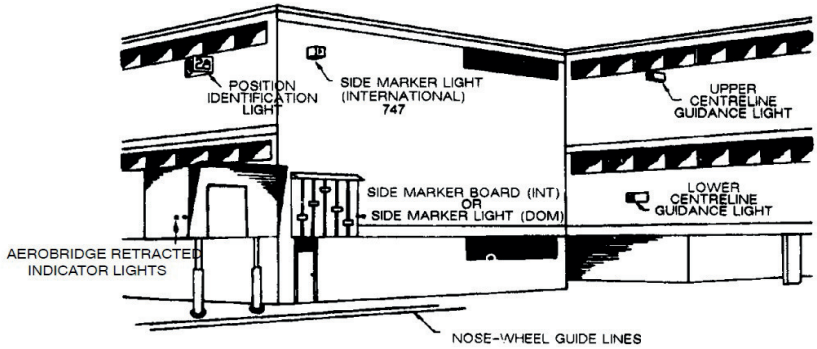


Figure 3 - Visual Docking Guidance System

6.2.3 Aircraft should use the following elements for docking:

AIRCRAFT TYPES	CENTRELINE LIGHT	STOP
DOMESTIC		
All types	Centreline Guidance Light	Side Marker Light
INTERNATIONAL		
All types except wide body	Lower Centreline Guidance Light	Side Marker Board
DC10	Intermediate Centreline	
B767, L-1011 A300B	Guidance Light	Side Marker Board
B747	Upper Centreline Guidance Light	Side Marker Light

Note 1: Some International docking positions are not equipped for wide body aircraft and, hence, only the Lower Centreline Guidance Light is provided.

Note 2: Heights of the Centreline Guidance Lights are:

– Lower: up to 5M

– Intermediate: 5 to 7.5M

– Upper: above 7.5M

6.2.4 The following is a brief description of the system:

a. The Position Identification Light indicates the number of the docking position and is white numerals on a black background outlined in green neon tubing at night.

b. The Aerobridge Retracted Indicator consists of two lights. The green light indicates the Aerobridge is in the fully retracted position. The red light indicates that the Aerobridge is not fully retracted or that an element of the visual guidance docking system is unserviceable.

c. The Centreline Guidance Light provides azimuth information and is aligned with the left pilot position. The unit emits RED/GREEN light beams and the signals are interpreted as follows:

RED/GREENAircraft is to the left of the centreline

GREEN/GREENAircraft is on the centreline

GREEN/REDAircraft is to the right of the centreline.

d. The slats on the Side Marker Board indicate the stopping position for each type of aircraft. Approaching the position, the slat will show GREEN; at the stopping position, the slat will show BLACK; and beyond that position, RED.

e. There are two Side Marker Light systems that indicate the stopping position.

Domestic (All types)

(1) Approaching the position, a preliminary dull GREEN light will show through the arrow-shaped aperture which also exhibits a cross bar.

(2) As the aircraft moves forward, the intensity of the green light increases until it becomes a bright arrow-head T shape which is the DC9 stopping point.

(3) As the aircraft continues, the bar of the stop signal disappears and the arrow-head starts to reduce in size.

(4) When the arrow-head disappears, two white bars appear, one above the other, indicating the stopping position. In some installations, two sets of bars are provided: one for the B727, the other for the B737.

(5) If the stopping position is passed, then a single RED bar appears.

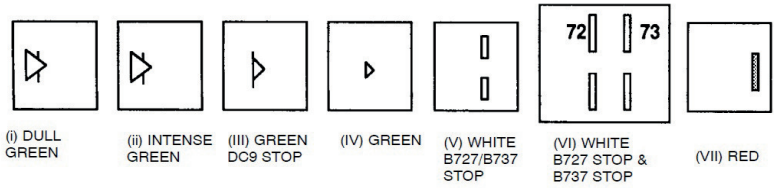


Figure 4 - Side Marker Lights (Domestic)
(DC9, B727 and B737)

International (for B747 Aircraft only). This is the same as the domestic system described above except that there is only one set of white bars and no bar around the arrow-head.

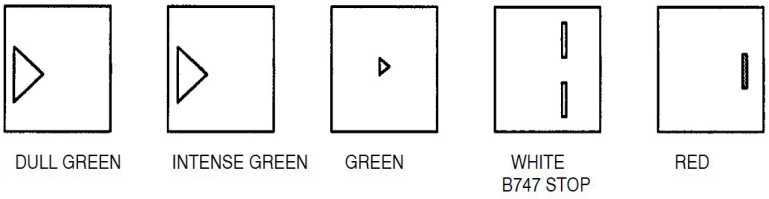


Figure 5 - Side Marker Light (International) (B747 only)

6.2.5 The above system is installed at Sydney (Kingsford Smith) Airport at the following locations:

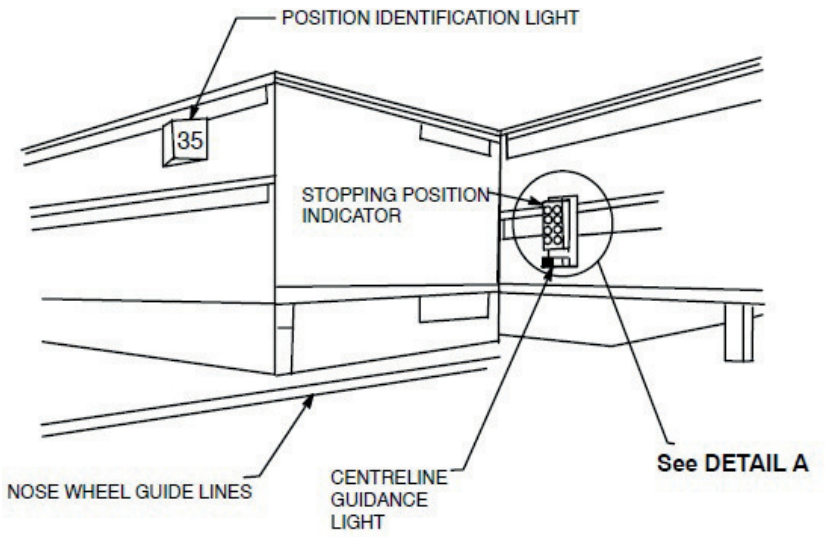
a. Domestic Terminal - Bay 49

6.2.6 **The second NIG system** contains the following three elements whose locations are shown in *Figures 6 and 7*:

a. Position Identification Light,

b. Centreline Guidance Light, and

c. Stopping Position Indicator.



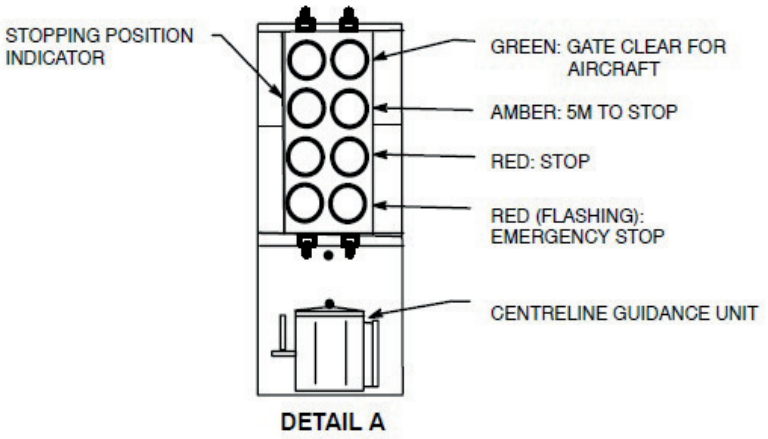


Figure 6 - Visual Docking Guidance System

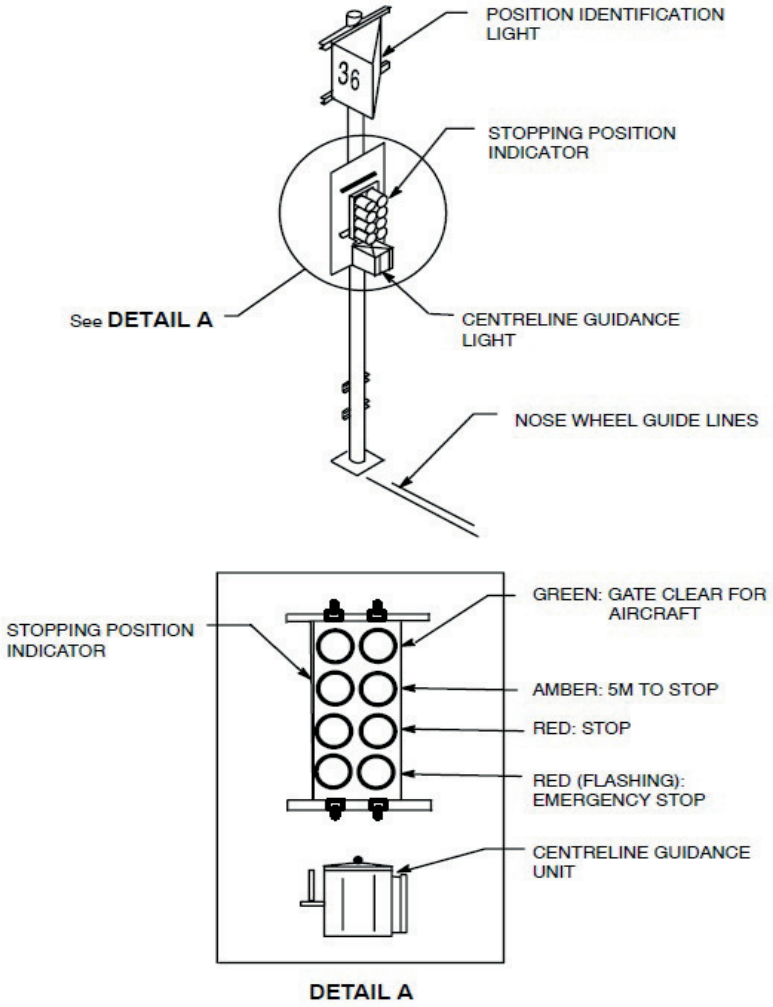


Figure 7 - Visual Docking Guidance System

6.2.7 Aircraft should use the following elements for docking:

AIRCRAFT TYPES	CENTRELINE LIGHT	STOP
All types	Centreline Guidance Light	Stopping Position Indicator

6.2.8 The following is a brief description of the system:

a. The Position Identification Light indicates the number of the docking position and is white numerals on a dark background outlined in green neon tubing at night.

b. The Centreline Guidance Light provides azimuth information and is aligned with the left pilot position. The unit emits RED/GREEN light beams, and the signals are interpreted as follows:

RED/GREEN	Aircraft is to the left of centreline.
GREEN/GREEN	Aircraft is on centreline.
GREEN/RED	Aircraft is to the right of centreline.

c. The Stopping Position Indicator is controlled by an airline ground marshaller and provides stopping information. The signals are interpreted as follows:

GREEN	GO	Gate is clear for aircraft.
AMBER	SLOW	Approximately 5M to STOP.
RED	STOP	Stop immediately.

RED (FLASHING) - EMERGENCY STOP

6.2.9 **Aircraft Positioning and Information System (APIS)**. The third NIG system operating in Australia is installed on International Terminal bays at Melbourne Airport, Sydney Airport International Terminal bays 2, 3, 4, 11 and 12; Domestic bays 33, 52, 53 and 55, Perth Airport Qantas Domestic bays 13 to 15, and also at Adelaide Airport Terminal 1 bays 12L, 13, 14L, 15, 16R, 16L, 18R, 18L, 19, 20R, 20L, 21, 22R, 22L, 23, 24L, 25, 26L, 28R, 28L and 29. The APIS is based on a centreline guidance sub-display. The steering and stop indication is provided from a display unit mounted on a pole in front of the cockpit in line with the left hand pilot seat. The parking bay position identification is mounted on top of the guidance pole.

6.2.10 On approach to the parking position, the pilot will see the display box face showing two rows of yellow alpha-numeric characters on a black background across the top, an illuminated closing-rate ‘thermometer’ at lower left, and an illuminated azimuth guidance display at lower right. The alpha-numeric characters on the top row should be flashing (see diagram at *Figure 8*).

6.2.11 The following is the sequence of APIS operation from initial approach to STOP:

a. Identify the correct parking bay position.

b. Ensure that the aerobridge retraction light indicates green.

c. Follow the taxi-in line and watch the centreline beacon.

d. Check that the correct aircraft type is flashing and that the door number is shown (where applicable).

e. About 20M before STOP, the aircraft type display goes steady and the door number disappears.

f. Follow the azimuth guidance display. The black arrow heads indicate which direction to steer for the centreline. When the aircraft is properly aligned in azimuth, the black vertical bar will be displayed.

g. The full closing rate 'thermometer' indicates at least 13M to STOP.

h. When the aircraft reaches 13M to STOP, the 'thermometer' bar lights begin to move from bottom to top.

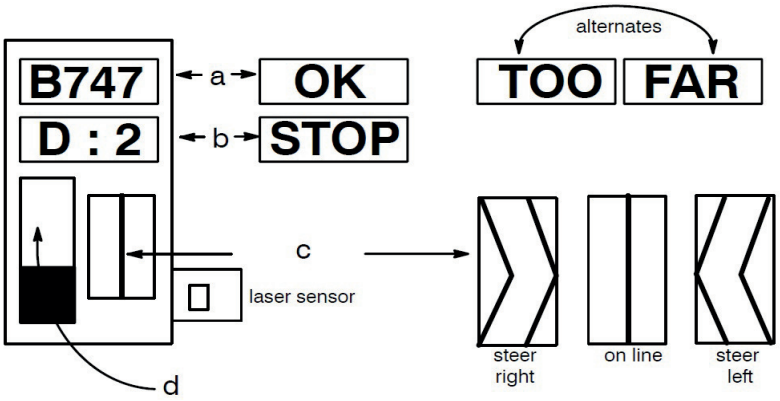
i. The deletion of each 'thermometer' bar indicates about one half metre progression.

j. When the STOP position is reached, all the closing rate 'thermometer' lights extinguish and the lower display indicates STOP. If the aircraft is parked correctly, the top display indicates OK.

k. If the aircraft overshoots the limit for correct parking, the top display indicates TOO FAR (alternating TOO then FAR).

l. The entire display automatically shuts down after some seconds.

Note: When the last row of lights of the closing rate 'thermometer' is extinguished and the word STOP is displayed, the aircraft should be at a standstill.



LEGEND

a. Display: ACFT type, OK or TOO/FAR

b. Display: Door Number or STOP

c. Centreline Beacon: steering guidance

d. 'Thermometer': closing rate indication - stopping guidance.

Note: The lettering is yellow on a black background. The 'thermometer' is yellow and goes black from bottom to top. The centreline beacon is a central black band surrounded by yellow.

Figure 8 – Visual Guidance System for Melbourne INTL

6.2.12 **RLG NIG System.** The fourth system is the RLG system which is installed at Brisbane International Airport and operates on Bays 77 to 84. This system is based on a centreline guidance display unit mounted on the wall of the terminal building. The complete Visual Guidance Docking System consists of three separate components:

a. Position Identification Unit (Bay Marker),

b. Aerobridge Retracted Indicator Light, and

c. RLG NIG Unit.

6.2.13 The Position Identification Unit (Bay Marker) gives clear indication of the parking bay for the aircraft. It consists of large white numerals on a dark background (illuminated at night by green neon lights) and is situated on the terminal wall with the NIG system unit.

6.2.14 The Aerobridge Retraction Indicator Light, mounted on the aerobridge, gives an early warning of the state of the aerobridge location. Green indicates a fully retracted aerobridge position, or a safe pre-parked position; red indicates that the aerobridge is out of position, and the pilot should not proceed with parking the aircraft. The NIG system is unable to be used while the aerobridge is out of position, and will flash a red signal.

6.2.15 The NIG unit consists of three components which provide information to the pilot:

a. the display box (top) which shows aircraft type designation in white lights,

b. the green/yellow/red 'traffic lights' display box (centre), and

c. the green/red azimuth centreline display unit (bottom).

Diagrams of the RLG system are shown at *Figure 9*.

6.2.16 The aircraft types which can utilise the system are displayed as follows:

Type	**Display**
Boeing	777, 7673, 7672, 757, 747, 747-SP, 737.
McDonnell Douglas	DC10, MD11.
Lockheed	1011.
Airbus Industries	300, 310, 320, 330.

6.2.17 The following is the sequence of system operation from initial approach to STOP:

a. Identify the correct parking bay position.

b. Ensure that the aerobridge retraction light indicates green.

c. Follow the taxi-in line and check that the correct aircraft type is displayed (white light on black background).

d. If two (or one) round green lights are illuminated, proceed.

Note: Failure of both green lights will render the system inoperable.

e. Line up so that the green vertical azimuth tube is visible (this is lined up on the left hand seat only).

f. If a vertical line of red is seen to one side of the green vertical azimuth tube, the aircraft is off line in that direction. Steer towards the green.

g. When the aircraft is 10M from STOP, the round green lights extinguish, the two (or one) yellow (caution) lights appear. The aircraft type display lights now change to indicate 'countdown to STOP', and will show 10M.

Note: Failure of both yellow lights will render the system inoperable.

h. Countdown to STOP will be indicated at 10M, 5M and 2M.

i. When the stopping position is reached, the yellow lights are extinguished and two (or one) red lights appear, and the countdown indicator changes to STOP.

Note: Failure of both red lights will render the system inoperable.

The aircraft is now at the correct location to allow the aerobridge to be moved to the aircraft door. If the NIG system is not turned off once the aircraft docks, movement of the aerobridge will cause the two (or one) round red lights to flash. This is not an emergency situation.

Note: Ground engineers have access to emergency push-buttons to deactivate the system should this become necessary. If an emergency situation occurs, operation of any push-button will cause:

a. the aircraft/countdown display to extinguish,

b. two (or one) round red lights to flash, and

c. the aerobridge retraction light to indicate red.

Ground engineers will be required to complete the guide-in manually once the emergency situation is cleared.

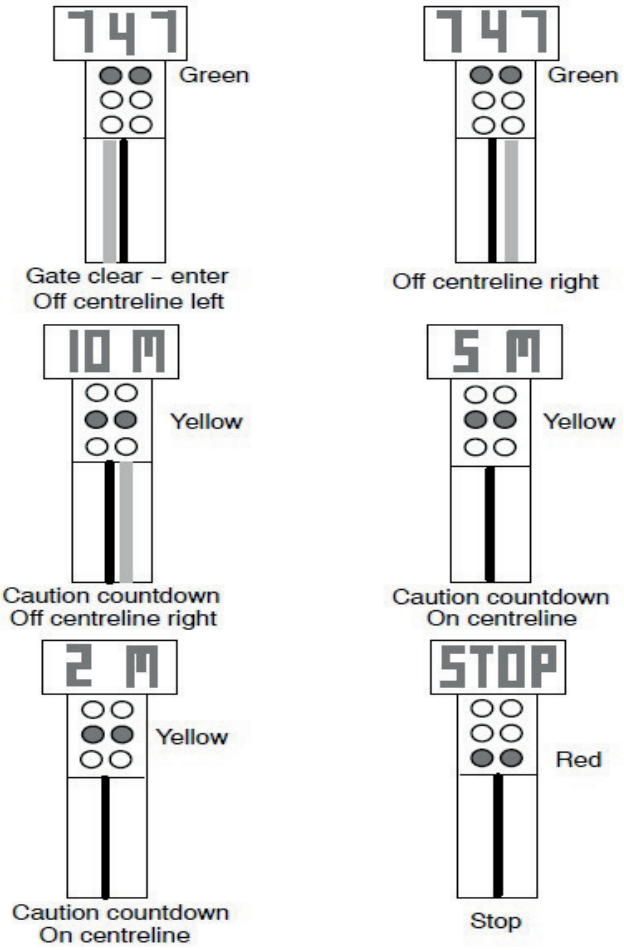


Figure 9 - RLG Automated Guide-In System (Brisbane INTL)

6.2.18 **Safegate Docking Guidance System (DGS)**. The fifth NIG system is the Safegate DGS and is used at Brisbane International Terminal (Bays 85 and 86), Cairns International Terminal (Bays 1, 2, 3, 4, 5 and 6), Cairns Domestic Terminal (Bays 18, 19, 20, 21 and 22), Darwin International Terminal (Bays 1, 2, 3, 4, 5 and 6), Melbourne International Terminal (Bays D2, D3, D4, D5, D6 and D8), Perth International Terminal (Bays 143, 144, 145, 146 and 147-155), Perth Domestic Terminals (Bays 12-16, 17, 17A, 18, 19, 19A, 20, 20A and 22-24), Sydney International Terminal (Bays 1, 5, 6, 8, 9, 10, 24, 25, 30, 31, 32, 33, 34, 35, 36, 37, 50, 51, 53, 54, 55, 56, 57, 58, 59, 60, 61, 63, 73, 74, 75, 76 and 77), Sydney Domestic Terminal (Bays 31, 32, 34, 35, 36, 38, 39, 40, 41, 42, 43, 44, 44A, 45, 45A, 54, 56 and 57) and Sydney Qantas Terminal (Bays 1, 2, 3, 4, 5, 6, 7, 7A, 8, 9, 10, 11, 12, 13, 14 and 16). Its operation is based on laser scanning of the incoming aircraft.The complete system consists of the following three elements:

a. Position Identification Unit (Bay Marker);

b. Aerobridge Retracted Indicator Light; and

c. DGS NIG Unit.

6.2.19 The Position Identification Unit gives clear indication of the parking bay for the aircraft. It consists of large white numerals on a dark background (illuminated at night by green neon lights).

6.2.20 The Aerobridge Retraction Indicator Light, mounted on the aerobridge, gives an early warning of the state of aerobridge location. Green indicates a fully retracted aerobridge position or a safe pre-parked position; red indicates that the aerobridge is out of position and the pilot should not proceed with parking the aircraft.

6.2.21 The NIG unit, mounted on the Terminal wall, consists of two components which supply the following information to the pilot:

a. The top alphanumeric information display which shows aircraft type designation, and other message information as necessary in yellow.

b. The azimuth and centreline guidance displays in red and yellow and the Closing Rate Bar in yellow.

6.2.22 The aircraft types which can utilise the system at each airport are displayed as follows:

Brisbane

Type	Display
Boeing	777, 767, 757, 747, 737, 727, 717, 707
McDonnell Douglas	MD11, DC10
Airbus Industrie	340, 330, 320, 319, 310, 300
British Aerospace	146
Fokker	F100
Lockheed	L1011

Cairns

Type	Display
Airbus Industrie	300 (Bays 2, 3, 4, 5 & 6), 319 (Bays1, 18, 19, 20, 21, 22), 320, 321, 330 (Bays 1, 2, 3, 4, 5, 6, 18, 19, 20), 340 (Bays 1, 2, 3, 4, 5, 6, 20).
Boeing	707 (Bays 5 & 6), 717 (Bays 21 & 22), 727 (Bays 5 & 6), 737/4 (Bays 18, 19, 20, 21, 22), 737/7, 737/8 (Bays 18, 19, 20, 21, 22), 737/9 (Bays 18, 19, 20, 21, 22), 747 (Bays 1, 2, 3, 4, 5, 6, 18, 19, 20), 757 (Bays 1, 2, 3, 4, 5, 6), 767 (Bays 1, 2, 3, 4, 5, 6, 18, 19, 20), 777 (Bays 1, 2, 3, 4, 5, 6), 787 (Bay 20).
Embraer	E170, E190 (Bays 5, 6, 18, 19, 20, 21, 22)
Fokker	F100 (Bays 1, 21, 22)
McDonnell Douglas	DC10/1 (Bays 1, 2, 3, 4, 5, 6), DC10/2 (Bays 2, 3, 4), MD11 (Bays 1, 5, 6)

Darwin

Type	Display
Airbus Industrie	310 (Bay 2), 319, 320, 321(Bays 1, 2, 3, 4 & 5) 330 (Bay 1 & 2), 340-300 (Bay 1), 340-600 (Bay 1), 380 (Bay 1).
Antonov	An-124 (Bay 1)

Boeing	717 (Bay 1, 2, 3, 4 & 5), 737 All Series (Bay 2, 3 & 4), 737-300 (Bay 1), 737-500 (Bay 1), 737-800 (Bay 1 & 5), 757 (Bay 1, 2 & 3), 767 (Bays 1, 2 & 3), 777 (Bays 1 & 2), 787 (Bay 1 & 2)
Embraer	E170, E190 (Bay 1, 2, 3, 4 & 5)
Fokker	F70 (Bay 1 and 2), F100 (Bay 1, 2, 3, 4 & 5)
McDonnell Douglas	MD11 (Bay 1)

Melbourne

Type	**Display**
Boeing	777-300, 777-200, 767, 747, 737-800, 737-700, 737-400, 737-300
McDonnell Douglas	MD11, DC10
Airbus Industrie	340-500, 340-300, 340-200, 330, 320, 310, 300

Perth

Type	**Display**
Boeing	777-300 (plus 2nd door), 777-200, 767, 767-300 (plus 2nd door), 757-200, 747-SP, 747 (plus 2nd door), 737, 727-200, 707, 717-200
McDonnell Douglas	MD11 (plus 2nd door), DC10 (plus 2nd door)
Airbus Industrie	340 (plus 2nd door), 330, 330-300 (plus 2nd door), 321, 320, 319, 310, 300
British Aerospace	BAe146
Fokker	F100
Embraer	E190, E170

Sydney

Type	**Display**
Airbus Industrie	A300, A310, A320, A321, A330, A340, A380
Boeing	B737, B747, B757, B767, B777, B787
British Aerospace	BAe146
Embraer	E190
Fokker	F100

McDonnell Douglas MD11

6.2.23 The following is the sequence of system operation from initial approach to STOP:

a. The pilot identifies the correct parking bay position.

b. The pilot ensures that the aerobridge retraction light is green.

c. The pilot observes that the rising vertical yellow arrows are indicating the system is activated and searching for the approaching aircraft.

Note: The pilot must not enter the stand area unless the rising vertical arrows are displayed.

d. The pilot follows the taxi-in line and checks that the correct aircraft type is displayed in yellow.

Note: The pilot must not enter the stand area unless the correct aircraft type is displayed.

e. On successful capture of the aircraft, the vertical arrows are replaced by the yellow T-shaped Closing Rate Bar.

Note: The pilot must not proceed to the bridge unless the arrows have been superseded by the Closing Rate Bar.

f. A vertical yellow arrow shows the aircraft position in relation to the centreline.

g. A flashing red arrow indicates the direction to turn to return to the centreline.

Note: If the aircraft is approaching faster than the accepted speed, the system will show SLOW DOWN as a warning.

h. The display of the yellow digital closing rate countdown will start when the aircraft is 20 metres from the STOP position.

Note: If the detected aircraft is lost prior to 12 metres to STOP, the display will show WAIT. The docking will continue as soon as the system detects the aircraft again.

i. When the aircraft is 12 metres from the STOP position, the Closing Rate Bar will decrease in size from the bottom by one row of lights per 0.5 metres closing rate.

Note: If the detected aircraft is lost after 12 metres to STOP, the display will show STOP and ID FAIL. Assistance must then be sought from the ground engineers.

j. When the correct STOP position is reached, the display shows STOP and red lights will be lit.

k. When the aircraft has parked, OK will be displayed.

l. If the aircraft has overshot the position, TOO FAR will be displayed.

m. When ground engineers have placed the chocks at the nosewheel, they will manually change the display to CHOCK ON.

n. During heavy rain or fog, the visibility for the docking system might be reduced. When the system is activated and in capture mode, the display will deactivate the rising vertical arrows and show DOWN GRADE. This text will be superseded by the Closing Rate Bar once the aircraft is detected.

Note: The pilot must not continue the approach to the bridge unless the DOWN GRADE text has been superseded by the Closing Rate Bar.

Note: Ground engineers have access to emergency push-buttons to deactivate the system. When an emergency stop is activated, the display will show STOP. The ground engineers will then be required to complete the docking manually once the emergency situation is cleared.

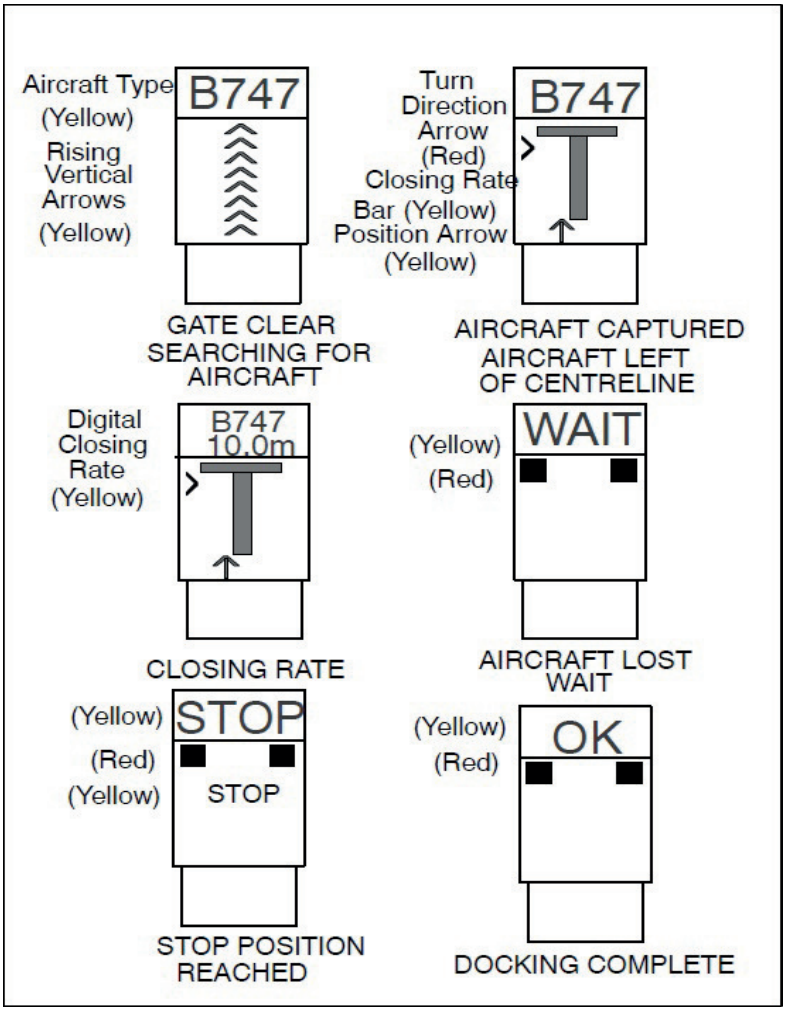


Figure 10 - Safegate Docking Guidance System

6.3 **Wind Direction Indicators**

6.3.1 At least one wind direction indicator is provided on each certified or registered aerodrome.

6.3.2 The primary wind indicator, coloured white, is located near the terminal. Other wind indicators are coloured yellow and those serving a particular runway are located upwind of the runway threshold on the left side.

6.4 **Segmented Circle**

6.4.1 A Segmented Circle visual indicator system is one method that may be used to provide circuit information at some non-controlled aerodromes. Circuit indicators are placed in pairs at opposite sides of the segmented circle to indicate runway alignment and circuit direction for each set of reciprocal runways.

6.4.2 The segmented circle may be based around the primary wind indicator at an aerodrome. Markings that may be placed upon the segmented circle include “Circuit Indicators”. These indicators are used for the purpose of controlling the direction of the circuit when there is any variation from the normal left hand circuit

7. PAVEMENT STRENGTH LIMITATIONS

7.1 **General**

7.1.1 The Aircraft Classification Number/Pavement Classification Number (ACN/PCN) method is used to specify the strength of pavements and hence permissible aircraft masses.

7.1.2 The operation of an aircraft above the maximum masses and tyre pressures is not permitted unless a pavement concession is approved.

7.1.3 The minimum widths of runways and runways strips required by various types of aircraft are specified in *ENR 1.1 Section 11.9.2*.

7.1.4 Operators of non-scheduled aircraft requiring to park on aprons used by scheduled services should check parking availability with the Aerodrome Operator at least 48 hours before the operation.

7.2 **Information Published For Rated Pavements**

7.2.1 The parameters published to specify the strength of a pavement suitable for use by aircraft above 5,700KG maximum all up mass are:

a. Pavement Classification Number (PCN)

b. The pavement type: Rigid Pavement R

Flexible Pavement F

c. The subgrade strength in four standard categories:

High Strength	A
Medium Strength	B
Low Strength	C
Ultra-low Strength	D

d. The maximum tyre pressure in kilopascals (KPA)

e. The method by which the pavement has been evaluated:

by technical evaluation	T
from aircraft experience	U

7.2.2 The parameters published for pavements suitable for use by aircraft not above 5,700KG maximum all up mass are:

a. the permissible aircraft gross mass in kilograms; and

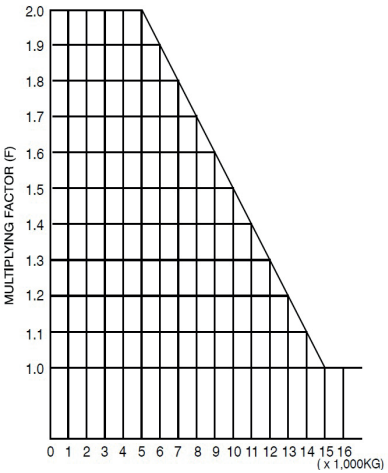
b. the maximum tyre pressure in kilopascals.

7.3 **Determination of Pavement Strength Suitability - Rated Pavements**

7.3.1 Compare the aircraft tyre pressure with the maximum listed for the pavement:

a. if the tyre pressure does not exceed that listed, proceed to *para 7.3.2*.

b. if the tyre pressure exceeds that listed, the permissible pressure may be increased using the factor obtained in *Figure 1* up to a limit of 1,400KPA. If the pressure requirements are then met, and provided that not more than four movements within a seven day period are proposed for aircraft above 5,700KG maximum gross mass, the user should proceed to *para 7.3.2.*



AIRCRAFT GROSS MASS
PERMANENT TYRE PRESSURE CONCESSIONS

Figure 1 - Permanent Tyre Pressure Concessions

7.3.2 An aircraft may use a pavement if its ACN for the appropriate type and subgrade strength does not exceed the published PCN, as illustrated in the following example.

Aircraft: B727-200; gross mass 80,000KG and 1035KPA tyre pressure.

Pavement: PCN 40/F/A/1050/T.

a. The tyre pressure, 1035KPA, is not above the maximum allowable, so no tyre pressure restriction applies.

b. As shown by the dashed line in *Figure 2*, the ACN at a gross mass of 80,000KG on a flexible pavement with category A subgrade is 42.8.

c. The ACN is greater than the PCN and the operation should not take place (except with a pavement concession approval from the aerodrome operator - see *para 7.5*).

d. The maximum permissible gross mass can be determined as shown by the dotted line on *Figure 2*, i.e. the maximum permissible ACN is the PCN (40), and the gross mass is then determined (75,300KG).

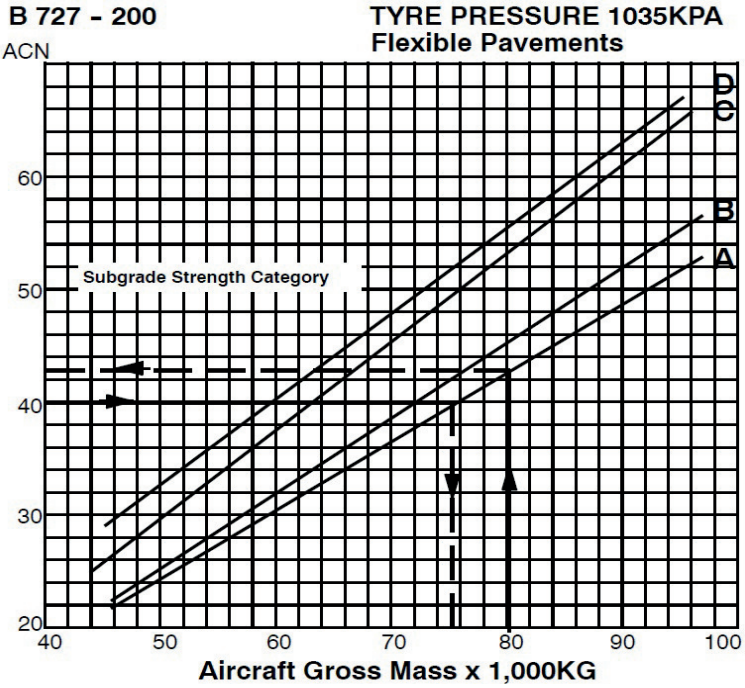
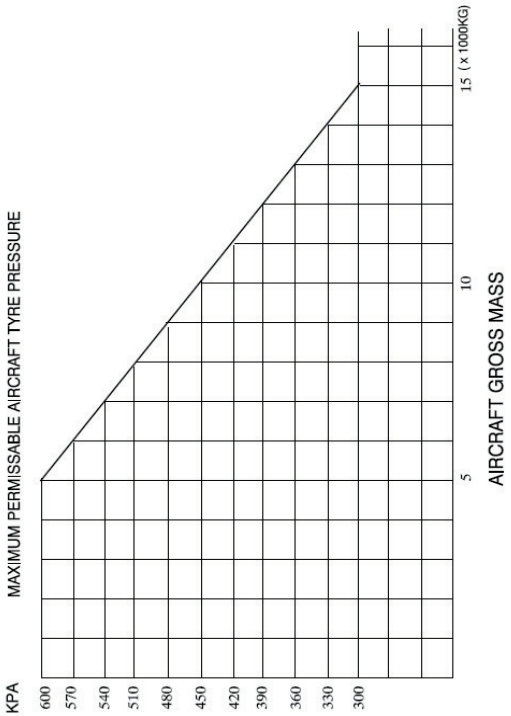


Figure 2

7.4 **Determination of Pavement Strength Suitability - Unrated Pavements**

An aircraft may operate on an unrated pavement, provided the aircraft gross mass and tyre pressure do not exceed that determined in *Figure 3.*



AIRCRAFT SUITABLE FOR UNRATED PAVEMENTS

Figure 3

7.5 **Pavement Concessions**

7.5.1 The operator of an aircraft requiring a pavement concession should apply to the airport operator (see *ERSA* for details).

7.6 **Care of Pavements**

7.6.1 Pilots should avoid running aircraft wheels close to edges of pavements or on to the shoulders of either runways or taxiways.

7.6.2 Tight turns on runways should be avoided and turning nodes, where provided, should be used. Locked wheels, in particular, should be avoided.

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AD 1.2 RESCUE AND FIRE FIGHTING SERVICES AND SNOW PLAN

1. Details of the rescue and fire fighting services available at Australian aerodromes can be found in the *ERSA*.

2. A Snow Plan is not relevant to Australia.

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AD 1.3 INDEX TO AERODROMES AND HELIPORTS

1. A complete list of codes for aerodromes and helicopter landing sites in Australia is available in *ERSA GEN*. Certified, registered, uncertified and unregistered aerodromes, together with location and status details, are identified, in alphabetical order, in *ERSA FAC*.

2. Frequently-used Helicopter Landing Sites (HLSs) are identified, by symbology, on VTC and some en route aeronautical charts (ERCs). They are also identified on the aerodrome diagram contained in *ERSA FAC*.

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AD 1.4 GROUPING OF AERODROMES/HELIPORTS

1. Australian aerodromes and heliports are not grouped.

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AD 2. AERODROMES
AD 2.1 AERODROME LOCATION INDICATOR AND NAME

1. Full details of all international and domestic (certified, registered and military) aerodromes in Australia and its territories are provided in *ERSA FAC*.

2. Details of uncertified and unregistered aerodromes (ALAs) are also included in *ERSA FAC* at the request of the aerodrome operator. It is the sole responsibility of a pilot intending to use any uncertified or unregistered aerodrome (ALA) to obtain current information on that aerodrome from the owner/operator prior to flight planning and to assess the suitability of the aerodrome for the intended operation.

3. A full list of location indicators along with encode and decode is provided in *ERSA IND-GEN*.

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AD 3. HELIPORTS
AD 3.1 HELIPORT LOCATION INDICATOR AND NAME

1. Details of domestic heliports in Australia and its territories are contained in *ERSA GEN*.

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