CHAPTER 5:

VISUAL AIDS FOR NAVIGATION

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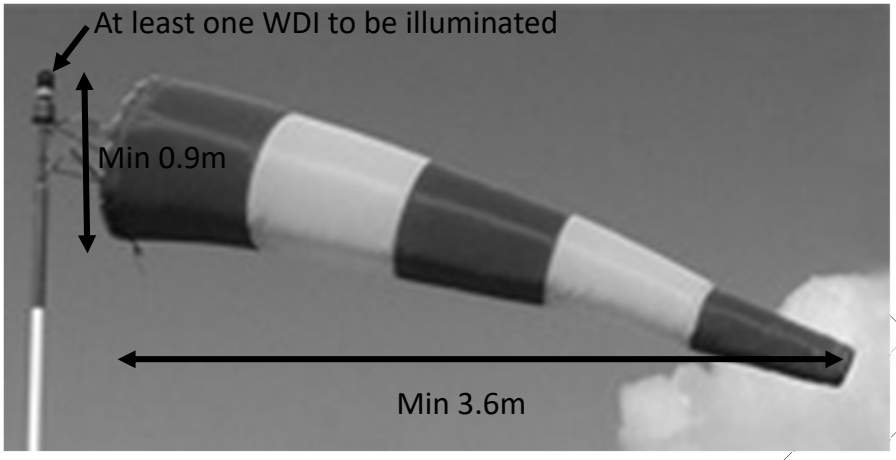
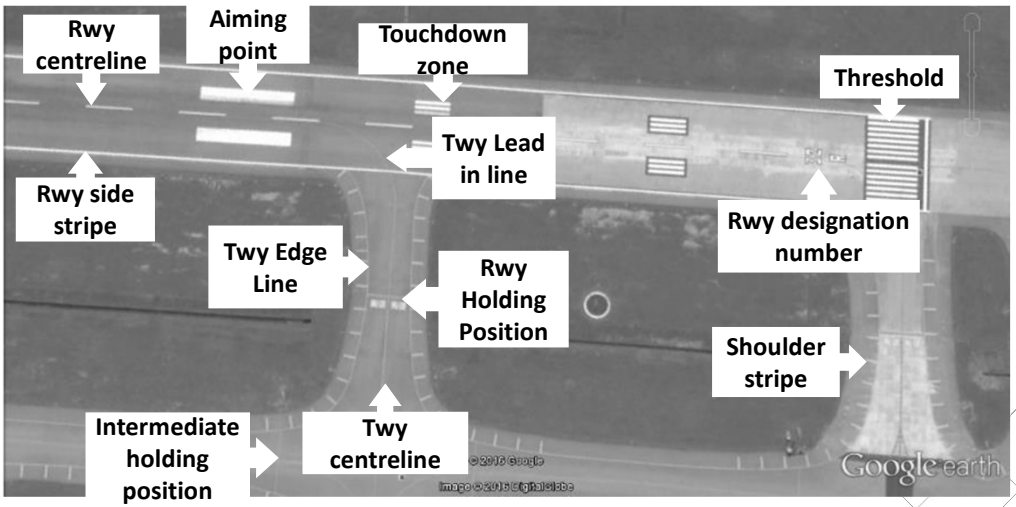
WIND DIRECTION INDICATOR

5.1.1.1 An aerodrome shall be equipped with at least one WDI



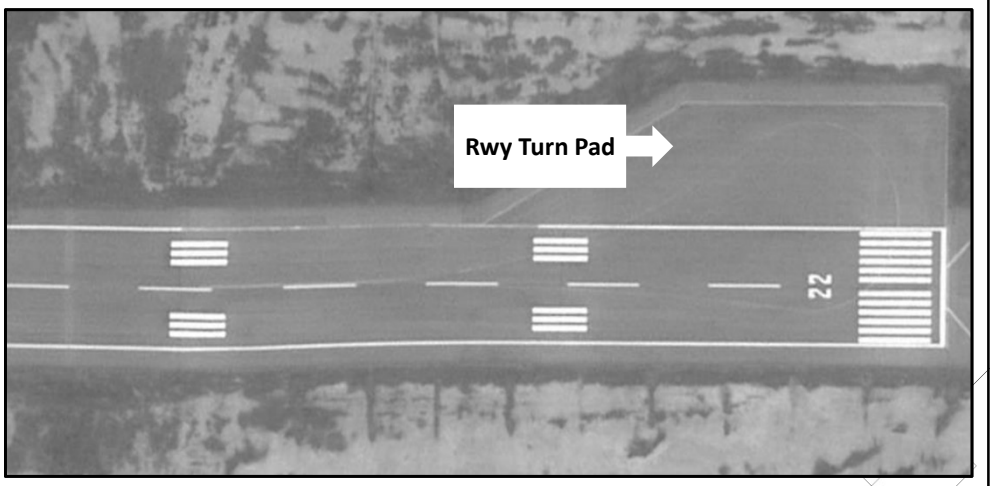
95

TYPICAL MARKINGS



96

TYPICAL MARKINGS



97

MARKINGS - COLOURS

5.2.1.4 Runway – **WHITE**

5.2.1.5 Taxiway, runway turn pad and aircraft stand – **YELLOW**

5.2.1.6 Apron safety line - **RED**

MARKINGS - RUNWAY

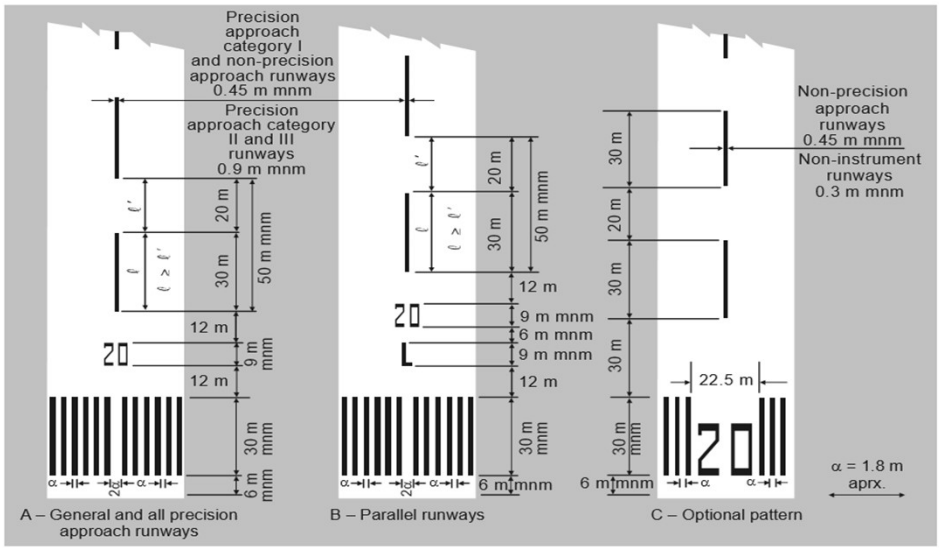
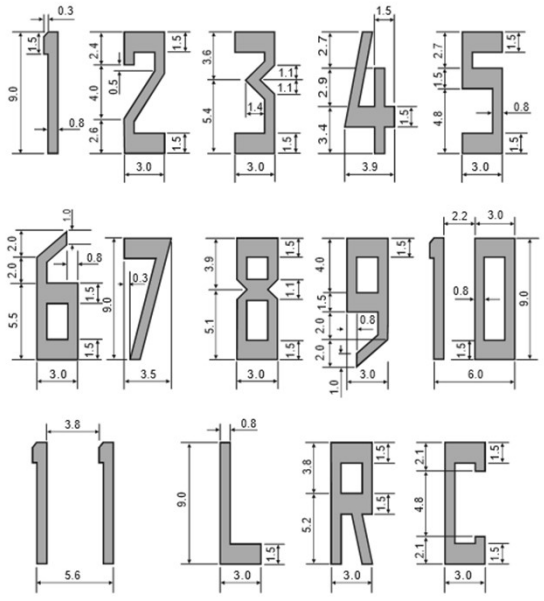


Figure 5-2. Runway designation, centre line and threshold markings

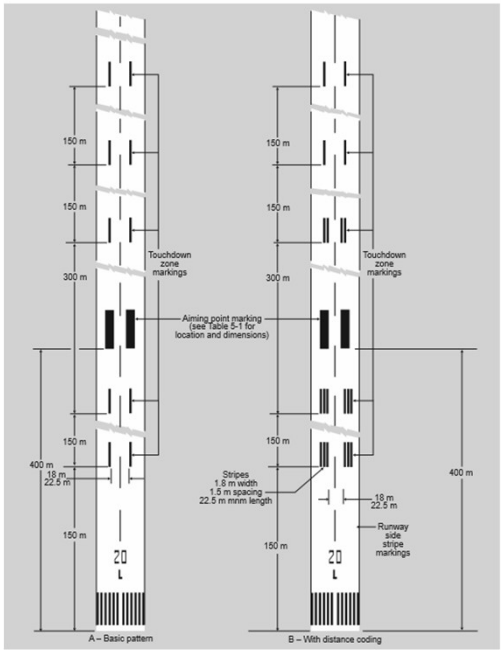
MARKINGS - RUNWAY



Form & proportions of runway designation markings

100

MARKINGS - RUNWAY



Aiming point & touchdown zone marking

(runway > 2400m)

101

MARKINGS - RUNWAY

Aiming point
(runway < 2400m)

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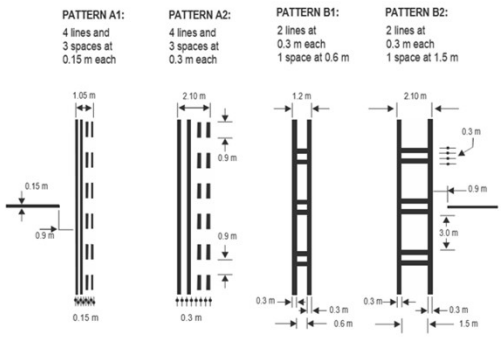
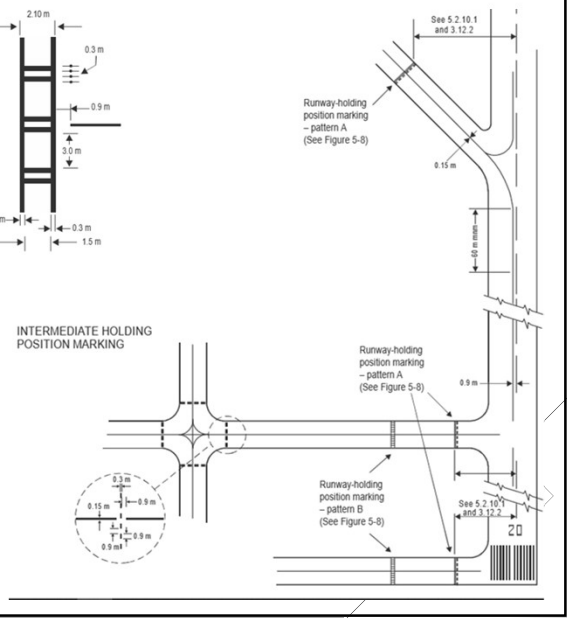
MARKINGS - TAXIWAY



Line thickness min.
150mm thk



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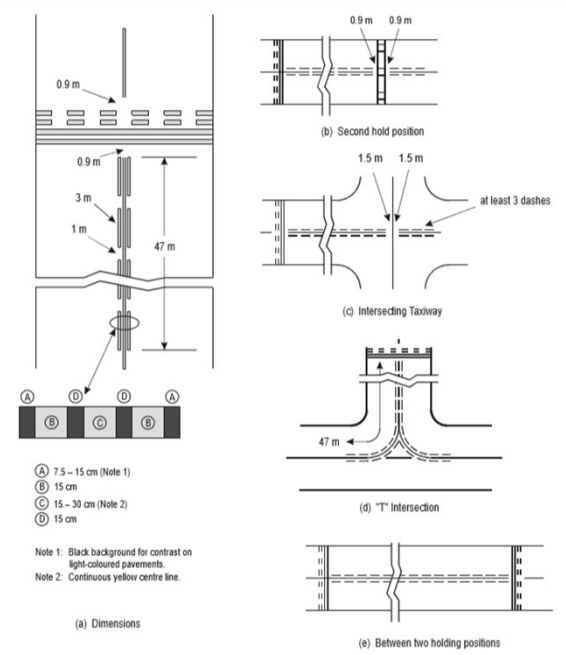
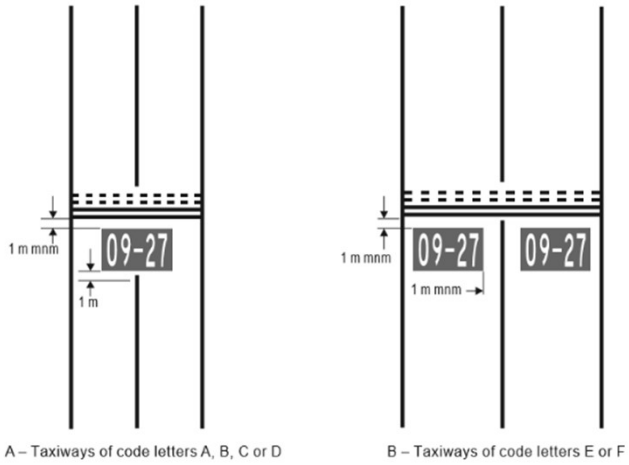
MARKINGS - TAXIWAY



5.2.8.9 Enhanced Taxiway Marking

104

MANDATORY INSTRUCTION MARKINGS

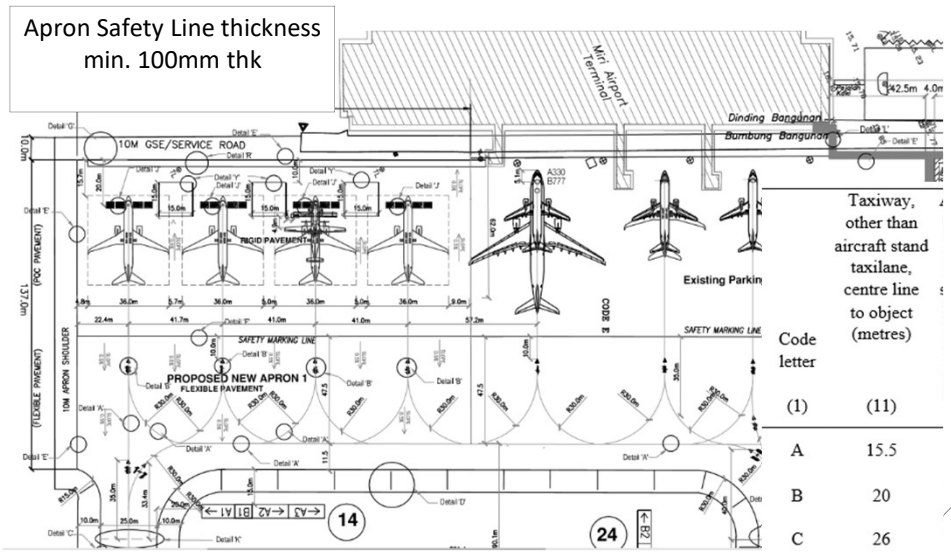


5.2.16.1 Where it is impractical to install a mandatory instruction sign, a mandatory instruction marking shall be provided on the surface of the pavement

105

APRON SAFETY LINES

Apron Safety Line thickness min. 100mm thk



Code letter	Taxiway, other than aircraft stand taxilane, centre line to object (metres)
(1)	(11)
A	15.5
B	20
C	26
D	37
E	43.5
F	51

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INFORMATION MARKINGS

- 5.2.17.1 Where an information sign would normally be installed and is impractical to install, as determined by the appropriate authority, an information marking shall be displayed on the surface of the pavement

- Yellow background; black letters

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LOCATION MARKINGS

Black background , yellow letters

Option 2 – Basic stop line marking

Characteristics

Dimension : A 1.0 m (mnm.)

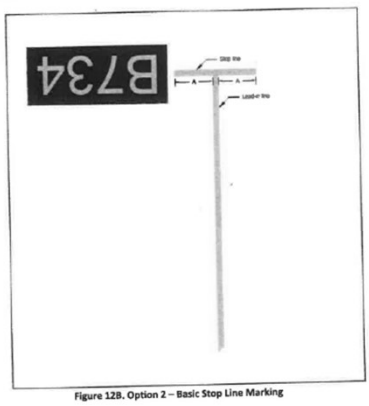

Figure 12B. Option 2 – Basic Stop Line Marking

Option 1 – Multiple stop line marking

Characteristics

Dimension : A 1.0 m (mnm.)

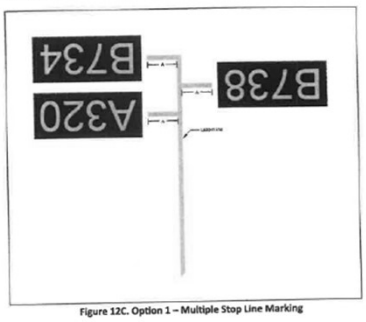

Figure 12C. Option 1 – Multiple Stop Line Marking

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LOCATION MARKINGS

Single aircraft type

Characteristic

Dimension : A 1.0 m
B 1.5 m
C Acc. to character width

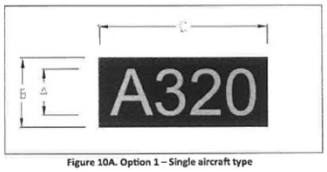

Figure 10A. Option 1 – Single aircraft type

Option 1 – Multiple aircraft type

Characteristic

Dimension : A 1.0 m
B 1.5 m
C Acc. to character width
D 0.5 m

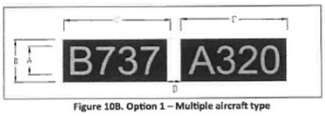

Figure 10B. Option 1 – Multiple aircraft type

Option 2 – Multiple aircraft type

Characteristic

Dimension : A 1.0 m
B 3.0 m
C Acc. to character width

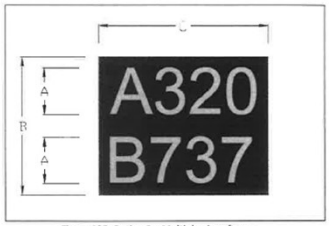

Figure 10C. Option 2 – Multiple aircraft type

Option 3 – Multiple aircraft type

Characteristic

Dimension : A 1.0 m
B 1.5 m
C Acc. to character width

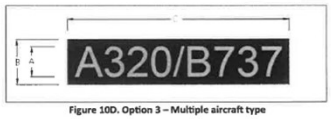

Figure 10D. Option 3 – Multiple aircraft type

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LOCATION MARKINGS

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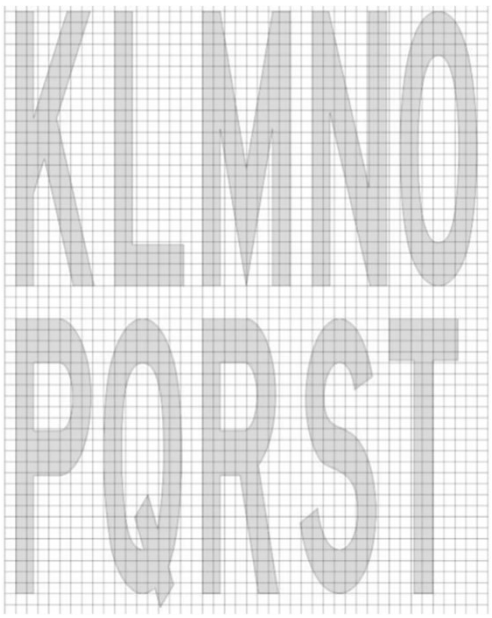
MARKINGS – SIZE & PROPORTIONS



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SIGNS

5.4.1.1 *Application*

- Signs shall be provided to convey a mandatory instruction, information on a specific location or destination on a movement area or to provide other information to meet the requirements of the surface movement guidance and control systems.

5.4.1.3 Characteristics

- Signs shall be frangible. Those located near a runway or taxiway shall be sufficiently low to preserve clearance for propellers and the engine pods of jet aircraft. The installed height of the sign shall not exceed the dimension shown in the appropriate column of Table 5-5.

TAXIING AND GUIDANCE

Table 5-5. Location distances for taxiing guidance signs including runway exit signs

Sign height (mm)				Perpendicular distance from defined taxiway pavement edge to near side of sign	Perpendicular distance from defined runway pavement edge to near side of sign
Code number	Legend	Face (min.)	Installed (max.)		
1 or 2	200	400	700	5–11 m	3–10 m
1 or 2	300	600	900	5–11 m	3–10 m
3 or 4	300	600	900	11–21 m	8–15 m
3 or 4	400	800	1 100	11–21 m	8–15 m

TAXIING AND GUIDANCE

Characteristics

- Signs shall be rectangular, as shown in Figures with the longer side horizontal.
- The only signs on the movement area utilizing red shall be mandatory instruction signs.

RUNWAY VACATED/LOCATION

RUNWAY EXIT

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TAXIING AND GUIDANCE

a) Letter to letter code number

Preceding Letter	Following Letter: B, D, E, F, H, I, K, L, M, N, P, R, U	C, G, O, Q, S, X, Z	A, J, T, V, W, Y
	Code number		
A	2	2	4
B	1	2	2
C	2	2	3
D	1	2	3
E	2	2	3
F	2	2	3
G	1	2	2
H	1	1	2
I	1	1	2
J	1	1	2
K	2	2	3
L	2	2	4
M	1	1	2
N	1	1	2
O	1	2	2
P	1	2	2
Q	1	2	2
R	1	2	2
S	1	2	2
T	2	2	4
U	1	1	2
V	2	2	4
W	2	2	4
X	2	2	3
Y	2	2	4
Z	2	2	3

b) Numeral to numeral code number

Preceding Numeral	Following number: 1, 5	2, 3, 6, 8, 9, 0	4, 7
	Code number		
1	1	1	2
2	1	2	2
3	1	2	2
4	2	2	4
5	1	2	2
6	1	2	2
7	2	2	4
8	1	2	2
9	2	2	2
0	1	2	2

c) Space between characters

Code No.	Character height (mm) 200	300	400
	Space (mm)		
1	48	71	95
2	38	57	76
3	25	38	50
4	13	19	26

d) Width of letter

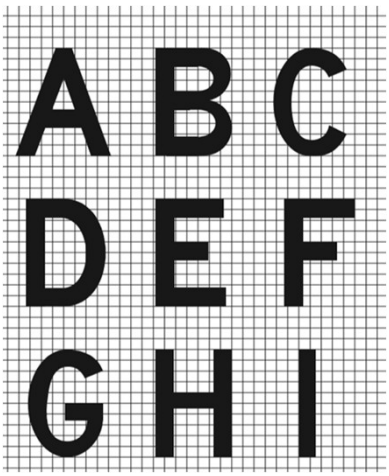
Letter	Letter height (mm) 200	300	400
	Width (mm)		
A	170	255	340
B	137	205	274
C	137	205	274
D	137	205	274
E	124	186	248
F	124	186	248
G	137	205	274
H	137	205	274
I	32	48	64
J	127	190	254
K	140	210	280
L	124	186	248
M	157	236	314
N	137	205	274
O	143	214	286
P	137	205	274
Q	143	214	286
R	137	205	274
S	137	205	274
T	124	186	248
U	137	205	274
V	152	229	304
W	178	267	356
X	137	205	274
Y	171	257	342
Z	137	205	274

e) Width of numeral

Numeral	Numeral height (mm) 200	300	400
	Width (mm)		
1	50	74	98
2	137	205	274
3	137	205	274
4	149	224	298
5	137	205	274
6	137	205	274
7	137	205	274
8	137	205	274
9	137	205	274
0	143	214	286

INSTRUCTIONS

1. To determine the proper SPACE between letters or numerals, obtain the code number from table a) or b) and enter table c) for that code number to the desired letter or numeral height.
2. The space between words or groups of characters forming an abbreviation or symbol should be equal to 0.5 to 0.75 of the height of the characters used except that where an arrow is located with a single character such as 'A →', the space may be reduced to not less than one quarter of the height of the character in order to provide a good visual balance.
3. Where the numeral follows a letter or vice versa use Code 1.
4. Where a hyphen, dot, or diagonal stroke follows a character or vice versa use Code 1.
5. For the intersection take-off sign, the height of the lower case "m" is 0.75 of the height of the preceding "0" (zero) and spaced from the preceding "0" at code 1 for the character height of the numerals.



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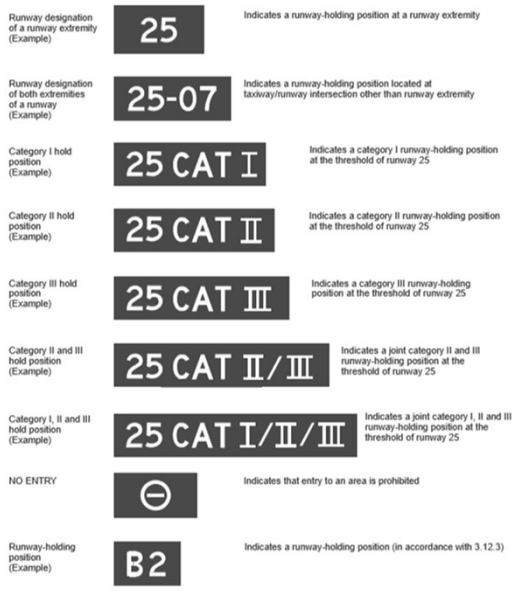
MANDATORY INSTRUCTION SIGNS

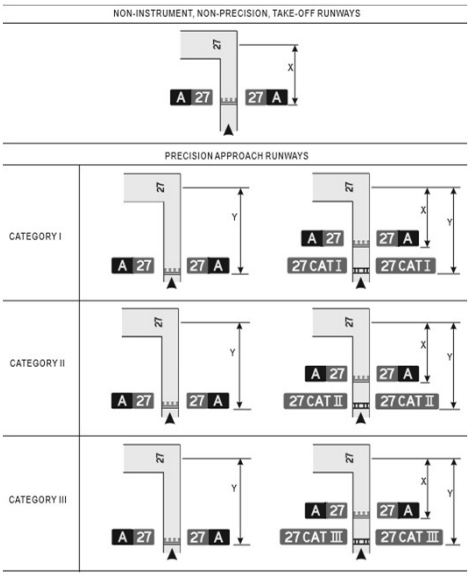
Application

- A mandatory instruction sign shall be provided to identify a location beyond which an aircraft taxiing or vehicle shall not proceed unless authorized by the aerodrome control tower.
- Mandatory instruction signs shall include runway designation signs, category I, II or III holding position signs, runway-holding position signs, road-holding position signs and NO ENTRY signs.

MANDATORY INSTRUCTION SIGNS



MANDATORY INSTRUCTION SIGNS



Note.— Distance X is established in accordance with Table 3-2. Distance Y is established at the edge of the ILS/ML critical/sensitive area.

Figure 5-32. Examples of sign positions at taxiway/runway intersections

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MANDATORY INSTRUCTION SIGNS

Runway designation of a runway extremity

To indicate a runway-holding position at a runway extremity

Runway designation of both extremities of a runway

To indicate a runway-holding position located at other taxiway/runway intersections or runway/runway intersections

NO ENTRY Sign

To indicate that entry to an area is prohibited

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MANDATORY INSTRUCTION SIGNS

	Runway designation of a runway extremity of Cat. I runway	To indicate a category I runway-holding position at the threshold of runway 27
	Runway designation of a runway extremity of Cat. II runway	To indicate a category II runway-holding position at the threshold of runway 27
	Runway designation of a runway extremity of Cat. III runway	To indicate a category III runway-holding position at the threshold of runway 27
	Runway holding position sign	To indicate a runway-holding position [established in accordance with 3.12.3]

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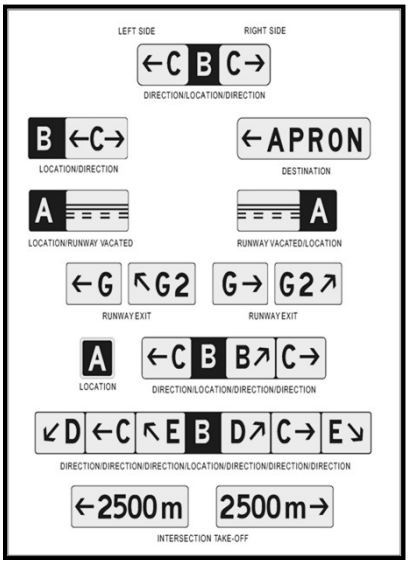
INFORMATION SIGNS



Characteristics

- An information sign other than a location sign shall consist of an inscription in black on a yellow background.
- A location sign shall consist of an inscription in yellow on a black background and where it is a stand-alone sign shall have a yellow border.

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INFORMATION SIGNS

- A runway exit sign shall be provided where there is an operational need to identify a runway exit.

- A runway vacated sign shall be provided where the exit taxiway is not provided with taxiway centre line lights and there is a need to indicate to a pilot leaving a runway the perimeter of the ILS/MLS critical/sensitive area or the lower edge of the inner transitional surface whichever is farther from the runway centre line.

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INFORMATION SIGNS

An intersection take-off sign should be provided when there is an operational need to indicate the remaining take-off run available (TORA) for intersection take-offs.

Where necessary, a destination sign should be provided to indicate the direction to a specific destination on the aerodrome, such as cargo area, general aviation, etc.

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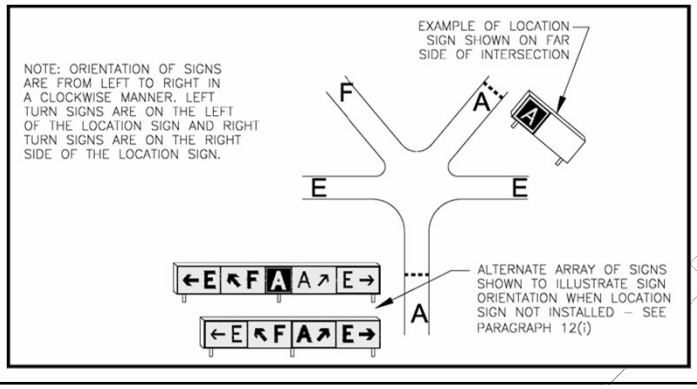
INFORMATION SIGNS

5.4.3 A location sign should be provided at an intermediate holding position.

A location sign shall be provided in conjunction with a direction sign, except that it may be omitted where an aeronautical study indicates that it is not needed.



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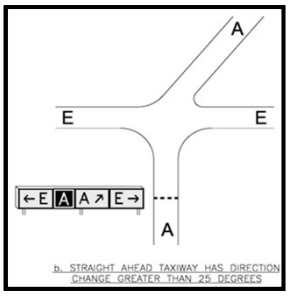
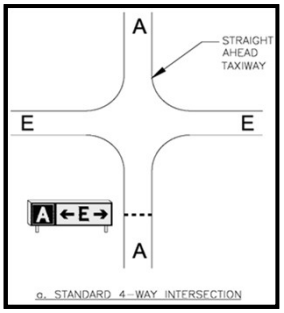
INFORMATION SIGNS



- A direction sign shall be provided when there is an operational need to identify the designation and direction of taxiways at an intersection.



- A combined location and direction sign shall be provided when it is intended to indicate routing information prior to a taxiway intersection.

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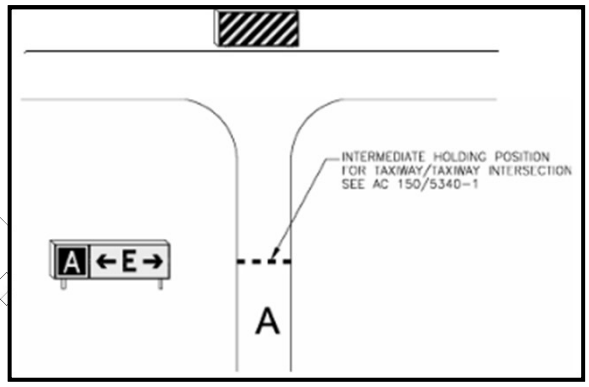
INFORMATION SIGNS



Recommendation.— *Where a taxiway ends at an intersection such as a ''T'' and it is necessary to identify this, a barricade, direction sign and/or other appropriate visual aid should be used.*

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VOR AERODROME CHK POINT SIGN

Application

When a VOR aerodrome check-point is established, it shall be indicated by a VOR aerodrome check-point marking and sign.

Location

A VOR aerodrome check-point sign shall be located as near as possible to the check-point and so that the inscriptions are visible from the cockpit of an aircraft properly positioned on the VOR aerodrome check-point marking.

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VOR AERODROME CHK POINT SIGN

VOR: is an abbreviation identifying this as a VOR check-point;

116.3: is an example of the radio frequency of the VOR concerned;

147°: is an example of the VOR bearing, to the nearest degree, which should be indicated at the VOR check-point; and

4.3 NM: is an example of the distance in nautical miles to a DME collocated with the VOR concerned.

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AIRCRAFT STAND IDENTIFICATION MARKING

An aircraft stand identification marking should be supplemented with an aircraft stand identification sign where feasible.

An aircraft stand identification sign should be located so as to be clearly visible from the cockpit of an aircraft prior to entering the aircraft stand.

An aircraft stand identification sign should consist of an inscription in black on a yellow background.

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ROAD HOLDING POSITION

- A road-holding position sign shall be provided at all road entrances to a runway.
- The road-holding position sign shall be located 1.5 m from one edge of the road (left or right as appropriate to the local traffic regulations) at the holding position.
- A road-holding position sign intended for night use shall be retroreflective or illuminated.

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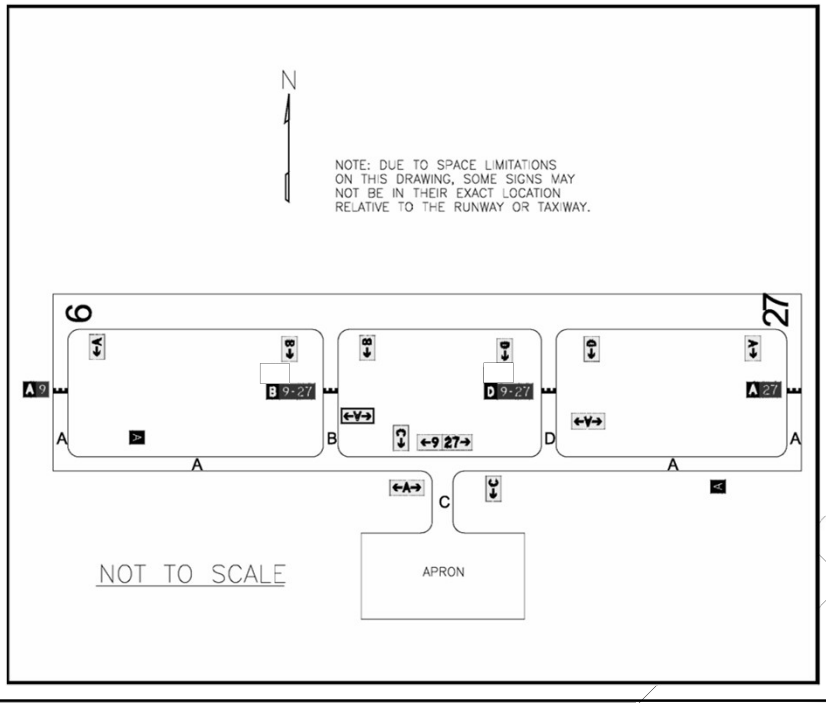
MANDATORY, INSTRUCTION AND INFORMATION SIGNS AT SINGLE RUNWAY AIRPORT



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CHAPTER 6:

VISUAL AIDS FOR DENOTING OBSTACLES

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OBJECTS TO BE MARKED AND/ OR LIGHTED

- A fixed object that extends above an obstacle protection surface shall be marked and, if the runway is used at night, lighted.
- Vehicles and other mobile objects, excluding aircraft, on the movement area of an aerodrome are obstacles and shall be marked and, if the vehicles and aerodrome are used at night or in conditions of low visibility, lighted, except that aircraft servicing equipment and vehicles used only on aprons may be exempt.
- Elevated aeronautical ground lights within the movement area shall be marked so as to be conspicuous by day. Obstacle lights shall not be installed on elevated ground lights or signs in the movement area.
- All obstacles within the distance specified in Table 3-1, column 11 or 12, from the centre line of a taxiway, an apron taxiway or aircraft stand taxilane shall be marked and, if the taxiway, apron taxiway or aircraft stand taxilane is used at night, lighted.

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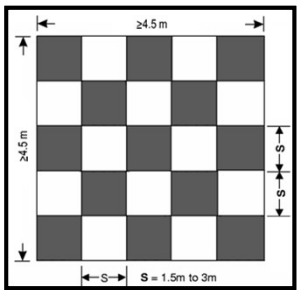
OBJECTS TO BE MARKED AND/ OR LIGHTED

- Obstacles in accordance with 4.3.2 [objects, in areas beyond the limits of obstacle limitation surfaces, which extend to a height of 150 m or more above ground elevation] should be marked and lighted, except that the marking may be omitted when the obstacle is lighted by high-intensity obstacle lights by day.
- Overhead wires, cables, etc., crossing a river, valley or highway should be marked and their supporting towers marked and lighted if an aeronautical study indicates that the wires or cables could constitute a hazard to aircraft, except that the marking of the supporting towers may be omitted when they are lighted by high-intensity obstacle lights by day.
- When it has been determined that an overhead wire, cable, etc., needs to be marked but it is not practicable to install markers on the wire, cable, etc., then high-intensity obstacle lights, Type B, should be provided on their supporting towers.

MARKING OF OBJECTS

- All fixed objects to be marked shall, whenever practicable, be coloured, but if this is not practicable, markers or flags shall be displayed on or above them, except that objects that are sufficiently conspicuous by their shape, size or colour need not be otherwise marked.
- All mobile objects to be marked shall be coloured or display flags.

MARKING OF OBJECTS



- An object should be coloured to show a chequered pattern if it has essentially unbroken surfaces and its projection on any vertical plane equals or exceeds 4.5 m in both dimensions.
- The pattern should consist of rectangles of not less than 1.5 m and not more than 3 m on a side, the corners being of the darker colour.
- The colours of the pattern should contrast each with the other and with the background against which they will be seen.
- Orange and **white** or alternatively red and **white** should be used, except where such colours merge with the background.

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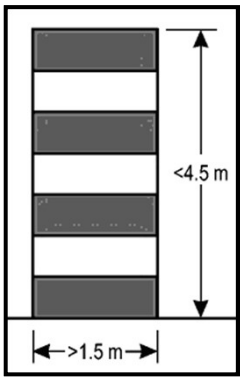
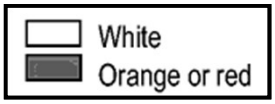
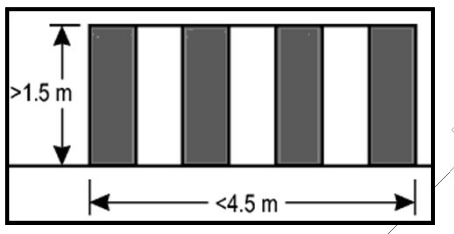
MARKING OF OBJECTS





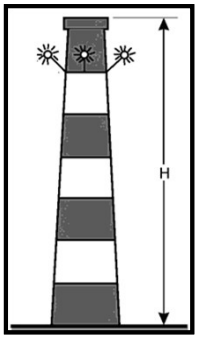
- An object should be coloured to show alternating contrasting bands if:

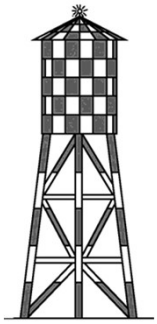
  it has essentially unbroken surfaces and has one dimension, horizontal or vertical, greater than 1.5 m, and the other dimension, horizontal or vertical, less than 4.5 m;



137

MARKING OF OBJECTS





H is less than 45 m

White
Orange or red

- An object should be coloured to show alternating contrasting bands if:

it is of skeletal type with either a vertical or a horizontal dimension greater than 1.5 m.

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MARKING OF OBJECTS

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MARKING OF OBJECTS

- An object should be coloured in a single conspicuous colour if its projection on any vertical plane has both dimensions less than 1.5 m. Orange or red should be used, except where such colours merge with the background.

[Note.— Against some backgrounds it may be found necessary to use a different colour from orange or red to obtain sufficient contrast.]

- When mobile objects are marked by colour, a single conspicuous colour, preferably red or yellowish green for emergency vehicles and yellow for service vehicles should be used.

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OBSTACLE LIGHTS

Use of obstacle lights

- The presence of objects which must be lighted shall be indicated by low-, medium- or high-intensity obstacle lights, or a combination of such lights.

[Note.— High-intensity obstacle lights are intended for day use as well as night use. Care is needed to ensure that these lights do not create disconcerting dazzle.]

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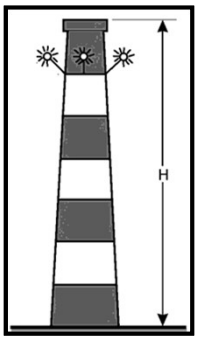
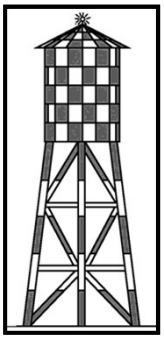
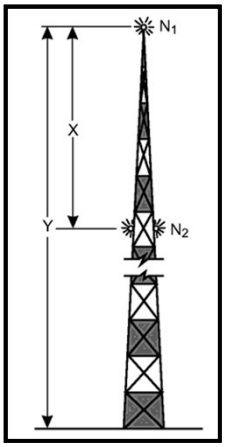
LOCATION OF OBSTACLE LIGHTS





H is less than 45 m



Light spacing (X) in accordance with Appendix 6

Number of levels of lights = N = $\frac{\text{Y (metres)}}{\text{X (metres)}}$

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CHAPTER 7:

VISUAL AIDS FOR DENOTING RESTRICTED AREA

143

CLOSED RUNWAY AND TAXIWAYS

- A closed marking shall be displayed on a runway or taxiway, or portion thereof, which is permanently closed to the use of all aircraft.
- A closed marking should be displayed on a temporarily closed runway or taxiway or portion thereof, except that such marking may be omitted when the closing is of short duration and adequate warning by air traffic services is provided.

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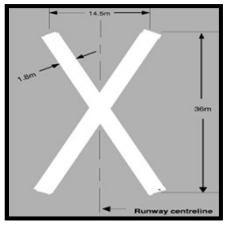
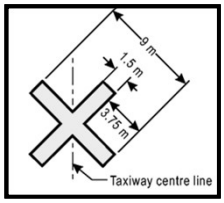
CLOSED RUNWAY AND TAXIWAYS

- The marking shall be:
  - **white** when displayed on a runway



  - shall be **yellow** when displayed on a taxiway.



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CLOSED RUNWAY AND TAXIWAYS

- When a runway or taxiway or portion thereof is permanently closed, all normal runway and taxiway markings shall be obliterated.
- Lighting on a closed runway or taxiway or portion thereof shall not be operated, except as required for maintenance purposes.
- In addition to closed markings, when the runway or taxiway or portion thereof closed is intercepted by a usable runway or taxiway which is used at night, unserviceability lights [red fixed lights] shall be placed across the entrance to the closed area at intervals not exceeding 3 m.

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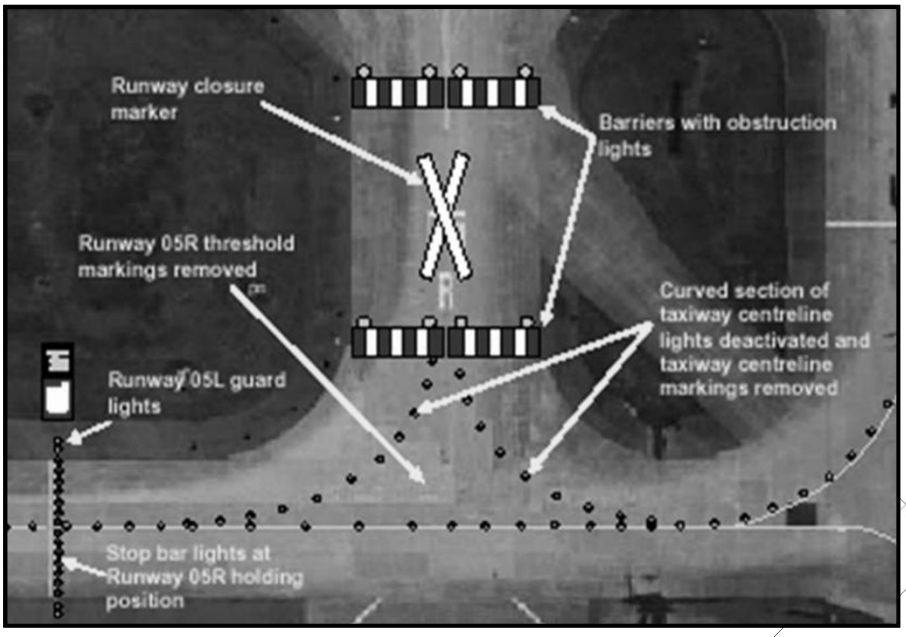
CLOSED RUNWAYS AND TAXIWAYS



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NON LOAD BEARING SURFACE

Application

Shoulders for taxiways, runway turn pads, holding bays and aprons and other non-load bearing surfaces which cannot readily be distinguished from load-bearing surfaces and which, if used by aircraft, might result in damage to the aircraft shall have the boundary between such areas and the load-bearing surface marked by a taxi side stripe marking.

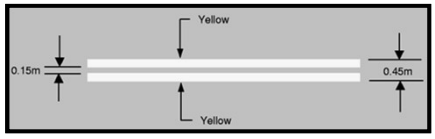
Location

A taxi side stripe marking should be placed along the edge of the load-bearing pavement, with the outer edge of the marking approximately on the edge of the load-bearing pavement.

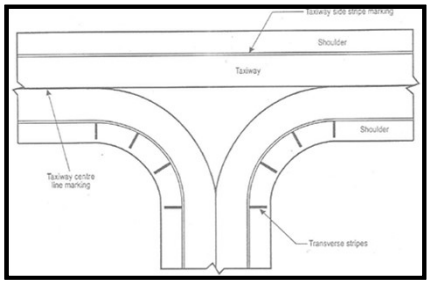
NON LOAD BEARING SURFACE

Characteristics

A taxi side stripe marking should consist of a pair of solid lines, each 15 cm wide and spaced 15 cm apart and the same colour as the taxiway centre line marking.



Taxi side stripe marking



Taxi side stripe and transverse marking

NON LOAD BEARING SURFACE

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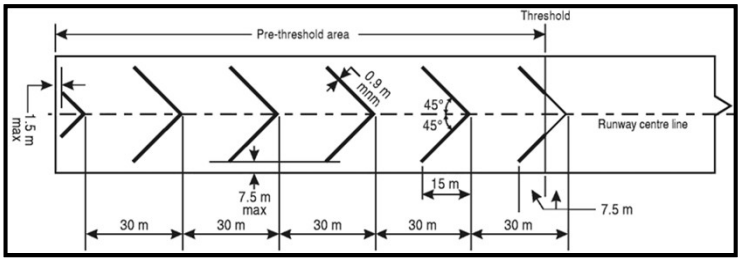
PRE THRESHOLD AREA

Application

When the surface before a threshold is paved and exceeds 60 m in length and is not suitable for normal use by aircraft, the entire length before the threshold should be marked with a chevron marking.

Location

A chevron marking should point in the direction of the runway and be placed as shown in Figure.



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UNSERVICEABLE AREAS

Application

Unserviceability markers shall be displayed wherever any portion of a taxiway, apron or holding bay is unfit for the movement of aircraft but it is still possible for aircraft to bypass the area safely. On a movement area used at night, unserviceability lights shall be used.

Location

Unserviceability markers and lights shall be placed at intervals sufficiently close so as to delineate the unserviceable area [at least one light should be installed for each 7.5 m of peripheral distance of the area].

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UNSERVICEABLE AREAS

Characteristics of unserviceability markers

Unserviceability markers shall consist of conspicuous upstanding devices such as **flags, cones or marker boards**.

Characteristics of unserviceability lights

An unserviceability light shall consist of a **red fixed light**. The light shall have an intensity sufficient to ensure conspicuity considering the intensity of the adjacent lights and the general level of illumination against which it would normally be viewed. In no case shall the intensity be less than 10 cd of red light.

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UNSERVICEABLE AREAS

Characteristics of unserviceability cones

An unserviceability cone should be at least 0.5 m in height and **red**, **orange** or **yellow** or any one of these colours in combination with **white**.

Characteristics of unserviceability flags

An unserviceability flag should be at least 0.5 m square and **red, orange** or **yellow** or any one of these colours in combination with **white**.

Characteristics of unserviceability marker boards

An unserviceability marker board should be at least 0.5 m in height and 0.9 m in length, with alternate **red** and or **orange** and vertical stripes.

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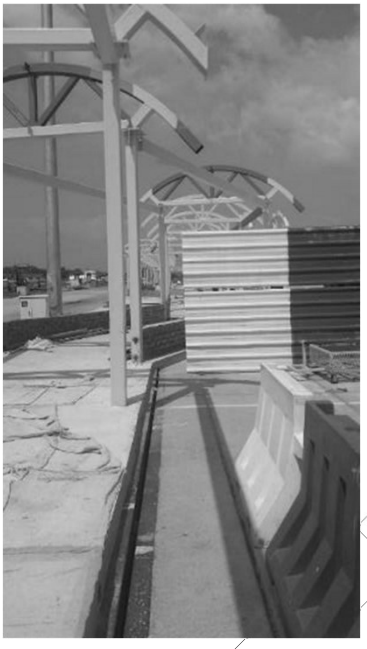
UNSERVICEABLE AREAS



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CHAPTER 9:

AERODROME OPERATIONAL SERVICES, EQUIPMENT AND INSTALLATIONS

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AERODROME EMERGENCY PLANNING

- Aerodrome emergency planning is the process of preparing an aerodrome to cope with an emergency occurring at the aerodrome or in its vicinity.
- The objective of aerodrome emergency planning is to minimize the effects of an emergency, particularly in respect of saving lives and maintaining aircraft operations.
- The aerodrome emergency plan sets forth the procedures for coordinating the response of different aerodrome agencies (or services) and of those agencies in the surrounding community that could be of assistance in responding to the emergency.

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AERODROME EMERGENCY PLANNING

Examples of emergencies are:

- aircraft emergencies,
- sabotage including bomb threats,
- unlawfully seized aircraft,
- dangerous goods occurrences,
- building fires and
- natural disasters.

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AERODROME EMERGENCY PLANNING

- The plan shall coordinate the response or participation of all existing agencies which, in the opinion of the appropriate authority, could be of assistance in responding to an emergency.

Examples of agencies are:

A) On the aerodrome:

- air traffic control unit,
- rescue and fire fighting services,
- aerodrome administration,
- medical and ambulance services,
- aircraft operators,
- security services, and
- police;

B) Off the aerodrome:

- fire departments,
- police,
- medical and ambulance services,
- hospitals,
- military, and
- harbour patrol or coast guard

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AERODROME EMERGENCY PLANNING

- The aerodrome emergency plan document should include at least the following:

a) types of emergencies planned for

b) agencies involved in the plan;

c) responsibility and role of each agency, the emergency operations centre and the command post, for each type of emergency;

d) information on names and telephone numbers of offices or people to be contacted in the case of a particular emergency; and

e) a grid map of the aerodrome and its immediate vicinity.

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AERODROME EMERGENCY PLANNING

Aerodrome emergency exercise

- The plan shall be tested by conducting:

a) a full-scale aerodrome emergency exercise at intervals not exceeding two years; and

b) partial emergency exercises in the intervening year to ensure that any deficiencies found during the full-scale aerodrome emergency exercise have been corrected; and reviewed thereafter, or after an actual emergency, so as to correct any deficiency found during such exercises or actual emergency.

The purpose of a full-scale exercise is : *to ensure the adequacy of the plan to cope with different types of emergencies.*

The purpose of a partial exercise is: *to ensure the adequacy of the response to individual participating agencies and components of the plan, such as the communications system.*

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RESCUE AND FIRE FIGHTING

Application

Rescue and fire fighting equipment and services shall be provided at an aerodrome.

[Note.— Public or private organizations, suitably located and equipped, may be designated to provide the rescue and fire fighting service. It is intended that the fire station housing these organizations be normally located on the aerodrome, although an off-aerodrome location is not precluded provided the response time can be met.]

RESCUE AND FIRE FIGHTING

Level of protection to be provided

The level of protection provided at an aerodrome for rescue and fire fighting shall be appropriate to the aerodrome category determined using the principles described in [9.2.5 and 9.2.6] **AA and BB**, except that, where the number of movements of the aeroplanes in the highest category normally using the aerodrome is less than 700 in the busiest consecutive three months, the level of protection provided shall be not less than one category below the determined category.

Notes.—

1. Either a take-off or a landing constitutes a movement.

2. Movements of scheduled, non –scheduled and general aviation operations should be counted in determining the aerodrome category.

RESCUE AND FIRE FIGHTING

Table 9-1. Aerodrome category for rescue and fire fighting

Aerodrome category (1)	Aeroplane overall length (2)	Maximum fuselage width (3)
1	0 m up to but not including 9 m	2 m
2	9 m up to but not including 12 m	2 m
3	12 m up to but not including 18 m	3 m
4	18 m up to but not including 24 m	4 m
5	24 m up to but not including 28 m	4 m
6	28 m up to but not including 39 m	5 m
7	39 m up to but not including 49 m	5 m
8	49 m up to but not including 61 m	7 m
9	61 m up to but not including 76 m	7 m
10	76 m up to but not including 90 m	8 m

Level of protection to be provided

Principle AA:

- The aerodrome category shall be determined from Table 9-1 and shall be based on the longest aeroplanes normally using the aerodrome and their fuselage width.

[Note.— To categorize the aeroplanes using the aerodrome, first evaluate their overall length and second, their fuselage width.]

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RESCUE AND FIRE FIGHTING

Table 9-1. Aerodrome category for rescue and fire fighting

Aerodrome category (1)	Aeroplane overall length (2)	Maximum fuselage width (3)
1	0 m up to but not including 9 m	2 m
2	9 m up to but not including 12 m	2 m
3	12 m up to but not including 18 m	3 m
4	18 m up to but not including 24 m	4 m
5	24 m up to but not including 28 m	4 m
6	28 m up to but not including 39 m	5 m
7	39 m up to but not including 49 m	5 m
8	49 m up to but not including 61 m	7 m
9	61 m up to but not including 76 m	7 m
10	76 m up to but not including 90 m	8 m

Level of protection to be provided

Principle BB:

- If, after selecting the category appropriate to the longest aeroplane's overall length, that aeroplane's fuselage width is greater than the maximum width in Table 9-1, column 3 for that category, then the category for that aeroplane shall actually be one category higher.

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RESCUE AND FIRE FIGHTING

Level of protection to be provided

During anticipated periods of reduced activity, the level of protection available shall be no less than that **needed for the highest category of aeroplane planned to use the aerodrome during that time** irrespective of the number of movements.

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RESCUE AND FIRE FIGHTING

Examples for the determination of aerodrome category for RFFS:

Example No. 1

Aeroplane	Over-all length	Fuselage width	Category	Movements
TU 154	47 m	3.45 m	**7**	300
B 707-320	46.61	3.55	**7**	600

Aerodrome category for RFFS: 7

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RESCUE AND FIRE FIGHTING

Examples for the determination of aerodrome category for RFFS:

Example No. 2

Aeroplane	Over-all length	Fuselage width	Category	Movements
DC-8-61	57.12 m	3.51 m	**8**	300
Super VC-10	52.43 m	3.50 m	**8**	300
B 767-200	48.50 m	5.03 m	**8**	300

Aerodrome category for RFFS: 8

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RESCUE AND FIRE FIGHTING

Examples for the determination of aerodrome category for RFFS:

Example No. 3

Aeroplane	Over-all length	Fuselage width	Category	Movements
DC-8-61	57.12 m	3.51 m	**8**	300
Super VC-10	52.43 m	3.50 m	**8**	300
TU 154	47 m	3.45 m	**7**	300

Aerodrome category for RFFS: 7

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RESCUE AND FIRE FIGHTING

Examples for the determination of aerodrome category for RFFS:

Example No. 4

Aeroplane	Over-all length	Fuselage width	Category	Movements
DC-10-30	53.35 m	5.72 m	**8**	400
B 767-200	48.50 m	5.03 m	**8**	400
TU 154	47 m	3.45 m	**7**	300

Aerodrome category for RFFS: 8

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RESCUE AND FIRE FIGHTING

Extinguishing agents

- Both principal and complementary agents should normally be provided at an aerodrome.

1. Principal agents produce a permanent control, i.e. for a period several minutes or longer.

2. Complementary agents have rapid fire suppression capability but offer a "transient" control which is usually only available during application.

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RESCUE AND FIRE FIGHTING

Extinguishing agents

- The principal extinguishing agent should be:

  a) a foam meeting the minimum performance level A; or

  b) a foam meeting the minimum performance level B; or

  c) a combination of these agents;

- The complementary extinguishing agent should be a dry chemical powder suitable for extinguishing hydrocarbon fires.

RESCUE AND FIRE FIGHTING

Extinguishing agents

The amounts of water for foam production and the complementary agents to be provided on the rescue and fire fighting vehicles shall be in accordance with the determined aerodrome category and Table 9-2.

Table 9-2. Minimum usable amounts of extinguishing agents

	Foam meeting performance level A		Foam meeting performance level B		Foam meeting performance level C		Complementary agents	
Aerodrome category	Water (L)	Discharge rate foam solution/ minute (L)	Water (L)	Discharge rate foam solution/ minute (L)	Water (L)	Discharge rate foam solution/ minute (L)	Dry chemical powders (kg)	Discharge Rate (kg/second)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1	350	350	230	230	160	160	45	2.25
2	1 000	800	670	550	460	360	90	2.25
3	1 800	1 300	1 200	900	820	630	135	2.25
4	3 600	2 600	2 400	1 800	1 700	1 100	135	2.25
5	8 100	4 500	5 400	3 000	3 900	2 200	180	2.25
6	11 800	6 000	7 900	4 000	5 800	2 900	225	2.25
7	18 200	7 900	12 100	5 300	8 800	3 800	225	2.25
8	27 300	10 800	18 200	7 200	12 800	5 100	450	4.5
9	36 400	13 500	24 300	9 000	17 100	6 300	450	4.5
10	48 200	16 600	32 300	11 200	22 800	7 900	450	4.5

Note.— The quantities of water shown in columns 2, 4 and 6 are based on the average overall length of aeroplanes in a given category.

RESCUE AND FIRE FIGHTING

Response time

- ✓ **Response time** is considered to be the time between the initial call to the rescue and fire fighting service, and the time when the first responding vehicle(s) is (are) in position to apply foam at a rate of at least 50 per cent of the discharge rate specified in Table 9-2.
- ✓ **Optimum visibility** and surface conditions are defined as daytime, good visibility, no precipitation with normal response route free of surface contamination e.g. water, ice or snow.

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RESCUE AND FIRE FIGHTING

Response time

- ✓ The operational objective of the rescue and fire fighting service should be to achieve a response time not exceeding **two minutes** to any point of each operational runway, in optimum visibility and surface conditions.
- ✓ The operational objective of the rescue and fire fighting service should be to achieve a response time not exceeding **three minutes** to any other part of the movement area in optimum visibility and surface conditions.

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RESCUE AND FIRE FIGHTING

Fire stations

- ✓ All rescue and fire fighting vehicles should normally be housed in a fire station.
- ✓ Satellite fire stations should be provided whenever the response time cannot be achieved from a single fire station.
- ✓ The fire station should be located so that the access for rescue and fire fighting vehicles into the runway area is direct and clear, requiring a minimum number of turns.

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RESCUE AND FIRE FIGHTING

Communication and alerting systems

- ✓ A discrete communication system should be provided linking a fire station with:
  - the control tower,
  - any other fire station on the aerodrome and
  - the rescue and fire fighting vehicles.
- ✓ An alerting system for rescue and fire fighting personnel, capable of being operated from that station, should be provided at:
  - a fire station,
  - any other fire station on the aerodrome and
  - the aerodrome control tower.

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RESCUE AND FIRE FIGHTING

Aerodrome category	Rescue and fire fighting vehicles
1	1
2	1
3	1
4	1
5	1
6	2
7	2
8	3
9	3
10	3

Number of rescue and fire fighting vehicles

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DISABLED AIRCRAFT REMOVAL

- ✓ A plan for the removal of an aircraft disabled on, or adjacent to, the movement area should be established for an aerodrome, and a coordinator designated to implement the plan, when necessary.
- ✓ The disabled aircraft removal plan should be based on the characteristics of the aircraft that may normally be expected to operate at the aerodrome, and include among other things:

  a) a list of equipment and personnel on, or in the vicinity of, the aerodrome which would be available for such purpose; and

  b) arrangements for the rapid receipt of aircraft recovery equipment kits available from other aerodromes.

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WILDLIFE STRIKE HAZARD

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WILDLIFE STRIKE HAZARD REDUCTION

- The wildlife strike hazard on, or in the vicinity of, an aerodrome shall be assessed through:

  a) the establishment of a national procedure for recording and reporting bird strikes to aircraft; and

  b) the collection of information from aircraft operators, airport personnel, etc. on the presence of birds on or a round the aerodrome constituting a potential hazard to aircraft operations.

- **Wildlife strike reports shall be collected and forwarded to ICAO** for inclusion in the ICAO Bird Strike Information System (IBIS) database.

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WILDLIFE STRIKE HAZARD REDUCTION

- When a bird strike hazard is identified at an aerodrome, the appropriate authority shall take action to decrease the number of birds constituting a potential hazard to aircraft operations by adopting measures for discouraging their presence on, or in the vicinity of, an aerodrome.
  [Airport Services Manual, Part 3.]

- The appropriate authority shall take action to eliminate or to prevent the establishment of garbage disposal dumps or any such other source attracting bird activity on, or in the vicinity of, an aerodrome unless an appropriate aeronautical study indicates that they are unlikely to create conditions conducive to a bird hazard problem.

[Note.— Due consideration needs to be given to airport operators' concerns related to land developments close to the airport boundary that may attract birds/wildlife.]

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APRON MANAGEMENT SERVICE

When warranted by the volume of traffic and operating conditions, an appropriate apron management service should be provided on an apron by an aerodrome ATS unit, by another aerodrome operating authority, or by a cooperative combination of these, in order to :

a) regulate movement with the objective of preventing collisions between aircraft, and between aircraft and obstacles:

b) regulate entry of aircraft into, and coordinate exit of aircraft from, the apron with the aerodrome control tower; and

c) ensure safe and expeditious movement of vehicles and appropriate regulation of other activities.

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APRON MANAGEMENT SERVICE

- An apron management service shall be provided with radiotelephony communications facilities.
- Where low visibility procedures are in effect, persons and vehicles operating on an apron shall be restricted to the essential minimum.
- An emergency vehicle responding to an emergency shall be given priority over all other surface movement traffic.

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APRON MANAGEMENT SERVICE

- A vehicle operating on an apron shall:

  a) give way to an emergency vehicle;

  b) give way to an aircraft taxiing, about to taxi, or being pushed or towed; and

  c) give way to other vehicles in accordance with local regulations.

- **An aircraft stand shall be visually monitored** to ensure that the recommended clearance distances are provided to an aircraft using the stand.

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GROUND SERVICING OF AIRCRAFT

- Fire extinguishing equipment suitable for at least initial intervention in the event of a fuel fire and personnel trained in its use shall be readily available during the ground servicing of an aircraft, and there shall be a means of quickly summoning the rescue and fire fighting service in the event of a fire or major fuel spill.

- When aircraft refuelling operations take place while passengers are embarking, on board or disembarking, ground equipment shall be positioned so as to allow:

  a) the use of a sufficient number of exits for expeditious evacuation; and

  b) a ready escape route from each of the exits to be used in an emergency.

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SITING OF EQUIPMENET AND INSTALLATIONS ON OPERATIONAL AREAS

- Unless its function requires it to be there for air navigation purposes, no equipment or installation shall be:

  a) on a runway strip, a runway end safety area, a taxiway strip or within the distances specified in Table 3-1, column 11, if it would endanger an aircraft; or

  b) on a clearway if it would endanger an aircraft in the air.

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FENCING

- A fence or other suitable barrier shall be provided on an aerodrome:
  - ✓ to prevent the entrance to the movement area of animals large enough to be a hazard to aircraft.
  - ✓ to deter the inadvertent or premeditated access of unauthorized persons onto a non-public area of the aerodrome.

    Note 1.— This is intended to include the barring of sewers, ducts, tunnels, etc., where necessary to prevent access.

    Note 2.— Special measures may be required to prevent the access of an unauthorized person to runways or taxiways which overpass public roads.

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SECURITY LIGHTING

- ✓ At an aerodrome where it is deemed desirable for security reasons, a fence or other barrier provided for the protection of international civil aviation and its facilities should be illuminated at a minimum essential level.
- ✓ Consideration should be given to locating lights so that the ground area on both sides of the fence or barrier, particularly at access points, is illuminated.

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