

CHAPTER 1

THE LAYOUT OF AN AIRFIELD

Introduction

1. This chapter and the one that follows, describe airfields (or aerodromes) and discuss the installations that cadets may expect to see when visiting them.
2. First of all, it is important to understand the meaning of words such as airfield, aerodrome, airport, aircraft manoeuvring areas, *etc*:
 - a. *Airfield (or Aerodrome)*. Nowadays these words have the same meaning, with "airfield" in more common use. An airfield may be defined as an area of land or water including any buildings and installations, usually used for the taking-off and landing of aircraft.
 - b. *Airport*. This is an airfield with additional facilities for the handling of freight and passengers. Such facilities could include customs, money-changing, immigration, baggage halls and restaurants—in fact "port" facilities.
 - c. *Aircraft Manoeuvring Areas*. These are areas of an airfield which have been specially prepared for the normal movement of aircraft on the ground. Such areas include runways, taxiways, aircraft servicing platforms, operational readiness platforms and dispersal hardstandings—all of which will be considered later in this chapter.
3. Next it is necessary to consider that aircraft manoeuvring areas can be anything from quite small level areas of grass to vast areas of asphalt and concrete, with complex patterns of runways and taxiways. Grass airfields are satisfactory for light aircraft engaged mostly in flying instruction and civil club flying. But as the size, weight and speed of aircraft using the airfield increase, so must the grass strip give way to the paved runway—in many cases, a triangular pattern of three runways to allow aircraft to take-off and land as near as possible into wind. The advent of tricycle undercarriages and jet propulsion have increased aircraft approach and landing needs. This means that when considering aircraft performance the length of the runway has become as important as the wind direction. The modern trend is for operations to be confined to one long runway, or at the most two, the longer being designated the "*main instrument runway*". This will usually be in line with the *prevailing wind* and will be equipped with full lighting and radio installations.
4. To summarize, it can be said that airfields fall broadly into three types: the basic grass airfield, the triangular-patterned runway type, and the modern main instrument runway type. Fig 1 illustrates these three types, and Fig 2 shows the layout of a typical modern airfield used by heavy and/or high-speed jet aircraft.

Runways

5. **Construction.** Modern runways are constructed of concrete or layers of asphalt. A concrete surface stands up better to the rigours of blast from the jet engines and spillage of kerosene fuel.

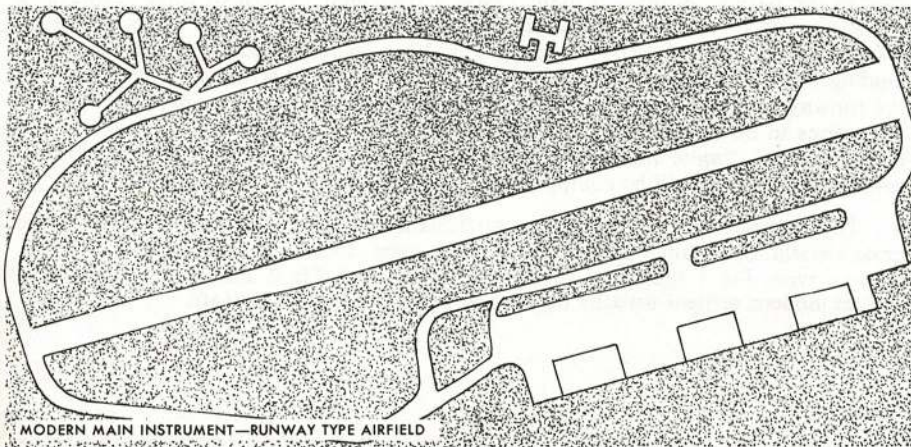
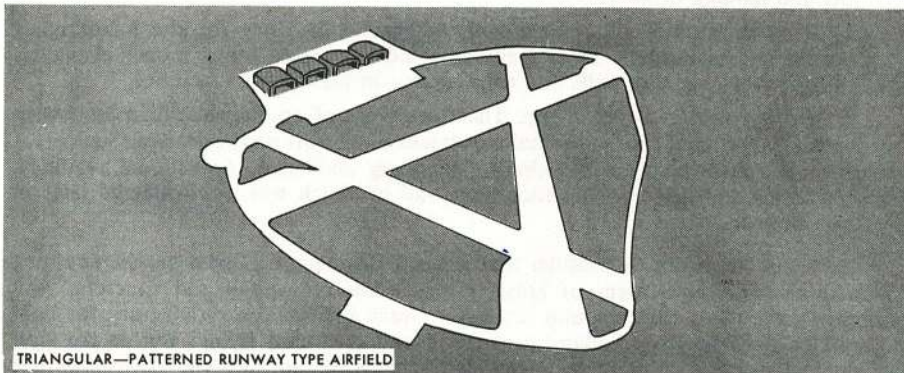


Fig 1 The Three Basic Types of Airfield

(AL6, Jun 83)

THE LAYOUT OF AN AIRFIELD

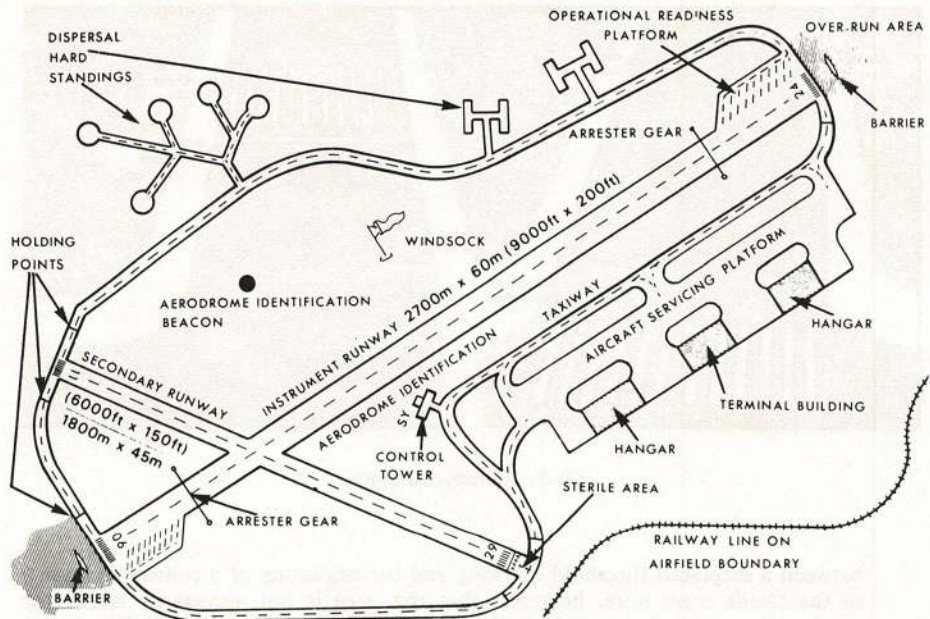


Fig 2 A Modern "Main Instrument Runway" Type Airfield

6. **Dimensions.** Runways vary in width and length according to the role of the particular airfield. At many airfields, the main instrument runway is 150 feet (45 m) wide and 6,000 feet (1,800 m) long, subsidiary runways being of the same width but shorter. At medium bomber and strategic transport airfields, the main runway is normally 200 feet (60 m) wide and 9,000 feet (2,700 m) long (see Fig 2).

7. **Markings.** The markings on runways are illustrated in Fig 3 and described below:

a. **Colour.** Runway markings are in white (do not confuse with taxiway markings which are in yellow—see later).

b. **Runway Numbers.** Each runway is marked by two white painted numerals indicating the magnetic headings of the runway direction, taken to the nearest 10° (see Fig 2). For example:

(1) Magnetic heading 238° (M)—runway number 24.

(2) Magnetic heading 058° (M)—runway number 06.

The magnetic heading is that viewed from the direction of approach. Thus the magnetic heading to one end of the runway is reciprocal to the other (as in above example).

c. **Threshold Markings.** These consist of longitudinal white stripes painted symmetrically about the runway centre-line (see Fig 3). Where the landing threshold has to be moved up the runway because of some form of obstruction in the final stages of the approach (eg the railway line in Fig 2), four chevrons and a bar are added as in Fig 3. By making the pilot land further up the runway, the aircraft will be at a safe height when it crosses the obstruction. The area

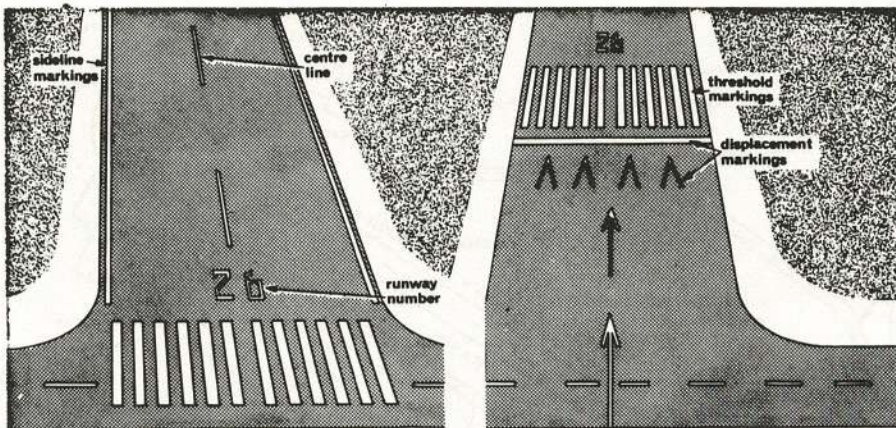


Fig 3 Runway Markings

between a displaced threshold marking and the beginning of a runway is known as the *sterile area*; note, however, that this area is not necessarily sterile for taxiing aircraft or for aircraft stopping after landing in the opposite direction.

d. *Centre-Line and Side-Line Markings.* As shown in Fig 3, the runway centre is indicated by a broken white line (arrowheads in the sterile area). Where there is lack of contrast between the runway and the shoulders it is permissible to mark each side of the runway with a solid white line.

Arrester Gear

8. Some runways are equipped with "arrester" gear. This is a system designed to bring an aircraft to a smooth stop on the runway and depends on the aircraft being equipped with a strong hook which is lowered during landing to engage a cable suspended across the width of the runway. When the aircraft pick-up hook engages the cable, the cable initially moves with the aircraft. As soon as the cable is played out, cable-braking occurs to bring the aircraft to a smooth stop. The cable can be braked in a variety of ways: the system in use in the RAF being the Rotary Hydraulic Arrester Gear (RHAG), which depends on large paddles rotating in liquid for its braking effect.

Over-Run Areas

9. These are areas beyond the ends of the runways that are provided for accidental or emergency use by aircraft over-running or under-shooting the runway (see Fig 2). They are areas cleared of obstacles, having a reasonably even surface, and capable of supporting an over-running aircraft without damaging the undercarriage. Over-run areas can be augmented by *barriers* which are large strong nets made of nylon rope. They can be raised and lowered by the airfield controller but are usually kept in the raised position. If a fast jet aircraft experiences a brake failure on landing and overruns, the net will literally "catch" the aircraft, slowing it and stopping it with minimum risk of damage to the aircraft or injury to the crew. Note that, for obvious reasons, a barrier is not used for propeller-driven aircraft.

Operational Readiness Platforms (ORPs)

10. These are specially-prepared areas (associated with fighter or strike airfields) built alongside the end of a runway to enable aircraft to be parked, either for rapid take-off with minimal warning ("scramble") or for final flight preparation. To provide the maximum safe use of the space available, the platforms are marked with taxiing lines and with areas set aside for essential ground equipment. The platforms are wired to provide a special form of communication (known as *tele-brief*) between the pilot, operations room, air traffic control and ground servicing crews. Tele-brief consists basically of a system of wiring which comes up through the ground, and is plugged into the waiting aircraft to enable the controller to speak to the pilot and "scramble" him—*ie* order him to take off in a hurry. When aircraft are scrambled, they start-up and move straight on to the runway for take-off. The tele-brief lead is automatically disconnected at the aircraft socket as the aircraft moves away.

Dispersal Hardstandings

11. Many airfields still use widely-dispersed areas for parking aircraft. These areas are known as "dispersal hardstandings" or "dispersals" and are designed to spread the aircraft around the airfield to make it difficult for enemy aircraft to damage or destroy all of the parked aircraft during an attack.

Aircraft Servicing Platforms (ASP)s

12. These are large paved areas provided for the servicing and quick turn-round of aircraft. They also ensure speedy handling of passengers and freight. They are usually rectangular in shape, with wide access tracks, and are sited in the vicinity of hangars or airport terminal buildings.

Taxiways

13. **Construction.** Taxiways connect all the various installations of the aircraft manoeuvring area (*eg* ASP to runway, ORP to runway, *etc*). Thus they enable

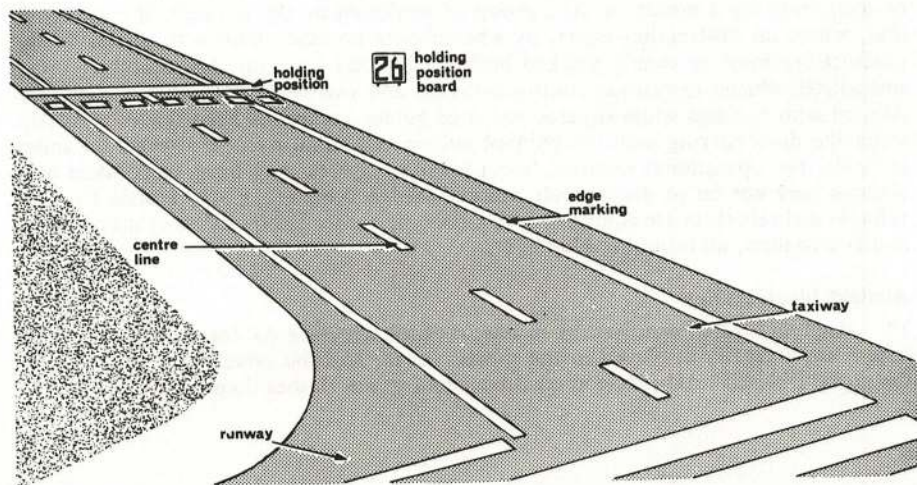


Fig 4 Taxiway Markings

AIRMANSHIP, CHAP 1

aircraft to move about the manoeuvring area as required. Taxiways are usually constructed in the same way as runways, and are normally a minimum of 50 feet (15 m) wide.

14. **Markings.** Taxiway markings are in *yellow*, as shown in Fig 4 and as described below:

a. *Centre Line.* The centre of taxiways is indicated by broken yellow lines. Where a taxiway intersects a runway or another taxiway, the broken yellow line is discontinued across the runway or other taxiway.

b. *Edge Marking.* Where there is little contrast between the taxiway and the surrounding area, it is permissible to mark the edge of the taxiway with a solid yellow line.

c. *Holding Position.* At junctions of runways with taxiways, a "holding position" is introduced at which taxiing aircraft are required to stop (*ie* "hold") until it is safe to move onto the runway. The holding position is indicated by two yellow lines, one solid, one broken, painted across the taxiway at right angles to the taxiway centre line and at a distance of 225 feet (68 m) from the nearest edge of the runway. A holding position board, containing the runway number painted in black on a yellow background, is also placed at this point at the outside of the taxiway (airfield boundary side).

Windsocks

15. Normally, two or more windsocks are situated on an airfield as a quick way of indicating wind direction. They are positioned away from trees and buildings where they are least affected by local wind turbulence. The main windsock has a white ring round its base.

Obstructions

16. Any object that constitutes a hazard to aircraft, either in flight or on the ground is an *obstruction*. Obstructions may be *permanent* (*eg* the runway controller's caravan) or *temporary* (*eg* a motor car or a group of workmen on the airfield). It is essential that, where an obstruction exists, its whereabouts be made known to pilots. Thus, obstructions must be clearly marked both by day and by night. For example, some specialized vehicles *eg* runway control caravans and sweepers used on the airfield are painted with red and white squares and tops golden yellow. Other vehicles regularly using the manoeuvring area are painted golden yellow all over. However, on some airfields, for operational reasons, 'tone-down' measures may have been taken and vehicles may not be so distinctively marked. Some vehicles, *eg* Air Traffic Control vehicles and refuellers are equipped with a flashing amber light; others, *eg* ambulances and fire engines, an occulting blue light.

Airfield Identification

17. Each airfield is identified by means of two letters—*eg* SY for Shawbury. These letters are normally displayed in the signals square and the same letters are used by the airfield identification beacon on the airfield which flashes them in morse code.

This file was downloaded from the RTFM Library.
Link: www.scottbouch.com/rtfm

Please see site for usage terms, and more aircraft documents.

