LECTURE

THE STORY BEHIND THE NOTICE TO AIRMEN.


The "Notice to Airmen" is a circular, a sort of step-child of the "Notice to Mariners," and is published to promulgate particulars of aeroplane landing grounds, and matters related thereto.

One is issued as soon as possible after the establishment of licensing of a landing ground and whenever changes made in an existing ground are so great as to warrant the preparation of a revised reprint.

The notices are distributed to hundreds of individuals and organisations interested in aviation. The N/A is but one of five different series of circulars distributed to the flying community, by the Civil Aviation Branch.

The need for some such type of notice is readily apparent, but it may not be so obvious that there is a tremendous amount of work underlying their production, involving staff hundreds of miles apart, and a great deal of inter-communication and enquiry, even after a landing ground site has been chosen and preparation of it has been commenced.

First of all, let us look at the circular itself. These notices, in common with the bulk of Defence Department printed matter, are produced by photo-lithography, from an original, which is partly typewritten and partly hand-drawn. The plans which appear near the top of the page, are drawn in Indian ink on ordinary blue tracing cloth, and the typing is done on a good hard paper, to obtain relatively thin lines. The tracing cloth is gummed in the right place on the typewriter paper, and this assembly is then mounted (by gumming on the left edge only) on a larger backing sheet. The backing sheet can be any cheap stiffish paper, and is employed partly to provide the blank margins, and partly to permit of a general squaring up of the typing, if this is a little askew. It is desirable not to gum on more than one edge, and just enough to hold the various parts in their designed place. The great heat of the lamps used in making the exposure causes buckling of the paper, and the cameraman really prefers to use pins only, so that he can smooth out the ripples that occur while the copy is warming up, prior to the actual exposure.
If the various layers were gummed all around, he could not do this without cutting somewhere. The originals, which measure 14" x 9" overall, are butted together like tiles on the copy board, and are photographed, sixteen different ones at a time, on to a glass plate, being reduced in the proportion 16:10, so that each page or notice becomes of the size that the printer calls "demy-octavo." The photo is printed down on to a zinc plate, from which copies are run off in a rotary offset lithographic press. The use of the typewriter plus lithography has reduced the cost of printing these notices to about one-tenth of the former cost when using linotype and line blocks. In parenthesis, one might say that, even without plans, the typewriter-lithographic process is very much cheaper than linotype, but when illustrations are involved, the saving is really remarkable. We are well aware that many people don't like the look of the typed circulars, but they are really quite adequate for the purpose they are intended to serve.

Formerly, the sheets of sixteen notices were cut by the printer and delivered in bundles, each containing one notice only. It was found that the work of "gathering" one from each of sixteen stacks of hundreds of notices, and placing the assembly in an addressed envelope, took up a great deal of time that could better be employed, and in addition there was always the risk of omitting a notice or duplicating one here and there, during the process. The present method is to have the sheets folded and trimmed into a pamphlet, but without staples. The mailing clerk's job is thus now reduced to picking up notices, sixteen at a time, and no duplications or omissions are possible. If the recipient wishes to separate his "pamphlet" into the component notices, he has only to slit up the fold with a knife and the job is done. This folding idea introduced a further minor problem; for, as you will by now have observed, there is a wider binding margin on the left side of the notice. Due to the technique of mechanical folding, it is necessary to have every second notice upside-down to keep this margin on its correct side.

This reversal led to another complication regarding allowance for the grippers which hold the metal plate in the printing press, for now half the notices had their narrow head-margins where the wider foot-ones would normally be, and a further adjustment had to be made to meet this circumstance. In case I appear to be labouring this printing business, I should explain that, as with most people, we have to cut costs when possible; and as the cost of photographing blank paper is just the same as that of copying the text, we endeavour to work right up to the permissible limits of the camera and the litho. plate.
At the top of the notice, we find the departmental heading, the title, and the number. Name and number are kept as far to the right as possible, to make it easier to find them, when looking through bound sets. For our own office use, we have abandoned binders, and have a few sets printed on card. These cards permit arrangement in boxes, either alphabetically or numerically, in any desired way, and thus form their own index. This card system has very considerable advantages when replacements or extractions are necessary, and it is possible for more than one man to refer to the set at the same time, by taking out the cards he wants.

The Locality Plan which appears on the left, is, whenever possible, traced directly from an existing State lithograph, our only addition being the position of the aerodrome. We are careful to acknowledge the source of this information, for two reasons, neither of which has anything to do with the copyright act. One reason is that it is beyond our scope to survey anew, the many square miles of country shown in the locality plan, and the second one is that the users of the notice may like to obtain a plan of a bigger area, and by our acknowledgement, are enabled to refer to the original map.

Away in the background there is a sort of sneaking sub-reason, too (but of course we don’t tell of it in the wrong place). It is that some maps of the distant parts of Australia are so sketchy (because State departments have their money troubles too) that we are a bit apprehensive of possible errors, and so dodge responsibility by quoting the parent map.

The Survey of the Landing Ground, shown in the right-hand sketch, is done by departmental aerodromes inspectors. These men have each a really tremendous territory to cover, there being half a dozen, with Australia divided up between them. Each inspector has a more-or-less defined district to himself, with spasmodic reinforcement, as occasion demands. The inspectors usually have light utility vehicles, and probably average 20,000 miles a year by car, in addition to a certain amount of rail, and plane, and steamer travel. Some of them have districts as much as 1500 miles from end to end, with an area of the order of half-a-million square miles, much of it in extremely rough and sparsely settled country, where roads and men alike, are primitive.

Bearing in mind that the flyer sees the ground laid out in plan view, it will be appreciated that the standard of surveying for many grounds, need not as a rule be very high, and except in the bigger towns, chain and compass survey are generally sufficient, with even an occasional descent, to
CLASS OF GROUND: Aerodrome licensed for all types of landplanes except large multi-engined machines.


POSITION: 3 miles south of Nowra, east of and adjoining the Nowra-Braidwood road. Lat. 34°55'S. Long. 150°34'E.

MAGNETIC VARIATION: 9°E. approx.

LANDMARKS: Clearing on the east of the Nowra-Braidwood road, where road crosses the Flat Rock Creek. Nowra Hill (628 ft. high) 1½ miles south by east of aerodrome.

MARKINGS: White circle and wind indicator.

DIMENSIONS: N.E.-S.W. 880 yards. N.W.-S.E. 460 yards.

HEIGHT ABOVE SEA LEVEL: 200 ft. approx.

APPROACHES: N. over felled timber; E. over felled timber and road; S. over some timber and clear gap; W. over tel.line (15 ft. high), road and timber along creek.

SURROUNDING COUNTRY: N.E. to S. hilly timbered country, with open spaces; W. heavily timbered country.

PETROL AND OIL: Nowra, 3 miles north.

WATER SUPPLY: Pound yard, 1 mile north.

WORKSHOPS: Garages at Nowra, 3 miles north.

HANGAR ACCOMMODATION: Nil.

TELEPHONE: Pound yard, 1 mile north (Nowra 53).

TELEGRAPH: Nowra Post Office.

NEAREST TOWN: Nowra.

NEAREST RAILWAY STATION: Bomaderry, 4½ miles north.

CHARGES: 1-2 seater plane, 1/- per landing, 7/6 per day. 3-4 " 2/6d. " 12/6 " 5-6 " 5/- " 20/- " Over 6 " 7/6d. " 30/- 

REMARKS: Sheep are grazed. Relative Strip Map No. 43.
pacing of distances in the wilder parts, where space is wide and restrictions are few. Each inspector also acts as designer and supervisor of improvement works, to the majority of grounds in his district, and lets contracts, or engages labour within certain prescribed limits, as required.

Capital city, and other major grounds are generally maintained and improved in co-operation with the Commonwealth Department of the Interior, for in these important grounds, we find rather a wide range of specialised engineering, drawn upon to provide wireless, lighting for night-flying, and so on, in addition to more rigorous standards in surveying, civil engineering, and architecture. The experiences of these inspectors make interesting hearing (of course you don’t want to be too credulous) and their tales of struggles with bridgeless rivers, snakes, insects, hard tucker, dear beer, goat teams, anthills, and baobab trees, would provide more than one evening of good entertainment, coupled with a fair sub-stratum of instruction in the practical overcoming of a variety of difficulties.

Having now got below the level of the plans, I will take seriatim the items which make up the text of the notice, and will amplify or explain the information which there is given.

Class of Grounds.—In Australia, the distinction between “aerodromes” and “emergency landing grounds,” is purely arbitrary. Broadly speaking, an aerodrome is a landing ground which is better prepared (i.e. by judicious selection, or by artificial grading or surfacing), and which is kept in a better surface condition by regular inspection and maintenance work. An emergency landing ground, although it may be possessed naturally of an excellent surface, can generally be expected to be somewhat inferior, and is not maintained to the higher standard of the aerodrome, because it is, as its name implies, really intended only for emergency use. The name “aerodrome” is not to be taken as connoting the presence of hangars, fuel supplies, or other services. Aerodromes are classified according to size, as expressed in the length of runway available for landing and taking-off.

To be suitable for all types of landplanes, the aerodrome must afford a minimum run of 660 yards (600 metres), in all directions preferably, subject to good approaches, but at least in several directions to meet commonly occurring winds. For single-engined, and the smaller multi-engined planes, the runs must be 550 yards (500 metres), and a ground that allows runs of but 440 yards is restricted to use by what are classified as “light” aircraft only. It should be noted that these lengths of run are as at sea-level, and in localities of
high altitude, the lengths must be increased to conform with
the effect on the performance of the aeroplane, caused by
the relatively rarefied air. Usually in very hot regions (because
of thin air), the runs are somewhat lengthened also.

Proprietor.—This word carries the usual business significance,
and does not necessarily mean the legal owner of the land. If
the Commonwealth Government is the proprietor, the ground
is described as suitable for use by such, and such a type of
aircraft; whereas if the proprietor be a private person, a munici-
pal council or corporation, the ground is licensed by the
Commonwealth for the particular use its size warrants. In all
cases, the proprietor is looked to, to effect proper maintenance
of the ground in working condition; and in the case of non-
Commonwealth ownership, there is a definite stipulation in
the licence to the required effect.

Positions.—To define the position of a landing ground, seems
simple enough, but there are two points of view, that of the
airman, who is concerned with air-line distances and directions,
and that of the people who approach the ground by roads which
may meander to an amazing extent in their course from the
nearest town. Latitude and longitude are occasionally avail-
able from records of direct observations at the spot, but much
more frequently we have to depend on the accuracy of what
State maps are available—and some of these are not a little
sketchy, and, in parts of Australia, fairly bristle with the
letters P.D., meaning “position doubtful.” In these cases we
just do our best, occasionally relying on speedometer readings
of cars plus a little well-informed guesswork. Fortunately
in districts where such expedients have to be resorted to, there
is often such a paucity of local feature, that the local homestead
or windmill, stands out so prominently that there is some
compensation.

We consider it reasonable to state lat.-long. to the nearest
minute only, having found that authorities differ by as much
as two minutes, with great consistency, and (though admittedly
quite rarely) have been found to be at variance to the extent
of ten minutes, here and there.

Landmarks.—These are selected from the airman’s point of
view. Sometimes, in featureless country, the nearest effective
landmark may be several miles away. Tracks and roads, unless
metalled and defined within fences, are apt to be impermanent,
because of the tendency of stock (and people) to seek new
paths. Any water surface makes a good landmark, hills are
not so effective as might be thought, and railways are sometimes
much less visible than roads. Corrugated iron roofs and
buildings in general, usually show up well.
Magnetic Variation should, of course, be written magnetic declination, but we are not pedantic. Australia is one of the few countries in which the declination is comparatively small, and in which the annual variation (i.e. change of declination), is, as far as air navigation is concerned, quite negligible, and after a few years, comes back to what it was before, as it were. It may perhaps be of interest to mention that in Australia, there are areas of pronounced local disturbance of the magnetic compass. The most striking example is at Mount Magnet, in Western Australia (lat. 28, long 117-50), where the declination should be about 1½ degrees West, there is a spot which reads 52 degrees East, while less than a foot away, the reading is 8 degrees less.

Markings.—It is helpful to mark the ground so that the visiting pilot can find it easily, and for safety, the boundaries of the landing area, if not readily picked out, are also marked. The “ground mark,” i.e. the identification mark, for both the larger class of aerodromes is an annulus (“circle”) of concrete, broken stone, or suitable lasting material, set flush with the surface, and if not light coloured by nature, painted white. Rarely, we have found light coloured ground surfaces which have required dark-coloured marks to secure the necessary contrast when seen from the air.

The smallest, or “restricted” class of aerodrome is marked with a semi-circle. All emergency landing grounds are marked with a cross, regardless of the size of ground. Ground marks are stipulated to be at least 50 feet in diameter, with lines not less than three feet wide. Occasionally, and with advantage, the marks are made as much as 100 feet across, but these big ones are expensive.

Boundary marks can be of concrete, or anything that shows up well in its environment. Preferably they should be raised, some what like a gable roof, so that they can be seen from planes running along the ground, as well as from the air above.

Included under “markings” is the wind indicator. Aeroplanes should land and take-off against the wind, and so, particularly when landing, a wind indicator is very useful, though an experienced pilot can of course judge the wind direction from his drift. The usual, and cheapest form is a fabric drogue or truncated cone, hung on a pole about 20 feet high.

The smallest effective wind indicator sleeve is about 9 feet long and a couple of feet in diameter at the large end (next the pole), and say 6 inches diameter at the thin end, where the amputation took place. Another form of wind indicator—but a more expensive one, is a swivelling tee, roughly like a smallish monoplane, free to rotate as the wind changes, so that it takes
up an attitude, head to wind. It is generally set close to the
ground, and from above, looks more or less like a plane that has
already landed in the proper direction. In modern practice,
boundary marks and wind indicators are illuminated for night
flying, neon tubes being found very suitable for the purpose
(except for the fabric sleeves, which commonly have a projector
inside the wide end directed towards the narrow tip).

Description.—This term is usually an abbreviation for descrip-
tion of surface, the plans embodied in the notice, being generally
quite adequate to indicate the shape. The surface
of all landing grounds should, of course, be smooth, practically
level, and firm in all weathers. Opinions or standards of
“levelness” vary a little in different countries, for a large per-
fectly level area presents drainage problems that are extremely
hard to deal with, but generally speaking, falls of 1 in 40 are
not objectionable, and are probably advantageous, provided
there are no marked undulations to cause a rapidly taxying
machine to bounce. The degree of smoothness should be such
that a car can be driven over the ground at say 25 to 30 m.p.h.
without discomfort. The earlier criterion was the behaviour of
the Ford Model T at 20 m.p.h.

Nevertheless, successful use of grounds with the gradients
as steep as 1 in 12 is being made in New Guinea, but grounds
as steep as this are all single runway aerodromes, and the
planes arrive at, and leave by, the down-hill end of the narrow
strip, and there is no traffic across the slope. The use of such
sloping grounds is only permitted when the direction of the
prevailing wind is parallel to the strip, and if, as in mountainous
country, better arrangements are impossible.

Dimensions.—These are shown in yards, and as a rule are a
trace on the short side of the maximum obtainable, just to allow
a small margin for safety, particularly if the ends of the runs
are not free of obstructions.

Height Above Sea Level.—It is important that this should be
known to the pilot because of the reduced performance of air-
craft at high altitudes, particularly a source of trouble when
landing and taking off.

For example, at an altitude of 3000 feet a runway of 800
yards is only as effective as one of 670 yards at sea level. If
landing after dark, the pilot should know when to expect the
ground to be met.

Approaches.—It is advisable to know what obstructions to
flight exist in proximity to the landing area. Electric supply
and telephone wires are frequent causes of trouble because of
the difficulty of seeing them from the air. It is the practice in Australia to remove or lop all obstructions such as trees which project above a line representing an angle of climb of 1 in 15 outwards from the edge of the landing area. Sometimes, of course, permission to do this cannot be obtained, and often the cost or difficulty of removing or undergrounding telegraph lines causes them to be left in positions where they constitute an appreciable danger to aircraft. When pole lines have to be left on the boundary of a landing ground, it is the practice to paint the tops of the poles in contrasting colours for five feet or so to make them easier to see.

Surrounding Country.—Usually under this heading is given advice as to whether or not the surrounding country is suitable for forced landings. Engines have been known to cut out shortly after taking off, and there is also a chance that an approaching flyer may not quite be able to reach the landing ground through engine failure, fuel shortage, or other cause.

Petrol and Oil.—Advice on this point helps in the planning of routes and schedules, and if the machine can be re-fuelled en route it may be that additional loading can be carried instead of petrol being brought from the initial point of the journey.

Water Supply.—Water supply means drinking water if that is available, but more often than not it is just "water," and may include the products of decomposition of rabbits and other small fry. Still, we do our best, and standards are not so high in the backblocks.

Workshops.—This again refers to the best available within easy reach. Sometimes the facilities are in the "better-than-nothing" class, but if they are likely to be useful in an emergency they are mentioned.

Hangar Accommodation is mentioned for those who may wish to stay.

Telephone and Telegraph.—Telegrams can usually be sent by phone, but it is desirable to mention the local post office so that messages can be sent to the aerodrome in advance of any projected visit or for other reasons.

Nearest Town.—The word "town" is used here to include quite a range, from capital cities to what might more justly be described as the nearest habitation.

Charges.—Landing fees, if imposed, are usually an attempt by the proprietor to recoup himself to some extent for his often considerable financial outlay in establishing the landing ground. Sometimes the proprietor, quite reasonably, thinks he is entitled
to share in the often quite considerable takings that a popular pilot receives during a day’s ‘joyriding’ from a suitable aerodrome.

Remarks.—Often stock is grazed on landing grounds to keep the grass down, and, of course, also to fatten the stock. This is noted under remarks, and fliers are asked to beware of cattle or sheep and, generally, to advise the owner of their approach so that they (the stock, that is) can be removed in time. Under “remarks” is also quoted the Strip Map (map of the air route) on which the landing ground occurs. Warnings as required are also inserted here.

The reference numbers at foot of notice refer to the office plan on which the detail sketch is based, to the serial number of the ground, and to the lithographic plate from which the reproduction was made.

DISCUSSION

Mr. R. J. Bennie said they were under a debt of gratitude to Mr. Pyke for his most interesting lecture. Mr. Pyke had given an account of matters upon which the records of the Institute had previously thrown no light. He for one would eagerly look forward to an extension of Mr. Pyke’s subject. As to the method of printing the Notice to Airmen, as described by Mr. Pyke, the American Gas Association, in collaboration with Prof. Jerome K. Morgan, recently produced, by photo zinc lithography, a treatise on Gas, which was circulated throughout America. Many of the diagrams looked almost like blue print copies. The size was about foolscap, and did not appear to be at all inconvenient. He was interested in the peculiarities mentioned at Mt. Magnet. He presumed there must be large magnetic deposits there, which it would be interesting to investigate more closely.

Mr. G. E. Gamble thought they should pay a tribute to Mr. Pyke for his interesting and informative talk. The lecture made him realise how much work there was behind the preparation of the notices to airmen. He would look forward with interest to a further contribution from Mr. Pyke in the near future.
Author/s: 
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Title: 
The story behind the notice to airmen (Lecture & Discussion)

Date: 
1937

Persistent Link: 
http://hdl.handle.net/11343/24795

File Description: 
The story behind the notice to airmen (Lecture & Discussion)