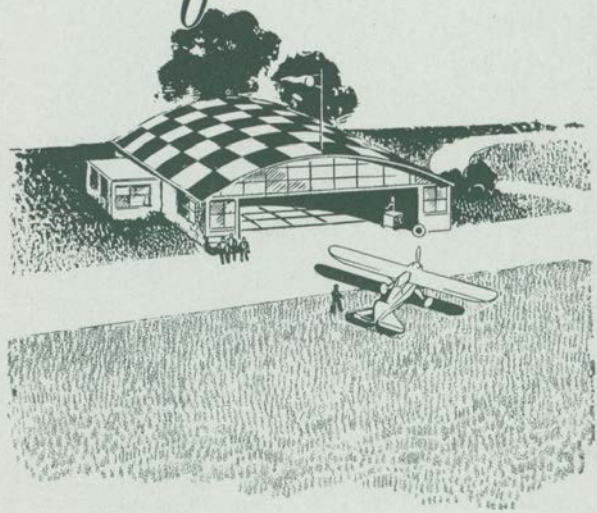


Airfields of the Future



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Airfields of the Future

BY LT. J. W. LENTZ

With many plans being laid for extensive private flying as well as numerous commercial flights after the war, it is not too early to prepare additional landing fields necessary to handle this increased air traffic. Communities of 5000 or more should begin choosing convenient sites for their airfields and obtaining options on the desired real estate.

The Army and Navy training programs of the last four years have expanded the size of most airports used previously by commercial airlines and have constructed large new fields capable of handling the heavier aircraft of peacetime.

It is the opinion of Charles I. Stanton, Administrator of Civil Aeronautics, and other leaders in the field of airport planning and construction that 99 percent of the 300,000 post-war airplanes will be relatively small for private and local commercial operations. Therefore the greatest expansion in our airport system will be in the form of numerous smaller fields located conveniently for private and local commercial fliers.

Heavy Turf Sod Indispensable

The advantages of a good turf sod on landing areas are many-fold:

1. A grass turf as a landing surface or adjacent to hard surfaced runways reduces dust and mud. In addition to being a great aid to safety, the dust-allaying property of airfield turf saves great

maintenance expense of flying equipment as well as of servicing equipment on the ground.

2. Sod absorbs heavy rainfall at an even rate—retarding erosion and minimizing standing water, both of which present a hazard to safe landings.

3. A grass sod knits surface soil together, reducing dangerous ruts and anchoring down gravel, thereby preventing the damage to fabric surfaces caused by flying gravel blown by propeller blasts.

4. Aside from adding beauty to airport surroundings, the contrast of a fresh, green turf adjacent to the hangars, ramps and taxiways provides a measure of safety to the flying personnel.

Another advantage in an over-all sod-surfaced landing field is that it provides landings and take-offs in countless directions into shifting winds—thereby eliminating the necessity for cross wind work, especially dangerous to lighter aircraft.

Before a recent meeting of the New York State Federation of Officials, Planning Boards and Mayors in Syracuse on June 8, 1944, Charles I. Stanton stated:

“A good turf is satisfactory for the average small airport. A good turf airport, with runways in two or more directions making it useable perhaps 90 percent of the time, could be built for the cost of a paved flight strip, which would be safe less than 50 percent of the time.”

Without exception grass is the most economical, simple and most practical landing surface for small aircraft.

Selection of Landing Field Site

Locating a new airport should entail consideration for the following factors:

1. Convenience to business and industrial neighborhoods, as well as to the main transportation arteries.

2. The site should be fairly level and relatively free from immediately surrounding obstacles such as mountains or cliffs. The more level, the less the grading problem involved.

3. The proposed landing field should be naturally well-drained. The soil type of the area must be investigated thoroughly, not only for its bearing properties but also for its ability to let excess water percolate on through to the subsoil. In this connection river bottom land should be avoided with few exceptions. While such a site is level and usually conveniently located, it frequently offers serious problems to airport operations when the adjacent river is at flood stage.

It is doubtless more economical to consider the drainage problem at the time the site for the new airport is selected than to drain a naturally wet area chosen only for its convenient location.

Grading and Drainage

Once a property has been arranged for in compliance with the above factors, attention should be directed to grading and draining the area as a whole. City, county and state highway engineers might be called in to help determine where cuts and fills are needed along the proposed landing lanes and approaches. Landing lanes or runways should be planned parallel to the direction of the prevailing surface winds for the district.

Grading operations should be carried out keeping in mind the grass growing operations to follow. Never bury light, fertile topsoil in any quantity beneath heavy clay and gravel. Instead,

where fairly decent topsoil exists in zones destined for fills, the topsoil should be removed first with bulldozers to a stockpile while the rough grading is accomplished with the heavier material.

It is better to complete rough grading early to provide plenty of time for settling before the field is first expected to handle aircraft traffic. By grading the landing area roughly at least one winter or wet season in advance, the fills will have ample time to settle.

Any drainage system functioning properly facilitates the prompt removal of excess surface moisture and limits the rise of the water table above subsoil level. A site requiring an underground drainage system might be serviced temporarily with open ditches. Under a long range construction program these ditches would be converted later into a permanent draining system by back-filling with coarse rock where available, or by laying the ditches with ordinary drainage tile.

An adequate drainage system in connection with a landing field serves three important purposes:

1. It is insurance against serious erosion, rutting and settling of runways.
2. It removes excess moisture immediately, making possible all-weather operation of the airport.
3. It provides a healthy growing condition for airfield turf.

The topsoil which was reserved in stockpiles should be redistributed at the time of finer grading operations. A four to six inch layer of topsoil, blended into the roughly graded surface, makes an excellent seedbed. Finer grading immediately preceding the planting should provide sur-

face drainage much as the crown of a highway sheds water toward either ditch. Final grading will minimize puddles of standing water in the areas carrying the heaviest traffic.

Starting the Sod

Just as the selection, grading and drainage of the new airport require well directed plans, so does the preparation of a permanent, useable airfield turf.

Wherever necessary grading has scarified the surface soil, cover crops should be planted first to provide a foundation for the finer turf to follow. These fast developing, temporary crops, which help knit the freshly graded soil into a sod bearing surface, may be grown during the seasons not beneficial to the starting of permanent turf grasses. These grasses, legumes and grains should be employed the season prior to the most ideal planting period for turf grasses. The varieties planted will depend on the season of the year, the soil and locality. Whatever the crop chosen it should be capable of producing rapid top-growth and considerable root development during the short period of its usefulness.

Timothy, cereal rye, wheat, sudan grass, soybeans, various clovers and other hay crops will fill the freshly graded surface with a network of roots which discing, blading and dragging preparatory to the final seeding will not seriously disturb. It would be well to consult local agricultural authorities as to the type of cover crop to choose and its rate of sowing.

In a long range airfield construction program weeds are controlled in the areas planted to hay crops by mowing once or twice annually until the

area is ready to be finally graded. Annual cereal crops such as the grains of Sudan grass should be disced into the topsoil while they are still lush and green. Deep discing and cross discing is good preparation to the planting of the permanent grass varieties.

Fertilizer

Use of a good commercial fertilizer is the most economical insurance for the success of large area turf seedings. A thorough study of the soil analysis results will determine the formula of the fertilizer chosen and the amount to use per acre. A balanced fertilizer containing all three of the essential ingredients—nitrogen, phosphorus and potash, with the greatest emphasis being placed on the phosphorus content—is usually recommended as an initial application for starting new grass. Although the rate of application will depend on the relative fertility of the soil, a treatment of between 300 to 600 pounds per acre disced well into the seedbed is the usual rate.

When the soil analysis indicates a need for lime, such an application is advisable. Lime is best distributed prior to fertilizing to make the fertilizer most effective. The usual rate of liming, depending on the degree of acidity and soil type, is between one and two tons of pulverized limestone per acre.

Seeding

Great care should be exercised in selecting the grass varieties to plant. The latitude, soil, moisture and the season of the year are the most important factors bearing on when and what to plant in starting a permanent turf.

Basic grasses in the north are Kentucky bluegrass and Canada bluegrass, redtop, bentgrass, perennial ryegrass, the fescues, and quackgrass. Basic grasses in the west are brome grass, meadow fescue, crested wheat grass and buffalo grass. Blue stem grass is also a variety found favorable in the dust bowl.

Some grasses usually considered weeds produce turf desirable for airfield landing mats. One such grass is quackgrass. This variety produces an unusually heavy growth of lateral stolons beneath the surface—which makes it a pest when found in cultivated crops. Quackgrass seed is available commercially and its planting is recommended for loose, sandy soils in localities where adjacent properties do not depend on cultivated crops. This tough grass makes the best growth in the northern latitudes, but might well be used in the zone dividing northern and southern areas where growing perennial grasses presents greatest problems.

Another grass which apparently is well suited for the zone between the northern and southern humid regions is *Zoysia*. This newcomer has recently received quite favorable publicity without mention of its limitations. Its northern practical limits are Maryland, southern Ohio and southern Missouri. *Zoysia* is slow in becoming established, and will not compete favorably with northern grasses during northern summers. While its seed is not yet available commercially (and there isn't much prospect of its becoming available for some time to come) when propagated from stolons or sprigs, *Zoysia* produces a closely knitted, erosion resistant sod. Due to its unavailability and the relatively small acreage devoted to its propagation, it is doubtful if much *Zoysia* will be employed on airfields in the near future.

Time of Seeding

Just when to start new grass from seed should receive as much careful consideration as what varieties, quality and quantities to plant. Early spring is the most popular time of year to start new turf areas. In many localities new grass may be started almost any season except midsummer.

In the northern latitudes one of the best seasons for successful grass plantings is during late summer or early fall. Then more ideal moisture conditions prevail and there is not the competition from fast growing summer weeds for the new turf to battle. In the Canadian border states spring remains the best time for planting grass.

Maintenance of Airfield Turf

MOWING The maintenance of large turf areas consists of mowing occasionally to discourage weeds and to encourage mat-like development of the grass. In large scale maintenance, grass should not be cut closely. Three or four inches high is the healthiest length for great expanses of turf.

FERTILIZING To replace the nutrients lost in mowing, turf must be refertilized at least once annually. Early fall is a good season to supply the grass with a high nitrogen bearing fertilizer. A 10-6-4 analysis at 300 to 400 pounds per acre or the equivalent is desirable.

Since peacetime aviation will require a substantial increase in the number of smaller landing fields for lighter planes, it is well for civic planning boards to give attention to the location and construction of new grass surfaced airports. A successful and permanent turf is the result of careful planning and long range preparation with respect to grading, draining and grass planting.



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