CHANGE

AC NO: 150/5300-4A CHG 1 TAD-4944

DATE: 9/13/73

ADVISORY CIRCULAR

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

SUBJECT: CHANGE 1 TO ADVISORY CIRCULAR 150/5300-4A, UTILITY AIRPORTS - AIR ACCESS TO NATIONAL TRANSPORTATION

1. PURPOSE. This change transmits new transverse grade criteria and informs the user of airport design standards of a change in terminology.

2. EXPLANATION OF CHANGE.

   a. Transverse Slope Change.

      (1) In order to facilitate drainage of surface water from runways and taxiways, the maximum transverse slope has been increased from 1-1/2 percent to 2 percent.

      (2) To help alleviate subgrade saturation from surface water runoff, the maximum allowable transverse slope in the runway safety area has been increased to 5 percent. However, it must be realized that increasing the transverse slope will not solve all problems of subgrade saturation. A subsurface drainage system may be necessary when the saturation problem is due to the presence of underground water.

   b. Terminology Change. Originally, all aircraft operated from relatively unimproved airfields. As aviation developed, the alignment of takeoff and landing paths became well defined and these paths became known as landing strips. Subsequently, requirements of more advanced aircraft necessitated improving or paving the center portion of the landing strip. The term "landing strip" was retained to describe the graded area upon which the runway or improved surface was placed. Consequently, landing strips ceased to be designed primarily for the takeoff and landing of aircraft. Rather, the primary role of the landing strip changed to that of a safety area surrounding the runway. This area, when traversed unintentionally,

Initiated by: AAS-560

should be capable of supporting aircraft without causing major damage or injury to the aircraft's occupants. This change and other refinements in airport design associated with modern aircraft developments dictate the need for providing more accurate terminology. Therefore, pending a complete revision of all airport design publications, the term "runway safety area" is to be used in lieu of the term "landing strip."

3. HOW TO OBTAIN ADDITIONAL COPIES OF THIS PUBLICATION. Normally, publications sold through the Superintendent of Documents do not allow changes to a basic document and require complete revisions to include any new criteria. However, due to the urgency to disseminate the information contained in this change, it was not considered feasible or economical to complete a revision of Advisory Circular 150/5300-4A at this time. A complete revision of the entire publication incorporating the information in this change along with other proposed changes is expected to be completed sometime in 1974. In the meantime, it will be necessary to obtain copies of the change or the basic publication as follows:

a. Change 1 to Advisory Circular 150/5300-4A, Utility Airports - Air Access to National Transportation, may be obtained free of charge from the Department of Transportation, Distribution Unit, TAD-484.3, Washington, D.C. 20590.

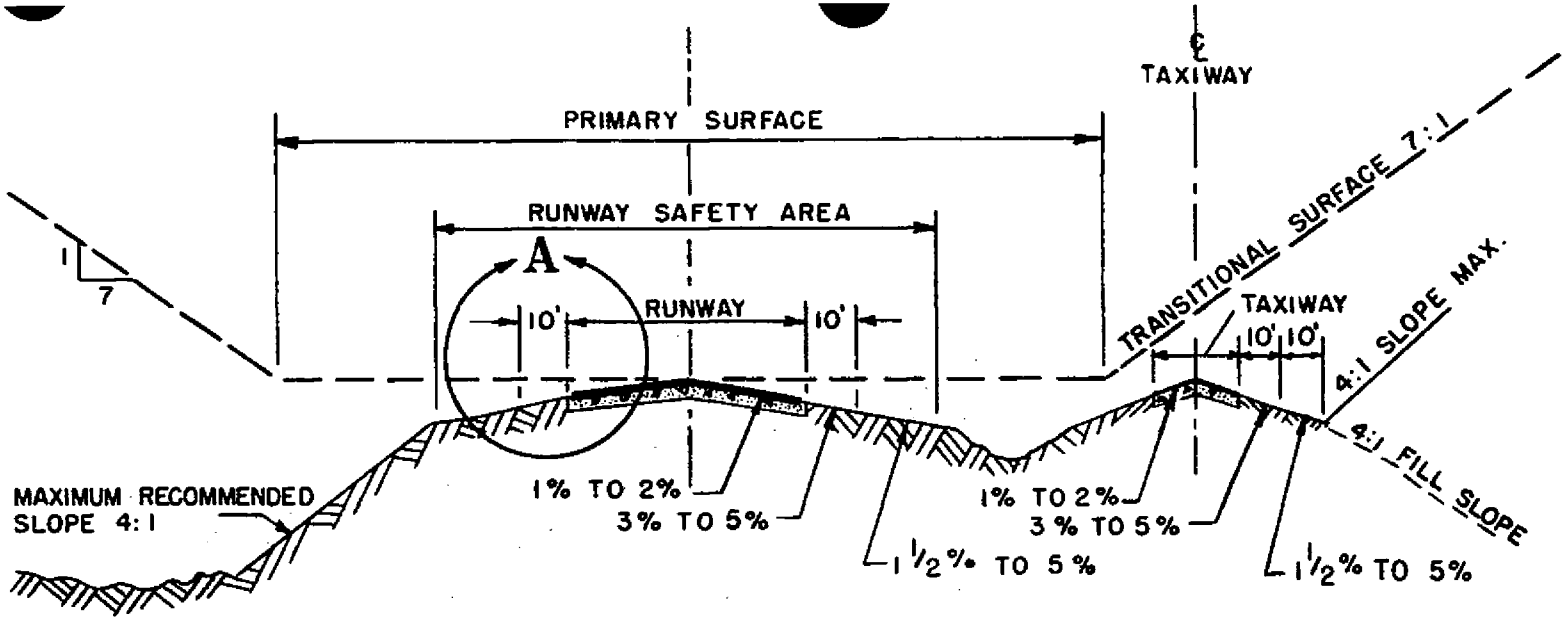
b. Copies of the basic document, Advisory Circular 150/5300-4A, Utility Airports - Air Access to National Transportation, may be purchased from the Superintendent of Documents, United States Government Printing Office, Washington, D.C. 20402, at a cost of $1.75. Checks or money orders should be made payable to the Superintendent of Documents; no c.o.d. orders are accepted.

4. PAGE CONTROL CHART.

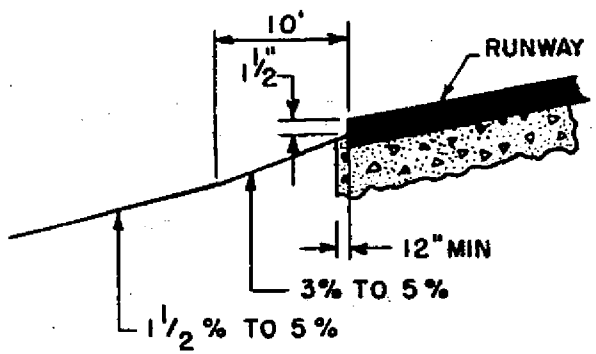
Remove Pages	Dated	Insert Pages	Dated
33 and 34	11/68	33 and 34	9/13/73
79 and 80	11/68	79	11/68
		80	9/13/73

Clyde W. Pace, Jr.

CLYDE W. PACE, JR.
Director, Airports Service



LOCATION OF DITCH, SWALE OR HEADWALL DEPENDS ON SITE CONDITION BUT IN NO CASE WITHIN LIMITS OF RUNWAY SAFETY AREA.



DETAIL A

TRANSVERSE SLOPES SHOULD BE ADEQUATE TO PREVENT THE ACCUMULATION OF WATER ON THE SURFACE. SLOPES SHOULD FALL WITHIN THE RANGES SHOWN ABOVE. THE RECOMMENDED $1\frac{1}{2}$" PAVEMENT EDGE DROP IS INTENDED TO BE USED BETWEEN PAVED AND UNPAVED SURFACES. IT IS DESIRABLE TO MAINTAIN A 5% SLOPE FOR THE FIRST 10' OF UNPAVED SURFACE IMMEDIATELY ADJACENT TO THE PAVED SURFACE.

FIGURE 17. TYPICAL CROSS SECTION

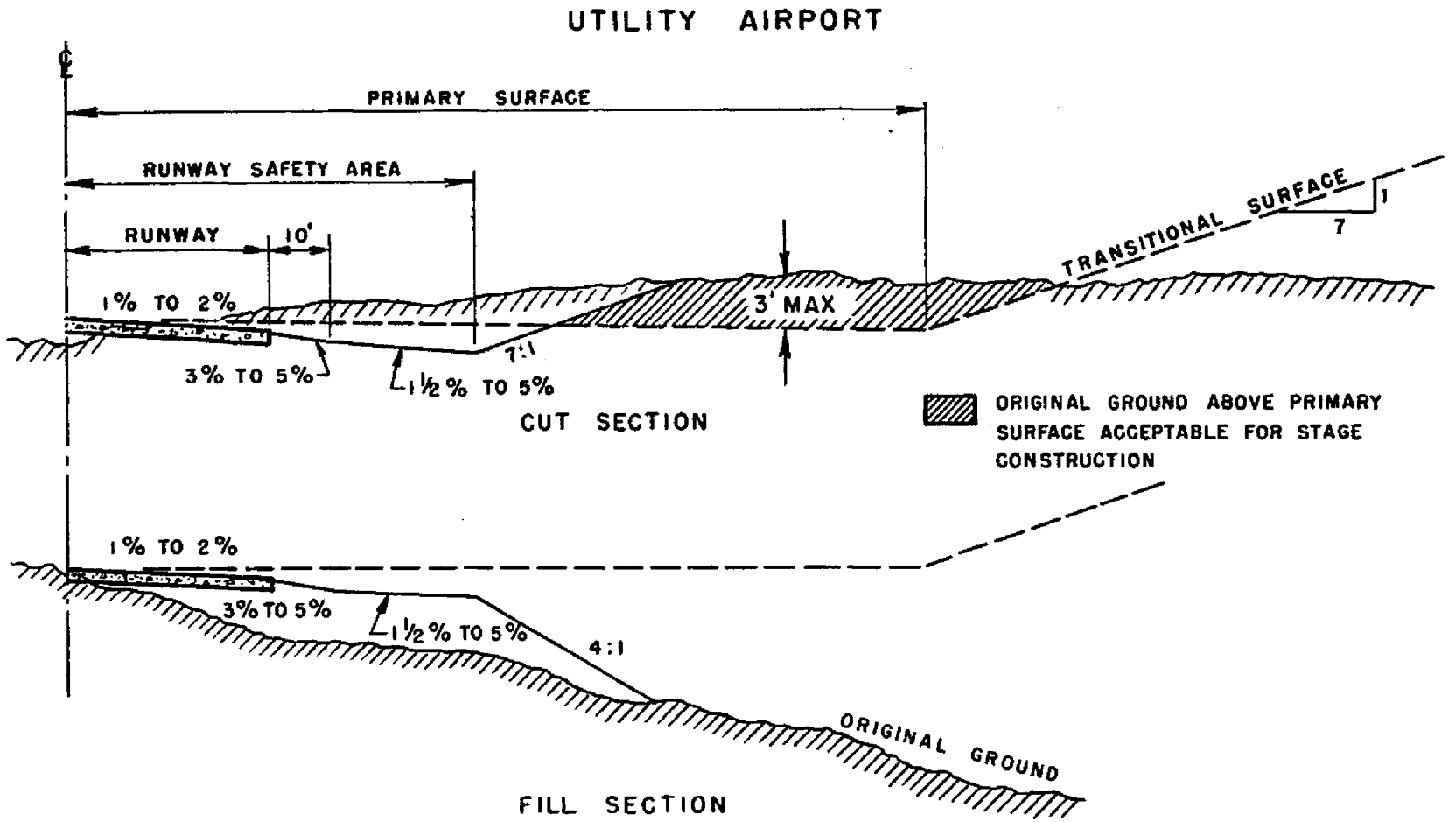


FIGURE 18. ACCEPTABLE CROSS SECTION

APPENDIX 1

VARIABLES IN DESIGN

The design of an airport component is affected by numerous independent variables. For example, an increase or decrease in temperature has the effect of increasing or decreasing, respectively, the runway length required for a particular airplane at a given site under constant conditions of wind and pressure. One can determine how much the required runway length changes with a unit change in the temperature and one can also determine statistically the number of times these changes occur.

A runway length provided to account for all variables at their critical condition, i.e., that condition which has the greatest effect on the runway length, would be excessive except when all critical conditions occur simultaneously. Accordingly, the cost of a runway so constructed would be prohibitive. Thus, a facility size less than maximum is acceptable since the likelihood of all critical conditions occurring at the same time is relatively slight. In general, the design procedures should determine the probability of the combined effect of the variables by statistical analysis. Use the result in conjunction with practical considerations in deciding the magnitude of the airport component to be designed.

In any event, the establishment of optimum size facilities should be done on the basis of an optimum ratio of costs expended to benefits gained.

For purposes of conciseness and brevity, it is considered appropriate here to list the individual airport components and state the variance that is considered acceptable, rather than the factors studied in each analysis. The following table has been prepared for this purpose.

TABLE I. Variables in Design

Airport Item	Acceptable Range of Design		Comment
	Minimum	Maximum	
A. GEOMETRIC CRITERIA			
1. Runway length—			
Basic I	2,000 feet	Airplane manual performance data for the critical aircraft in the specific group	Performance curves were prepared to be representative of aircraft in each group.
Basic II	2,500 feet		
General	3,000 feet		
2. Runway width—			Forecasted activity of student flying and frequency of crosswinds, as well as future airport expansion plans, may indicate need for initial construction of maximum width.
Basic I	50 feet	75 feet	
Basic II	60 feet	75 feet	
General	75 feet	100 feet	
3. Runway safety area width-			Same general comment as above.
Basic I	100 feet	150 feet	
Basic II	120 feet	150 feet	
General	150 feet	300 feet	
4. Runway safety area length-	100 feet beyond each runway end	200 feet beyond each runway end	200-foot length at each end provides some overrun and short-landing capability as a safety factor. More is not justified except, as stage construction for future runway extension.
5. Taxiway width—			Lighting of taxiways can justify an initial 40-foot width.
Basic I	20 feet	40 feet	
Basic II	30 feet	40 feet	
General	40 feet	40 feet	
6. Runway and taxiway longitudinal slope	Zero percent	2 percent	Site conditions will dictate the most practical grades. Slopes in excess of 2 percent could adversely affect aircraft operation.
7. Runway and taxiway transverse slope	1.0 percent	2.0 percent	Preferred slope is 1.5 percent. Maximum slope based on crown cross section.
8. Runway shoulder transverse slope	3.0 percent for first 10 feet, then 1.5 percent to limit of runway safety area.	5 percent to limit of runway safety area	Maximum slopes are intended to facilitate drainage thus preventing saturation of the pavement subgrade. No drainage structures should protrude above surface of runway safety area.
9. Taxiway shoulder transverse slope	3.0 percent for first 10 feet	5 percent for first 10 feet	Beyond 10 feet, engineering design for grading and drainage will dictate.
10. Rate of change of longitudinal grade for runway	Zero percent	0.33 percent per 100 feet of vertical curve	Does not apply to taxiways which are controlled only by maximum grade and good engineering practice.

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