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ADVISORY CIRCULAR

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

SUBJECT: USE OF A FRICTION MEASURING DEVICE IN ENGINEERING AND MAINTENANCE OF AIRPORT PAVEMENT SURFACES

1. PURPOSE. The equipment described herein is the Mu-Meter. The friction measuring device is primarily used as an ENGINEERING and MAINTENANCE tool and will provide airport management with a graphic record of relative friction (Mu) values for airport pavements under varying conditions.

2. BACKGROUND.

   a. Considerable research and development have been undertaken in techniques and equipment to measure pavement friction characteristics by the Federal Aviation Administration (FAA), the United States Air Force (USAF), the National Aeronautics and Space Administration (NASA), and in the United Kingdom. This development has reached the stage where a number of these measuring devices are now in use at various airports, civil and military, in the United States and overseas.

   b. The International Civil Aviation Organization (ICAO) has recognized the problems of pavement surfaces. Their recommendations call for construction of airport pavements without irregularities that would result in loss of coefficient of friction or otherwise adversely affect takeoff, landing, or taxiing; and construction and maintenance of a pavement surface that will provide a suitable coefficient of friction in wet conditions. Guidance for measuring and expressing coefficient of friction on wet pavements is provided in ICAO Annex 14, Aerodromes, Attachment B, and the Aerodrome Manual, Part 5, Volume II.

   c. The guidance material in ICAO Annex 14, Aerodromes, is shown in the following table:

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ICE AND SNOW

Coefficients of Friction	Description
0.40 & above	Good
0.39 - 0.36	Medium to Good
0.35 - 0.30	Medium
0.29 - 0.26	Medium to Poor
0.25 & below	Poor

The figures and associated descriptive terms of the above table were developed from experience in compacted snow and ice with one type of decelerometer and one type of continuous measuring device at fixed speeds and should not, therefore, be taken as absolute values applicable in all conditions, specifically slush, wet (loose) snow, or water.

d. Meanwhile, in the ICAO Sixth European Mediterranean Regional Air Navigation meeting held in Geneva, Switzerland, in 1971, the following table was prepared and is under consideration for adoption. The revision as shown in the table below updates the guidance material in Annex 14 for reporting of braking action on wet or slush-covered runways, compatible with that of braking on ice or snow-covered runways.

WATER AND SLUSH

Coefficients of Friction	Description
0.40 & above	Good
0.30 - 0.39	Medium
0.29 & below	Poor

NOTE: These values in the above tables may need to be revised depending on the results of the ICAO Eighth Air Navigation Conference to be held in Montreal, Canada, October 1973. This meeting will have benefit of the FAA/USAF/NASA research study and the Planned ICAO Equipment Correlation Program.

3. DESCRIPTION OF EQUIPMENT. For the purpose of this advisory circular, the equipment used is described as follows: a vehicle equipped with a friction measuring device geared to a continuously recording graph chart with a remote visual meter which provides a means for the operator

to observe pavement surface conditions during the operation along the entire length of the runway or taxiway. Basically, the equipment is designed to provide relative friction characteristics of the pavement in a documented form as well as on a visual meter for monitoring purposes. It is also designed for rugged use, minimal maintenance, and can be operated by any individual qualified to drive a motor vehicle. The equipment is capable of obtaining the following types of information data:

a. Relative friction values; i.e., the slipperiness of the pavement surfaces.

b. Comparison of previous data recorded over a period of time to detect changes in surface friction characteristics. Any deterioration from pavement surface friction readings that have been considered operationally acceptable, therefore, can be noted and located, and PROPER MAINTENANCE PROCEDURES established to upgrade the friction readings to the original safe operational level. These changes are detected by a friction readout from which the operator may equate to known contaminants on the surface, such as greasy fuel spills, rubber deposits, water, etc.

c. Areas of slippery paint surface.

d. Changes in surface texture which may occur due to age, overloading, or inordinate increases in number of operations.

e. Relative values in a graphic chart form that can be readily interpreted as pavement friction characteristics.

4. DISCUSSION.

a. This advisory circular does not purport to provide a means to predict aircraft stopping distances.

b. The equipment will obtain friction data for the entire length of the runway with minimal requirement for shutdown periods.

5. HOW TO OBTAIN THIS ADVISORY CIRCULAR. Obtain additional copies of this advisory circular free of charge from the Department of Transportation, Distribution Unit, TAD-484.3, Washington, D.C. 20590.

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