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Equations and Techniques for Computing Braking Friction Coefficients and Braking Energies

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14. ABSTRACT

Maximum energy braking tests are among the most hazardous tests conducted by the Flight Test Center. The reasons they are so hazardous are many and varied (fire from overheated brakes, broken brakes and wheels with hot shrapnel puncturing fuel tanks, etc.) but many of these hazardous conditions result from poor control over the amount of energy programmed for the test. It is with this in mind that the equations derived here were developed. These equations were successfully used in the prediction and analysis of data obtained in the "Evaluation of a 5-Rotor Brake and Modulated Anti-skid System Installed on a KC-135A", AFFTC-TR-64-43. The results were cross checked with the digital and analog results detailed in TR-64-43, and they generally fell between the analog and digital results, favoring slightly the analog results.

In view of the fact that exact energies absorbed by the brakes are difficult to obtain because of the many factors involved (braking coefficients, lift and drag coefficients, engine thrust, etc.) it is recommended that maximum braking test be carried out to 95+ percent of rated braking energy. This allows a five (5) percent margin for unknown factors. Tests should never be programmed for 100 percent of rated braking energy since some overshoot is easily possible.

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