Federal Aviation Administration

Memorandum

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To: Airport Regional Division Managers, AXX-600's
Airport Regional Division Managers, AXX-620's
Airports District Office Managers

From: John R. Dermody, Deputy Director, Airport Safety & Standards, AAS-2

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Subject: Lightning Protection Counterpoise System Study

This memorandum both introduces and briefly summarizes a study conducted by Mississippi State University titled "Study of the Counterpoise Lightning Protection System for a Scale Model Runway"

The intention of including the study with AC 150/5340-30, Design and Installation Details for Airport Visual Aids, is to provide a source of technical information for engineers that are involved with the design of an airfield lightning protection systems. The study will help the engineer determine and understand the best choice of counterpoise design for an airfield.

STUDY SUMMARY

The Mississippi State university study addresses the most important questions posed to the design engineer for the airport lightning protection system. Do I design the counterpoise system for equipotential or isolation types of counterpoise systems? Isolation lightning protection systems do not connect the counterpoise to the light bases or mounting stakes for the runway edge lights and use the counterpoise conductor as a barrier that is located between the runway edge and the edge lights. An equipotential lightning protection system connects the counterpoise to the light bases for runway edge lights – both the light bases and the counterpoise are at equal potentials or "equipotential." The airfield environment poses unique design challenges because of the large surface area and below ground counterpoise requirements. The design engineer must be aware of the two types of counterpoise systems and how they function to produce functional lightning protection system designs.

The Mississippi State University study will help the design engineer to understand how lightning attaches to the counterpoise lightning protection system through the use of a 100:1 scale model runway, counterpoise system, and scale model runway edge light fixtures. In addition, polarities of lightning are discussed in detail with their propagation effects upon both an isolation and equipotential counterpoise system. Numerous diagrams and high speed photographs are included to help the reader understand what happens when lightning strikes the runway surface.

The design engineer should use the information in the Mississippi State University study in conjunction with the requirements in AC 150/5340-30, Chapter 12, to determine the best design of counterpoise for the airfield.

The Federal Aviation Administration gratefully acknowledges the work of the Mississippi State University and Ms. Joan Campbell, Air Force Civil Engineer Center (AFCEC) Tyndall Air Force Base, Florida.

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