Transportation
Aviation

Client
Various

Location
Various

Additional Technical Advisor/Committee Memberships
AAAE Water Quality Subcommittee

Co-Chair, ACC planning and environmental committees

Chair of the ACC education and engineering committees
ACI-NA Environmental Affairs Committee and Water Quality Work Group

ACI-NA ELG Task Force

ACRP (Airport Cooperative Research Program) Project Panel 03-13: Understanding Airspace Analysis Tools for Airport Planning

Technical Advisor to the Airport Clean Water Alliance

Improved Overlay Design Parameters for Concrete Airfield Pavements Technical Panel

Using Design Build Acquisition for Concrete Airfield Pavements Technical Panel

Aviation Research Projects

Project Description
CH2M HILL Aviation staff have performed a significant amount of research, participated in several research projects, and are contributing members of many research panels and committees.

Airfield Pavements
Upon formation of the Integrated Pavement Research Foundation, CH2M HILL staff have been very active in various technical panels supporting research on improved airfield pavements, one of the most significant airport capital program costs. Since 2001, CH2M HILL has provided staff to serve in an oversight role for the guidance and development of this research. In addition, our globally-recognized airfield pavement experts have served as senior consultants to the principal investigators leading these research efforts. Two example project descriptions and CH2M HILL's involvement are discussed below.

Best Practices Manual
CH2M HILL provided staff for the technical panel to oversee the development of a Best Practices Manual for Portland Cement Concrete (PCC) airfield pavements. This oversight committee consisted of a representative from the Federal Aviation Administration (FAA), the airports community, the construction community, and the consulting community. The manual is a compendium, prepared in a "user-friendly" format, of good construction practices that lead to long-term pavement performance. Some of these practices have been translated into construction specifications that mandate certain requirements for various construction activities. The scope of the research study included the following:

1. Documentation of construction techniques and practices.
2. Discussion of advantages and disadvantages of each technique or practice.
3. Identification of practices that result in early age or premature failures and poor long-term performance.
4. Identification of practices that result in superior airport PCC pavements.
5. Discussion of commonly encountered problems with meeting project specifications and how to mitigate such problems.

Practices for Accelerated Airfield Concrete Pavement Rehabilitation and Reconstruction
Many of the airports in the U.S. operate at or near capacity; however, the maintenance and rehabilitation of PCC pavements, or even reconstruction of existing pavements with PCC, has become increasingly problematic at busy airfields. For example, more and more airport owners are insisting that rehabilitation work be performed only during nighttime closures, with the pavement turned over to the contractor no earlier than 10:00 pm and a

penalty imposed if it is not reopened by 6:00 am. For reconstruction or certain extension projects, owners are severely limiting the available construction time, as any activity that adversely affects operations directly translates into lost revenue from airport tenants.

While the materials and procedures for accelerated or "fast-track" airfield construction are not necessarily new, there is very limited guidance on their integrated application in the aviation industry. As is often the case, innovation in actual practice is leading standardization and documentation by at least several years.

The Innovative Pavement Research Foundation (IPRF) is supported research in this area to address this shortcoming. The eventual product of this research is a guide for accelerated concrete pavement techniques for airfield pavement. This guide, whose target audience includes airport owners and operators, planners, designers, and contractors, was based on the actual experiences of that target audience, and will be of interest and value to anyone who is contemplating tackling the maintenance, rehabilitation, or reconstruction of a PCC pavement under operational constraints. CH2M HILL provided senior consultant staff in a subcontractor role to support this research effort.

Airport Deicing

Since 2006, CH2M HILL's airport deicing experts have been leading or playing key contributing roles in a variety of research projects conducted for the Transportation Research Board's Airport Cooperative Research Program. Each of these projects involves a different aspect of deicing that airport managers and aircraft operators are facing today as they continue to ensure safe and efficient aircraft operations under all weather conditions, while meeting the increasingly demanding requirements for controlling runoff from deicing activities.

ACRP 02-02. Managing Runoff From Aircraft and Airfield Deicing and Anti-Icing Operations. 2006-2008. CH2M HILL led a multidisciplinary team of engineers, scientists, and legal experts in creating guidance for developing deicing runoff control programs. The primary product of this effort is *Planning Guidelines and Best Management Practices for Aircraft and Airfield Deicing Stormwater Management Systems*, the first ever standard reference for deicing management practices. Other products include a comprehensive bibliographic database of available literature and other information on the topic, an annotated bibliography, and a set of 43 Fact Sheets that present concise descriptions of relevant aspects of each available BMP. Ongoing efforts consist of a workshop series to educate the aviation community about the document, and production of associated technology transfer materials.

ACRP 02-01. Alternative Aircraft and Airfield Deicing and Anti-Icing Formulations With Reduced Aquatic Toxicity and Biological Oxygen Demand. CH2M HILL is part of a multidisciplinary team of engineers and scientists who are developing alternative components and formulations for aircraft and pavement deicers. CH2M HILL's technical role involves bringing an understanding of airfield operations to the evaluation of

prospective alternative deicer formulations, and assessing the environmental impact of those formulations in the context of commercial airfields. In addition, we are providing organizational support to the Principal and Co-Principal Investigators in coordinating the complex technical team and meeting project milestones.

ACRP 11-02 (Task 10). Estimate National Use of Aircraft and Airfield Deicing Materials. Principal Investigator leading a multidisciplinary team of engineers, scientists, and legal experts assessing the magnitude and distribution of aircraft and airfield deicer usage in the U.S., and characterizing the existing environmental regulatory requirements that pertain to the control of deicing runoff.

ACRP Synthesis Topic S10-03. Impact of Airport Pavement Deicing Products on Aircraft and Airfield Infrastructure. CH2M HILL's deicing practice leader was an invited Topic Panel member overseeing the synthesis of available information on damage to aircraft and airfield infrastructure from environmentally-friendly airfield pavement deicers, and identification of gaps in the existing knowledge base.