

ACRP Problem No. 12-07-06

General Aviation Terminal, Apron, and Hangar Area Planning and Design

ACRP Staff Comments: No comments offered.

TRB Aviation Group Committees Comments: AIRCRAFT/AIRPORT COMPATIBILITY CMTE - This is an opportunity to address the need for guidelines for developing and approving through-the-fence operations by private developers. The advisory circular information on GA airports probably needs to be updated, but there seems to be no high-priority issues to be addressed.

AIRPORT TERMINALS AND GROUND ACCESS CMTE - We recommend approval. There is a general dearth of information on planning GA facilities. This proposed guidebook would be of significant benefit to the operators of small airports and the FBOs. Research to develop tools for this hodge-podge of activity would be of value.

Review Panel Comments: Recommended — Planning and design guidelines for GA facilities are often overlooked; this research would provide significant value.

AOC Disposition: Approved and funded at \$300,000. This research will help improve GA airport safety. There is a need for standardization and more guidelines, especially since the relevant advisory circulars are not current. Although this is normally FAA's purview, it can be done more efficiently through ACRP, and FAA can endorse the guidance and update their related advisory circulars to reflect the guidelines.

I. PROBLEM TITLE

General Aviation Terminal, Apron, and Hangar Area Planning and Design

II. RESEARCH PROBLEM STATEMENT

Terminal buildings, apron areas, and hangar areas serving general aviation aircraft need to accommodate a wide variety of aircraft types and sizes ranging from small single engine aircraft up to large intercontinental business jets. Each of these aircraft has differing requirements. For example, each of these aircraft require different amounts of apron area for parking. The service needs of these aircraft also differ. This ranges from simply providing tiedowns for many small aircraft to ground power units and tugging for larger business jets. These aircraft also have different fueling, security, and handling needs. General aviation terminal requirements are vastly different. This could include on a simple flight planning room and restrooms at a low activity airport to meeting rooms and restaurants at busier general aviation airports serving business and corporate activity. Finally, hangar needs and layouts also differ according to aircraft size and the use of the building. Presently, there is no single source of information to help plan the terminal, apron, and hangar areas serving such a diverse range of general aviation aircraft.

Appendix 5 of FAA Advisory Circular (AC) 150/5300-13, *Airport Design*, provides limited guidance for planning a general aviation terminal building and T-hangar configurations. Apron recommendations are related to standard small aircraft tiedown layouts. The AC also includes a sample methodology for determining transient and based aircraft parking needs. However, the AC recommendations are focused on small aircraft and do not consider the wide range and different requirements of today's business aircraft fleet. Also, aircraft owner preferences have changed for a preference for aircraft storage over outside tiedowns. This potentially decreases the number of tiedown spaces for based aircraft.

Considering the changing general aviation fleet mix, aircraft owner preferences for aircraft storage, as well as industry demands for enhanced security, the industry needs new methodologies and requirements for developing terminal buildings, apron areas, hangar areas and support facilities to serve general aviation aircraft

III. OBJECTIVE

To develop a guidebook that airport sponsors, fixed based operators, and airport planners can use to design a terminal, apron areas, hangars, and support facilities serving general aviation aircraft. This guidebook would provide methodologies for determining the optimal number of tiedown spaces and hangars by type (conventional, T-hangar, etc.) based upon existing and forecast demand. The guidebook would also detail a methodology for determining the optimal mix of transient and based aircraft tiedown locations as well as determine how much apron area to allocate to business jet parking during peak periods. Additionally, define a methodology to

determine apron needs associated with a fixed base operator (FBO) providing commercial aviation services. The guidebook also would provide a methodology for determining the types of services to plan for a general aviation terminal building as well as sizing of functional areas based upon demand and a methodology for support facility determinations such as aircraft parking, and roadway access.

The guidebook should provide recommendations for improving the safety and security of the apron and hangar areas. This would include methods to segregate ground vehicles from aircraft parking areas and improve the security of aircraft remaining on the apron. Environmental considerations for fuel handling, spill prevention, the location of fixed fuel islands, refueling vehicle parking, and the proper placement of fuel storage tanks to facilitate fuel delivery should also be incorporated into the guidebook. The guidebook should provide recommendations on lighting, signage, and markings. The guidebook should also include recommendations for determining the correct pavement strength for the apron area and taxiways/taxilanes.

IV. RESEARCH PROPOSED

- a. Research current industry practices for general aviation terminal, apron, and hangar design.
- b. Determine data requirements to support facility analysis. Criteria could include (but is not limited to)
 - i. Number of operations
 - ii. General Aviation Passengers
 - iii. Peak period operations
 - iv. Based aircraft
 - v. Transient aircraft logs
 - vi. Hangar waiting lists:
- c. Develop methodologies for determining the following (preliminary list, not all-inclusive):
 - i. Mix and number of apron parking/tiedown positions
 - ii. Apron area to support the commercial aviation services of a FBO
 - iii. Number of T-hangar positions
 - iv. Conventional hangar size
 - v. Terminal building sizing and functional requirements
 - vi. Automobile parking needs
 - vii. Fuel storage requirements
- d. Develop recommended parking position layouts for business jet aircraft assuming both power-in/power-out and tub placement of aircraft.
- e. Develop recommended hangar layouts and configurations
- f. Develop recommendations for pavement strength.
- g. Develop security and safety recommendations.
- h. Outline environmental requirements
- i. Define support facility requirements (i.e., fuel storage and dispensing, wash racks, etc..)
- j. Provide sample apron layout designs.
- k. Develop recommendations for integrating fuel storage, dispensing, and spill prevention in general aviation apron design.
- l. Develop guidebook
- m. Written report summarizing research findings.

V. ESTIMATE OF THE PROBLEM FUNDING AND RESEARCH PERIOD

Recommended Funding: \$300,000

Research Period: 15 months. 12 months for study research and analysis. Three months for review.

VI. URGENCY AND PAYOFF POTENTIAL

There is no current comprehensive guide or industry source for planning facilities serving general aviation. Planning for general aviation needs is different among airports and those in consulting industry. FAA recommendations for general aviation apron and terminal design contained in AC 150/5300-13, *Airport Design*, are outdated and do not consider the requirements for the diversity of aircraft within the general aviation fleet. A standard methodology and format can assist the FAA in updating future guidance. Airport sponsors could realize reduced capital and maintenance costs through optimal design.

VII. RELATED RESEARCH

There is no evidence of related or past research applicable to this proposed research project.

VIII. PERSON(S) DEVELOPING THE PROBLEM

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IX. PROCESS USED TO DEVELOP PROBLEM STATEMENT

Experience in general aviation facility design and planning.

X. DATE AND SUBMITTED BY

Chris Hugunin
March 4, 2011