

## CHAPTER 6. FACILITY REQUIREMENTS

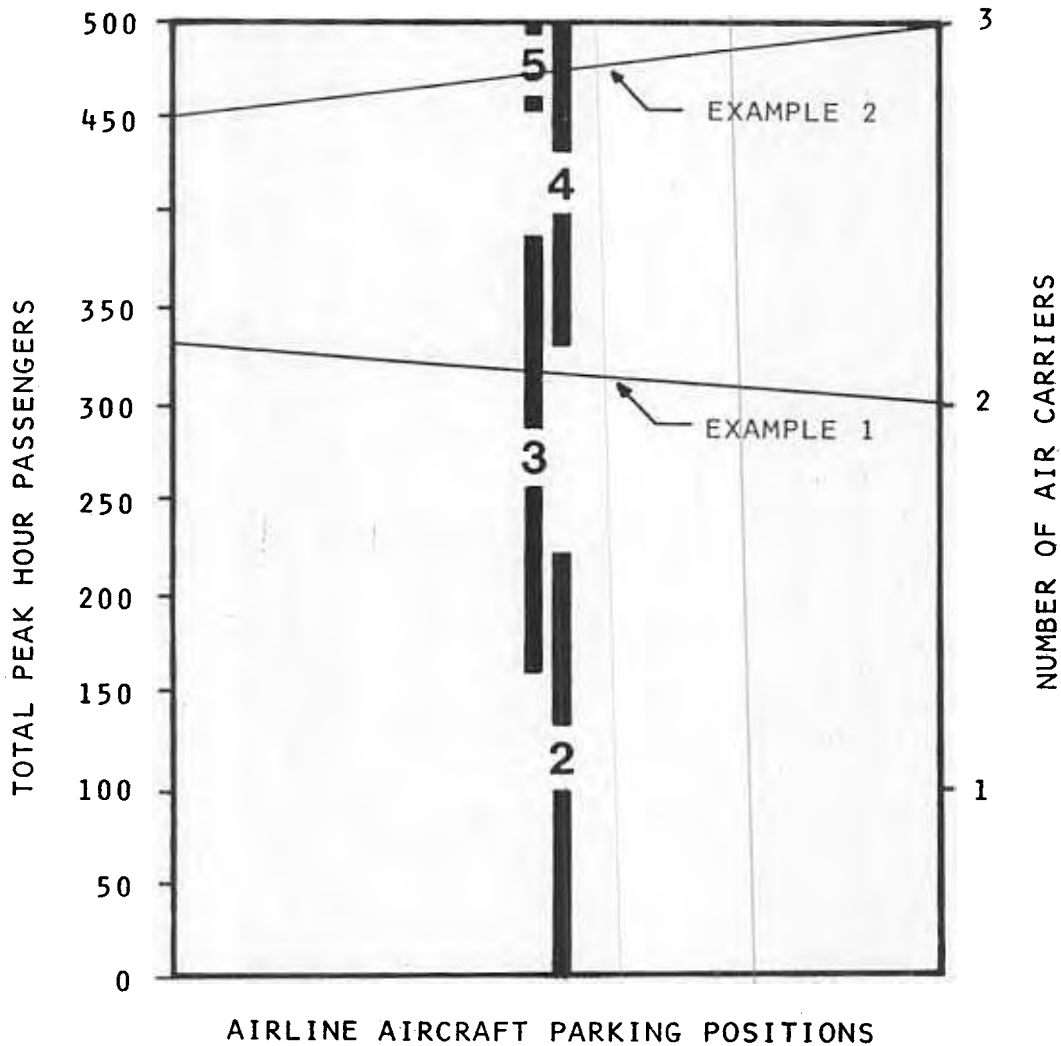
27. FACILITY REQUIREMENT GRAPHS. The facility sizing graphs herein are based on peak hour passenger activity with the exception of automobile parking, which is based on annual enplanements. The graphs have been designed for those specific facilities that are dependent on enplaning passenger peaks (e.g., airline ticket counters); deplaning passenger peaks (e.g., baggage claim facilities); or total passenger peaks (e.g., lobby/seating area).

28. AIRCRAFT PARKING. The principal factors of parking air carrier aircraft at the terminal relate to the number of positions, the method of parking, and the apron layout. Airline technical representatives can provide advice and assistance.

a. Number of Airline Aircraft Parking Positions. As a minimum, two parking positions are necessary for air carrier aircraft--one position for regularly scheduled flights and the other for the possibility of a delayed or off-schedule flight. Airlines sometimes request preferential parking positions. Additional parking positions may be required due to scheduling of simultaneous flights or when more than one airline serves the airport. To determine the required number of aircraft parking positions, it is necessary to use the forecast of total peak hour passenger activity for the planning periods and to account for the number of airlines serving the airport. In calculating peak hour passenger traffic, passengers carried by the intra-state carriers using similar equipment to that of certificated carriers should be included in the annual and monthly data. The graph shown in Figure 6-1 can be used as a guide in determining the number of airline aircraft parking positions for each of the forecast periods. Commuter airlines, air taxis, charters, and general aviation could add to the requirements for aircraft parking positions. The graph does not include these activities, and additional aircraft parking positions may be warranted. If commuter airline, air taxi, or general aviation parking positions are provided at the terminal, they should be carefully located to avoid interference with air carrier aircraft maneuvering and the effects of jet blast.

b. Methods of Aircraft Parking. At nonhub airports, aircraft are generally taxied in and out of parking positions with their own power. This is a cost effective operating procedure preferred by the airlines but requires adequate space between parked aircraft for maneuvering and clearance. In special situations where space is limited, aircraft parking positions can be spaced closer but must be pushed out by use of a tug. At most nonhub airports, however, the volume of passenger traffic will not justify the cost of the push-out operation or the equipment required. Before adopting such a solution, this should be reviewed with the airlines serving the airport.

c. Apron Design. Apron frontage of two taxi-in, taxi-out aircraft parking positions for most Group II size aircraft listed in AC 150/5335-1 may be based on a minimum spacing of 175 feet (53 m) center to center. In planning the aircraft parking apron, 25 feet (8 m) is considered a safe



**Example 1:**

Given: 330 forecasted average total peak hour passengers and 2 air carriers.

To find required number of air carrier aircraft parking positions at terminal - using a line connect the number (330) of total peak hour passengers with the number (2) of air carriers.

On the center bars read 3 aircraft parking positions.

**Example 2:**

Given: 450 forecasted total peak hour passengers and 3 air carriers.

To find required number of air carrier aircraft parking positions at terminal - using a line connect the number (450) of total peak hour passengers with the number (3) of air carriers.

On the center bars read 4 or 5 positions. Paragraph 28a. cites influences on aircraft parking position requirement variations to assist in a determination of a 4 or 5 position apron.

FIGURE 6-1. AIRLINE AIRCRAFT PARKING POSITIONS

minimum clearance to other aircraft, buildings, or obstructions and for passenger circulation or service equipment. The depth of apron is dependent on aircraft size, parking angle to the building, and whether apron edge taxiing is planned. Guidance on aircraft parking aprons is contained in "The Airport Terminal Building Planning Report" (Report No. FAA-RD-75-191).

d. Jet Blast. In designing an apron-terminal complex, the effect of jet blast at the terminal, particularly on glass areas facing the apron, must be considered. AC 150/5325-6, Airport Design Standards--Effects and Treatment of Jet Blast, current edition, contains information on this subject. In addition, user airlines should be consulted to reflect their operating experience. General aviation parking areas on the terminal apron must be planned to give consideration to the effects of jet blast or propeller wash from maneuvering aircraft.

e. General Aviation Aircraft Parking. Security requirements will affect the locations of parking space for general aviation aircraft at the terminal. ADAP legislation requires that users of such aircraft must be provided access to the passenger enplaning and deplaning area of the airport and to and from the passenger terminal building. Since persons using these aircraft have not normally been screened for security, their movement in aircraft operational areas and their access to the terminal building must be controlled. For this reason, it is often necessary to designate separate areas apart from air carrier aircraft parking for general aviation aircraft. In addition, provisions must be made to permit unscreened individuals deplaning from general aviation aircraft to have access to terminal facilities without passing through "sterile" secure areas.

29. AUTO PARKING. Public parking facilities should be provided for in proximity to the passenger terminal for airline passengers, visitors, and other terminal users. While parking requirements and characteristics vary from airport to airport, Figure 6-2 provides a guide for the number of required public parking spaces based on annual enplaned passenger traffic. Data analyzed at many airports revealed that public automobile parking requirements are more accurately relatable to annual enplaned passengers than to peak hour passengers.

a. Total Public Parking Requirements. The quantities indicated by the curve are intended to be used as a guide. It is advisable to survey public parking lot usage to determine its adequacy or inadequacy during typical peak days. The data obtained on existing public parking related to current annual enplaned passengers can be plotted on the graph. If the data seems valid, it can be projected parallel to curves or adjusted to reflect special conditions. From this procedure, future need can be estimated.

b. Short- and Long-term Parking. Normally 15% to 25% of the total public spaces should be allotted to short-term parking (up to 3 hours' duration)--the balance provided for long-term parking. Short-term parking is usually provided nearer to the terminal for two basic reasons. The

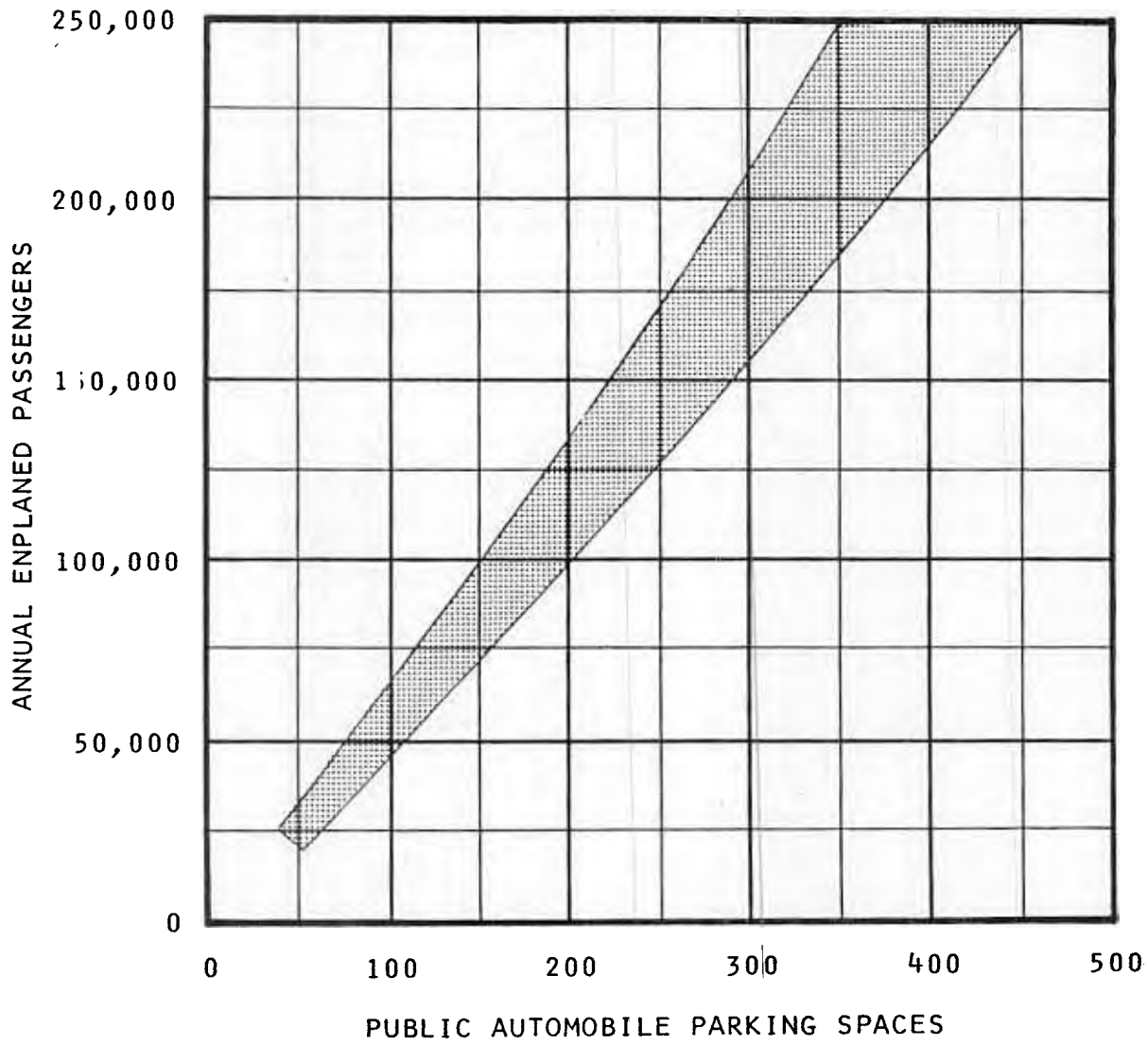


FIGURE 6-2. PUBLIC AUTOMOBILE PARKING

turnover is usually three or more times that in the long-term lots--thus it provides more spaces where needed. Parking fees for the short-term lot usually command a substantially higher rate per hour than the long-term lot.

c. Parking Lot Entrance and Exits. Points of entering and exiting the parking lots should be clearly identified and sufficiently separated to preclude confusion. A single exit is preferable where fees are charged. The exit should be situated to permit the parking patron to recirculate to the terminal curb for passenger and baggage pickup.

d. Employee Parking. Parking for terminal employees should be provided within a reasonable distance to the terminal. The number of terminal area employee parking spaces required can normally be determined by consulting with airport management, the terminal tenants, or by providing 10% to 20% of the projected public parking space requirements.

e. Rental Car Parking. At airports with low passenger volumes, a minimum of 10 parking spaces for each rental agency having a counter in the terminal should be provided in proximity to the terminal building--usually near the baggage claim area of the building. The number of spaces to provide is dependent on local agency requirements. Rental car wash, service, and storage facilities are normally situated away from the terminal building complex.

30. TERMINAL CURB. The passenger terminal curb provides for passenger and baggage dropoff and pickup. The length of curb at nonhub volume airports is usually a function of the length of the building which is generally adequate for the normal vehicular traffic. However, curb extensions beyond the ends of the building are advisable to accommodate peak demands and to correspond with future building extensions. The platform or sidewalk adjoining the curb should be of a width to allow for the swinging open of a car door plus a minimum of 8 feet (2.5 m) for circulation. A canopy extending over the curb, minimum height of 11 feet (3 m) (check local codes) to clear service trucks and buses, is a desirable feature for weather protection. The roadway at the terminal curb should be a minimum of three lanes--one for parking while unloading and loading, one for maneuvering into a parking position, and one for through traffic. In nonhub airports with special peaking problems, such as those in resort areas, professional traffic analysis and recommendation should be sought.

31. PUBLIC AREAS. The type, shape, and juxtaposition of the elements of a terminal plan affect the amount of public space in a terminal, as discussed in the following guidance material:

a. Lobby/Waiting Area. A lobby directly accessible from the curb with space for waiting and seating should be provided adjacent to the ticketing area. The lobby must be large enough to accommodate passengers who arrive early, passengers with delayed flights, and people who accompany passengers to the airport. It should be located with easy access to concessions, rest rooms, telephones, security check point(s), and the baggage claim area. It is the hub of the circulatory route through the terminal; and as such, the

seating should not conflict with passengers' queuing at the ticket counters or with passenger traffic flow. The graph, Figure 6-3, can be used as a guide to the amount of area for a lobby or waiting area. Unusual peaks resulting from special events, resort areas, or colleges may require additional lobby/waiting space than indicated on the graph. The number of occurrences annually can influence judgment on providing additional space for such conditions. Ten to 15 percent for circulation space and allowance for visitors is accounted for in the curve. Lobby space for queuing in front of ticket counters is obtainable from Figure 6-4. The depth of queuing space should not be less than 20 feet (6 m). Queues should not obstruct entrances or impinge on the circulation space parallel to the line of ticket counters. Area for the circulation space is in addition to the areas obtained from Figure 6-4.

b. Circulation Space. As described in paragraph 20 and shown in Figure 4-2, circulation is a key element in a successful terminal plan. The amount of circulation space with respect to the gross terminal area varies from approximately 20% to as much as 30%, depending upon the layout, degree of centralization of facilities, and size. As an example, initial development may include a concourse to a departure lounge. Future construction phases may include an addition to the departure lounge and apron to accommodate an additional aircraft parking position and enlarged ticket counter, ticket lobby, and baggage claim areas. Thus, additional circulation space will not be required for these additions; and its percentage of the total space would be less than the initial percentage. Unless some factor portends unusual growth, 20% may be used for planning purposes. Adequate circulation space should be allowed in the planning to take into account future forecast requirements.

c. Passenger Security Screening. Air carriers using aircraft operated under FAR Part 121 are required by section 121.538 to screen all passengers prior to boarding the aircraft. Three types of preboard passenger screening stations are currently used in airport passenger terminals. They are sterile concourse, holding area, or boarding gate, in this order of preference from the standpoints of security and passenger facilitation. Careful attention should be afforded the type, location, and number of screening stations to simplify passenger flow through the terminal and to plan for a minimum security screening staff. This suggests a single screening station. Nonhub terminals, when the volume of traffic warrants, sometimes employ x-ray baggage inspection and/or electronic walk-through metal detection devices. A security screening station requires in the order of 100 to 150 square feet (10 to 15 m<sup>2</sup>). In an existing passenger terminal when a single security station is not functionally feasible, provision must be made for multiple security screening facilities at boarding gates, departure lounges, or concourses as appropriate. Queuing space should be provided at the security inspection station to accommodate queues which can quickly develop when a person must be rescreened or physically searched or when baggage must be physically inspected. The security inspection stations should be planned to avoid queues extending into circulation elements. Additional security considerations are discussed in Chapter 7.

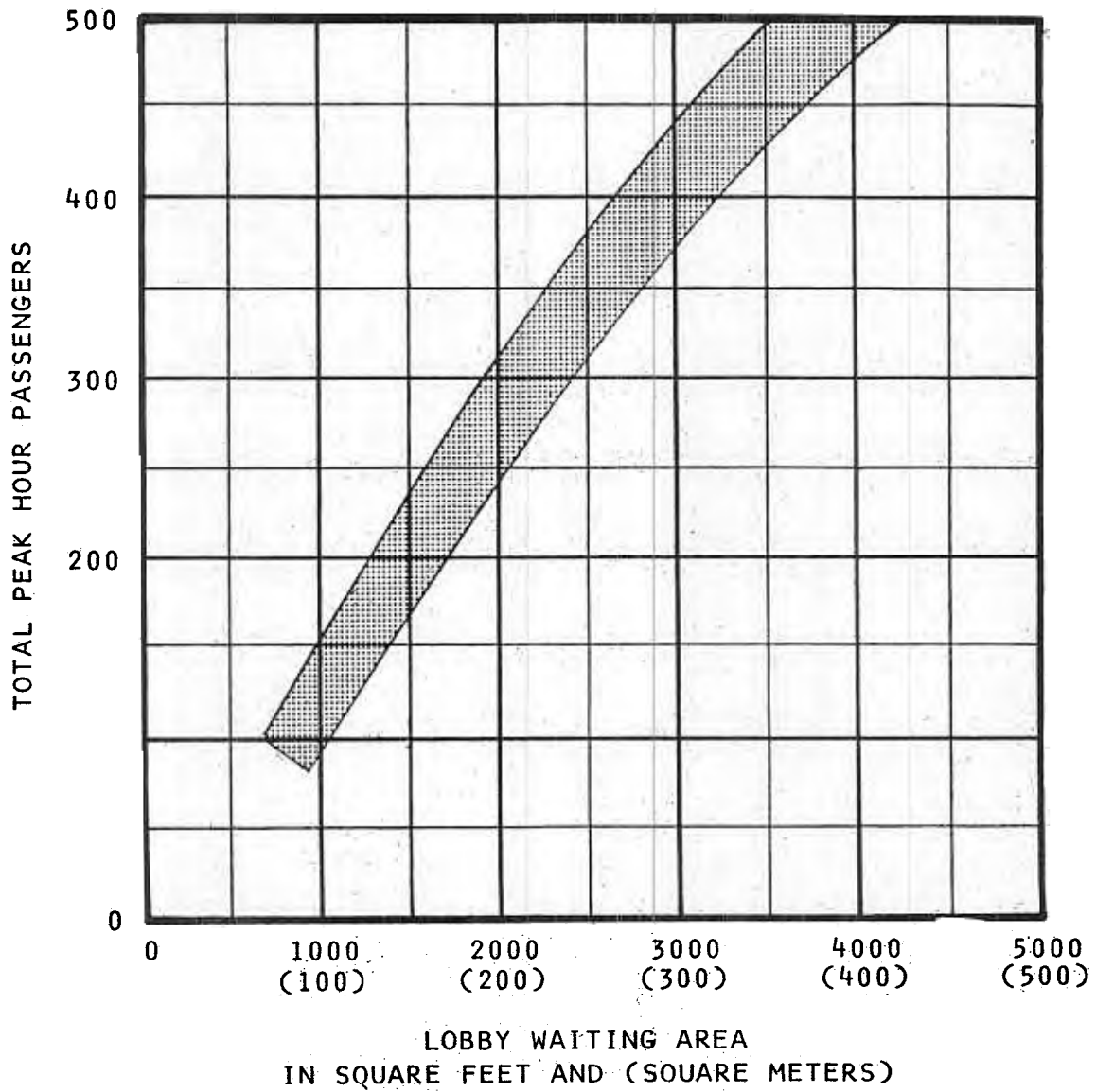
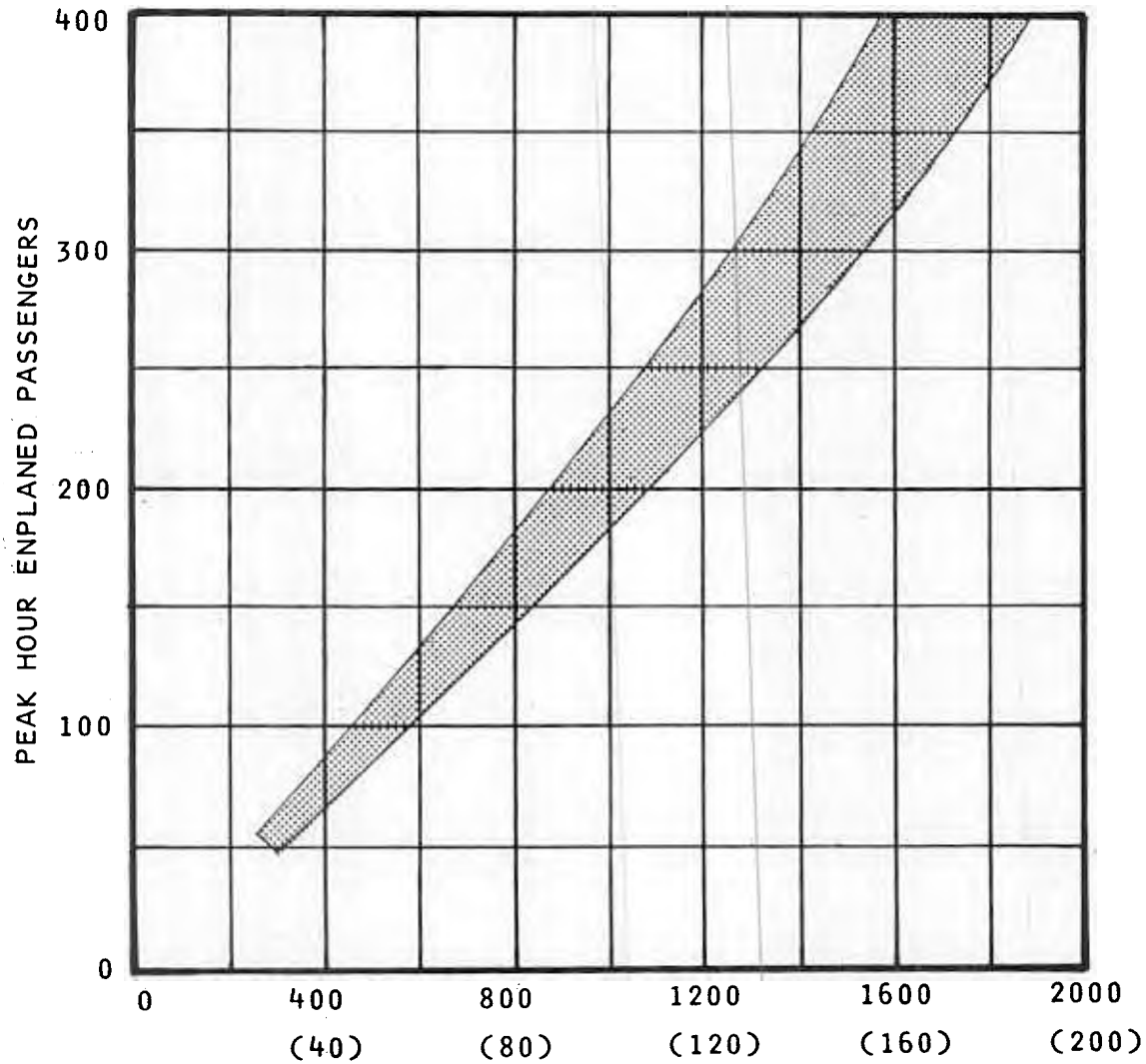


FIGURE 6-3. LOBBY AND WAITING AREA



QUEUING AREA IN FRONT OF AIRLINE TICKET COUNTERS  
IN SQUARE FEET AND (SQUARE METERS)

FIGURE 6-4. TICKET COUNTER QUEUING SPACE



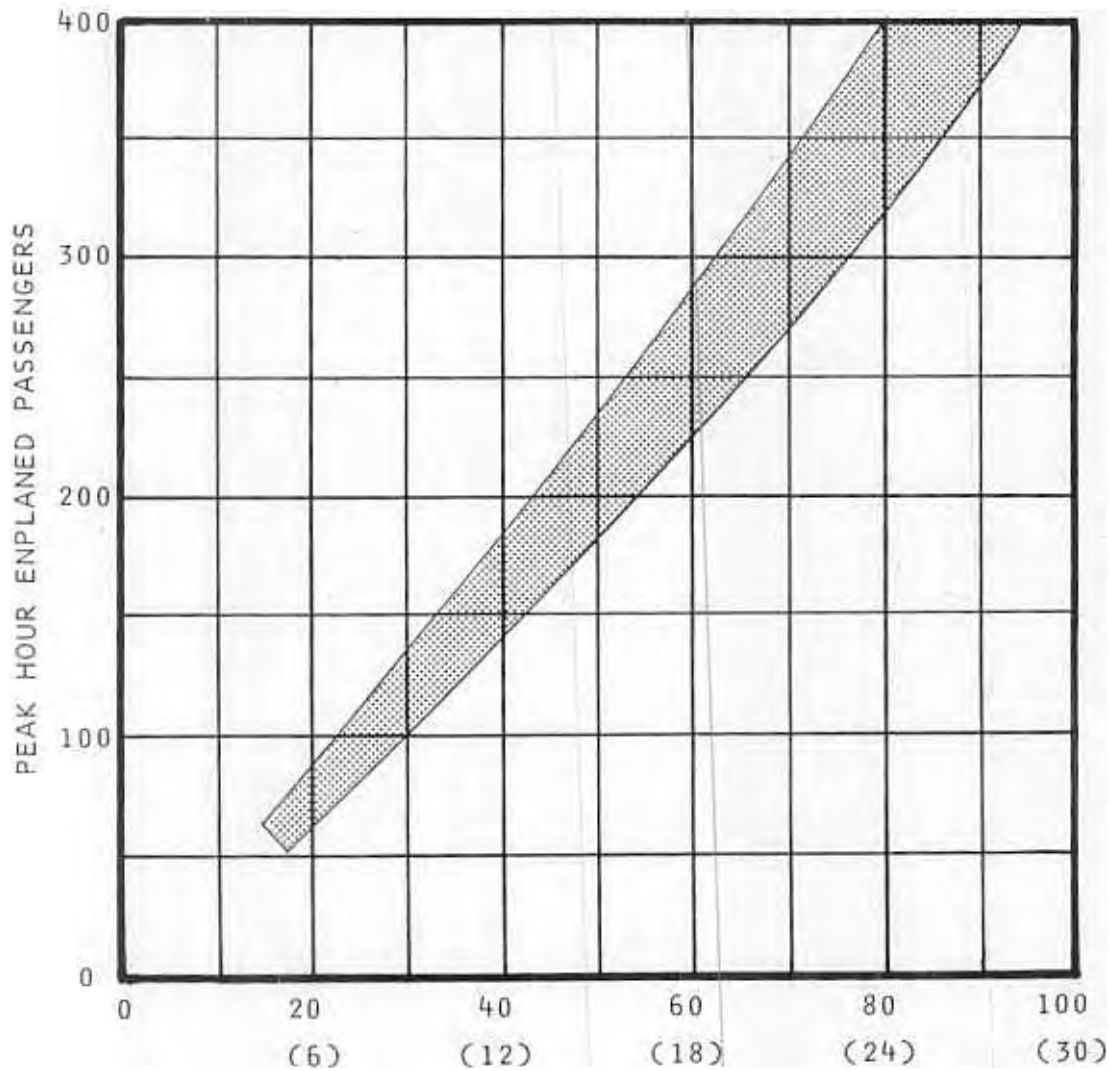
d. Departure Areas and Lounges. After passengers have been processed through security, they proceed to a departure area to wait until the boarding of aircraft commences. These areas must be designed to maintain security through monitored or controlled entrances, exits, or fire doors to preclude random egress or ingress between the aircraft apron or to nonsecure areas. Boarding passes are checked at the departure area or lounge door which opens to the aircraft parking apron. At nonhub volume airports, departure areas can range in size from 500 square feet (50 m<sup>2</sup>) up to 1200 square feet (120 m<sup>2</sup>), depending on the number of seats on the airplane(s) and boarding load factors. Seating in the departure areas can be approximated by providing one seat for each 20 square feet (2 m<sup>2</sup>). Where feasible, a single common departure area or "hold room" may be space and cost effective for passengers processed through the security check. The tenant airlines can be helpful in furnishing square foot requirements for departure areas.

e. Rest Rooms. Public rest rooms should be at locations convenient to the ticket lobby, restaurant facilities, and baggage claim area. In most nonhub terminal buildings, rest room facilities can be grouped in one centralized location. Additional rest rooms might be provided in a secure area and/or in proximity to departure lounges. Private toilet facilities are sometimes provided in conjunction with operational and administrative facilities in nonpublic-use areas. Local building codes often specify the number of fixtures based on occupancy of a public building. Provision must be made for access and use of facilities by handicapped persons. (See Chapter 7.)

32. AIRLINE SPACE REQUIREMENTS. The guidance material presented on sizing of facilities for airline use can be utilized for preliminary planning. The user airline(s) should be consulted on facility requirements early in the planning stages.

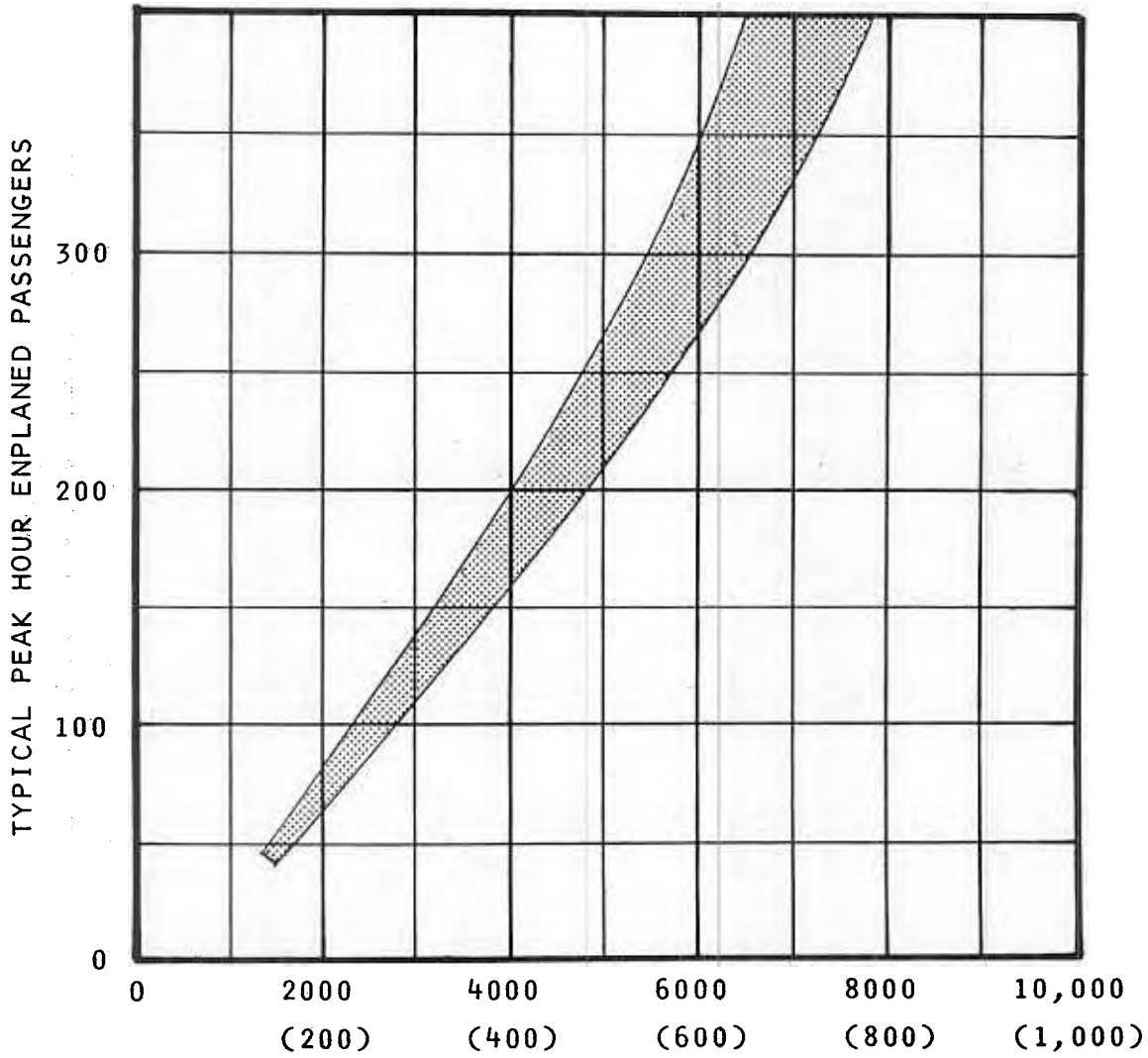
a. Ticket Counter. Counters for the sale of tickets and check-in of baggage should be situated near the entrance, clearly visible and readily accessible from the terminal curb and the lobby areas. Curbside baggage check-in facilities are rarely provided at nonhub size terminals. Airline equipment at the counter often includes computer terminals that provide reservation data, seat assignment data, inventory control, and flight information. Tenant airlines will furnish specifics on communications and electrical requirements. Figure 6-5 provides a guide to ticket counter lengths for planning purposes. Individual airline counter requirements should be obtained from each tenant airline to verify or modify the data taken from the graph. Counters are normally placed in a continuous line with space provided for expansion. Approximately 8 feet (2.5 m) should be provided between the counter and the wall behind the counter for counter airline personnel and baggage conveyors.

b. Airline Office and Operational Spaces. The tenant airlines will furnish a tabulation of the spaces and space requirements for their individual needs in the airport terminal. Figure 6-6 is intended to provide an approximation of total office and operational spaces to be used for preliminary planning and sizing of airline terminal facilities.



AIRLINE TICKET COUNTER  
IN LINEAR FEET AND (LINEAR METERS)

AIRLINE TICKET COUNTER LENGTH



AIRLINE OFFICE, OUTBOUND BAGGAGE AND OPERATIONAL SPACE  
IN SQUARE FEET AND (SQUARE METERS)

FIGURE 6-6. AIRLINE SPACE REQUIREMENTS

(1) Outgoing Baggage, Cargo, and Mail. After baggage is tagged at the ticket counter, it is conveyed to a baggage makeup area where it is sorted according to destination and loaded onto carts for movement to the parked aircraft. The security of the baggage makeup area is important not only for theft prevention reasons but also as a security measure to prevent the introduction of explosive devices into checked baggage. Outgoing baggage or baggage makeup areas at nonhub airport terminals should be located near, usually behind, the ticket counters and have direct access to the aircraft apron. Individual baggage makeup areas are generally provided for each airline and sized to baggage carts and handling requirements. At some locations, small package cargo is often moved by truck directly to or from the baggage room or to the aircraft. At locations where there is a substantial volume of cargo activity, a separate cargo building may be required. Mail transported by air is transferred at planeside to and from Postal Service vehicles. If the latter, it is sometimes processed in a secure section of the cargo area.

(2) Offices. Airline office space is usually provided behind the ticket counters. This office area should have access to the ticket counter and baggage makeup area. It is used primarily by the agents as a work space, and space is frequently needed for a lounge and training purposes. Sometimes a multipurpose room is used for all these functions. The airline manager's office may also be in this location.

(3) Operations and Maintenance. Each airline usually requires space in the terminal accessible to the crews for flight planning purposes. A crew lounge may also be included. Limited maintenance space and storage for aircraft supplies is usually required and can be located near the aircraft parking apron or, if not, as a part of the space behind the ticket counter.

c. Baggage Claim. The baggage claim facilities are normally shared by all airlines at nonhub airports. Actual counts have indicated that, on the average, an allowance of one checked bag per passenger is a reasonable planning criteria. This number varies and would be lower for locations of predominantly business travel and higher in resort or college areas.

(1) Facility and Location. The baggage claim facility consists of nonpublic circulation and unloading space for baggage carts, a claim counter on which baggage is displayed for claiming, and space for passengers awaiting baggage. An alternative to a fixed baggage claim counter is a moving display baggage conveyor. The claiming facility should be situated convenient to the deplaning passenger flow patterns and in proximity to the terminal curb. Car rental counter space should be provided adjacent to the claim area.

(2) Space Requirements. The total quantity of baggage claim space required--airline and public--is determined by the seating capacity of the arriving airplane (or airplanes for simultaneous arrivals) and the number of

deplaning passengers. The claiming facility is thus subject to surges of occupants as deplaning passengers leave the aircraft in a 10- to 20-minute timespan, frequently before bags are delivered to the claim facility. The graph of baggage space requirements in Figure 6-7 must be considered a preliminary planning guide, allowing for area adjustments as affected by current and forecast airline scheduling and aircraft types. Also, the number of bags per person is greater in resort areas than in other areas, and additional counter lengths may be required. Areas taken from the curve include the waiting space and space for the baggage claim counter or device(s).

(3) Counter Length. The graph in Figure 6-8 approximates lengths of baggage counters or lengths of a moving baggage display device in the public baggage claiming lobby. Figure 6-8 is based on a 2'6" (0.75 m) wide counter. For moving displays, sufficient length for the unloading of a minimum of two baggage carts should be provided in the nonpublic airline work-space.

(4) Baggage Cart Unloading. The baggage handling area in the nonpublic space for offloading baggage carts should be a minimum of 12 feet (4 m) wide plus an additional 10 feet (3 m) of width for cart maneuvering or passing. The length of the work area should be equal to the length of the claim room as a minimum.

33. CONCESSIONS. The type and size of concessions that are economically feasible in nonhub volume airports are primarily dependent on traffic volumes. Figure 6-9 provides the terminal planner a guide to an approximation of space requirements for food, beverage, and miscellaneous concessions. Final space requirements should be based on local conditions of possible patronage of the concessions planned.

a. Food Service. A minimum facility would consist of space provided for vending machines for the dispensing of hot and cold pre-prepared food and beverages. An area of 80 square feet (8 m<sup>2</sup>) would be a minimum. If a vending machine-type service is planned for the initial stage of terminal construction, the terminal should be capable of accepting future additions that could include a snack and beverage bar. The latter might be considered when a determination is made that passenger volumes and other airport patron sources would support a minimum staffed facility of 400 to 600 square feet (40 to 60 m<sup>2</sup>). In the higher volume nonhub airports, a coffee shop with some table seating and a separate kitchen may be warranted. Local conditions and potential patrons would be a determinate for this type of facility which could, in addition to patronage related to passenger volumes, provide meals to be served on airline aircraft, executive, or general aviation aircraft. The size of such a facility could range from 1,000 to 3,000 square feet (100 to 300 m<sup>2</sup>).

b. Beverage Service. A beverage facility, bar or cocktail lounge, where alcoholic beverage laws permit, could be situated in conjunction with

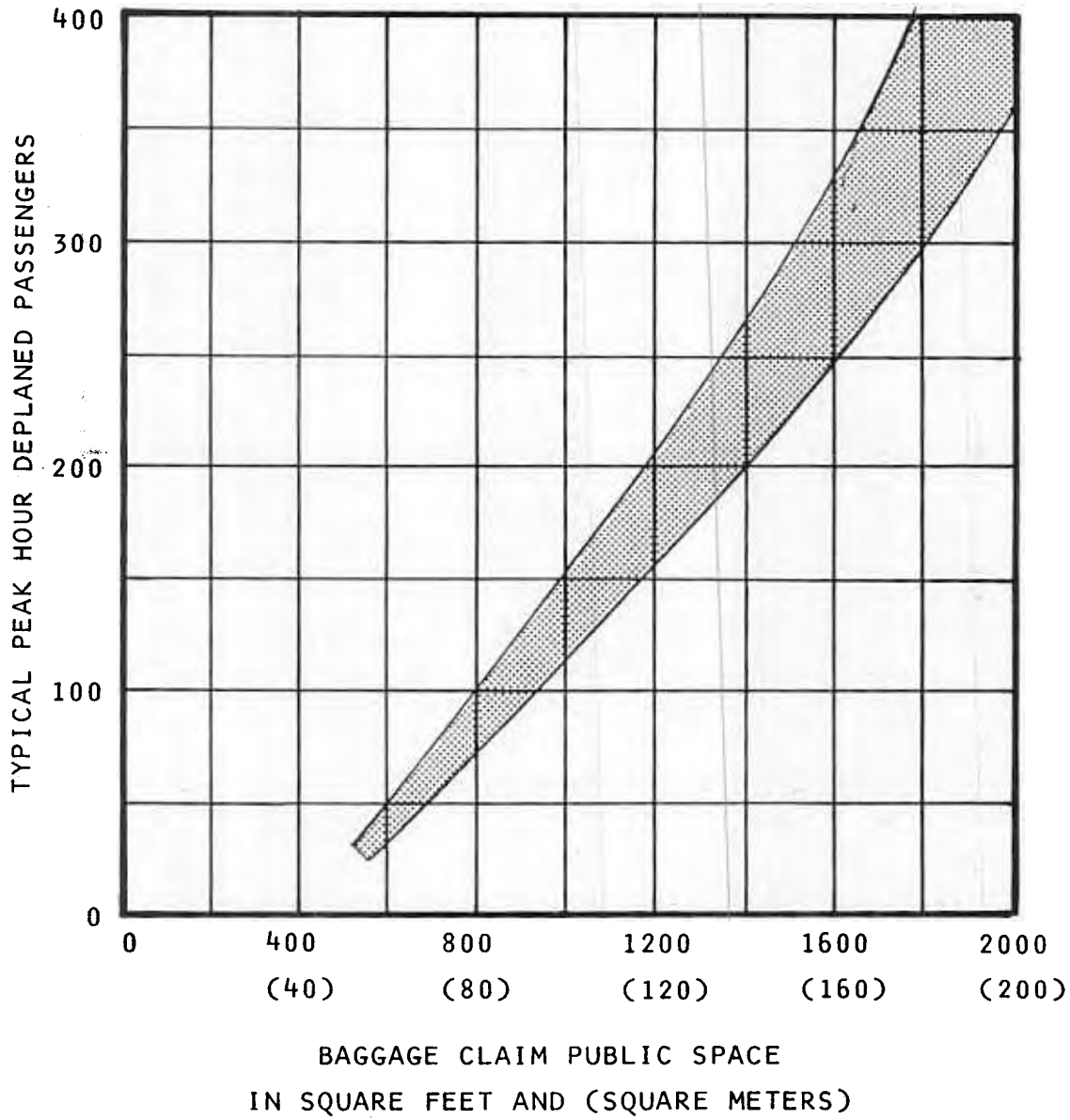


FIGURE 6-7. BAGGAGE CLAIM PUBLIC SPACE

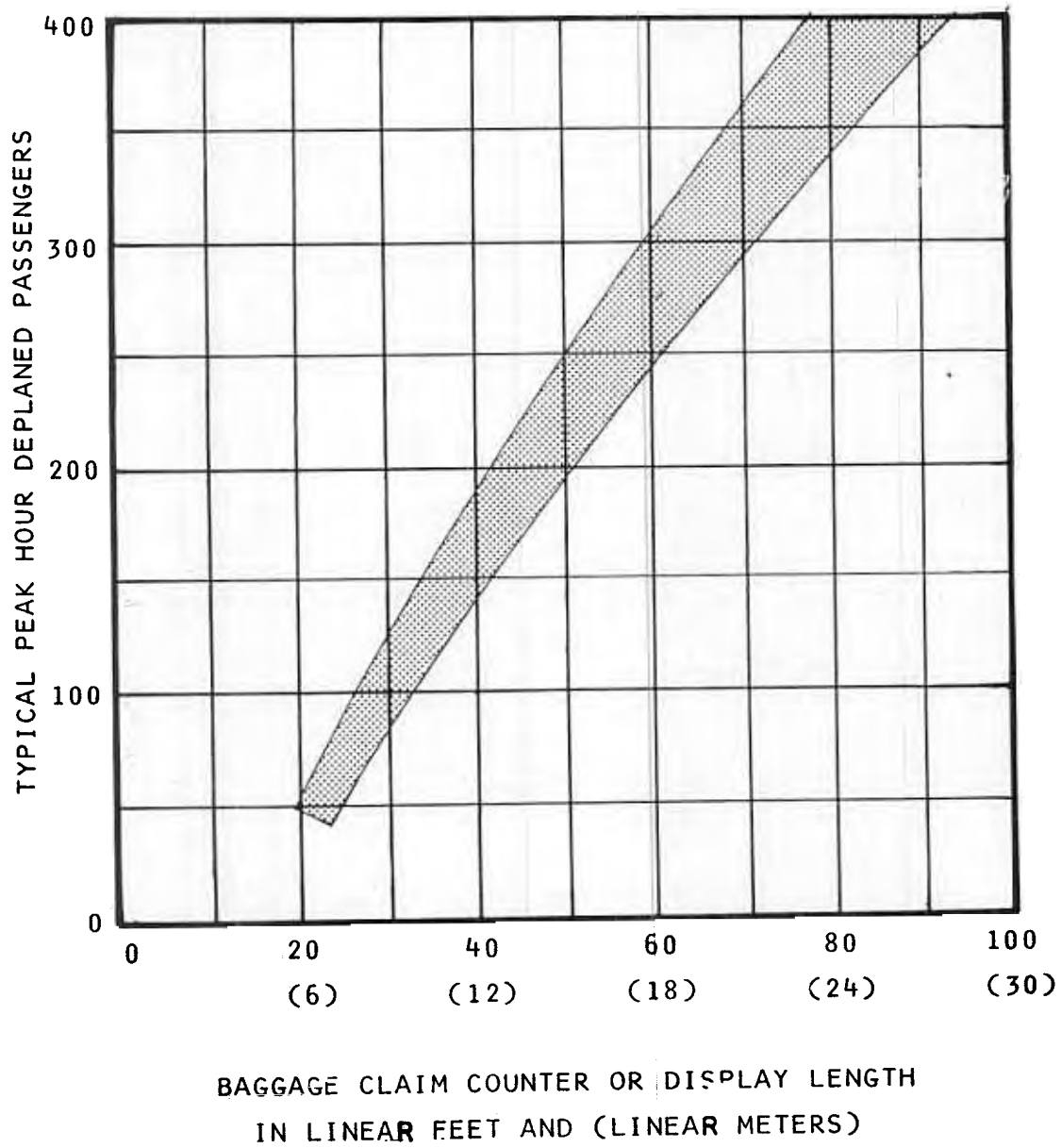
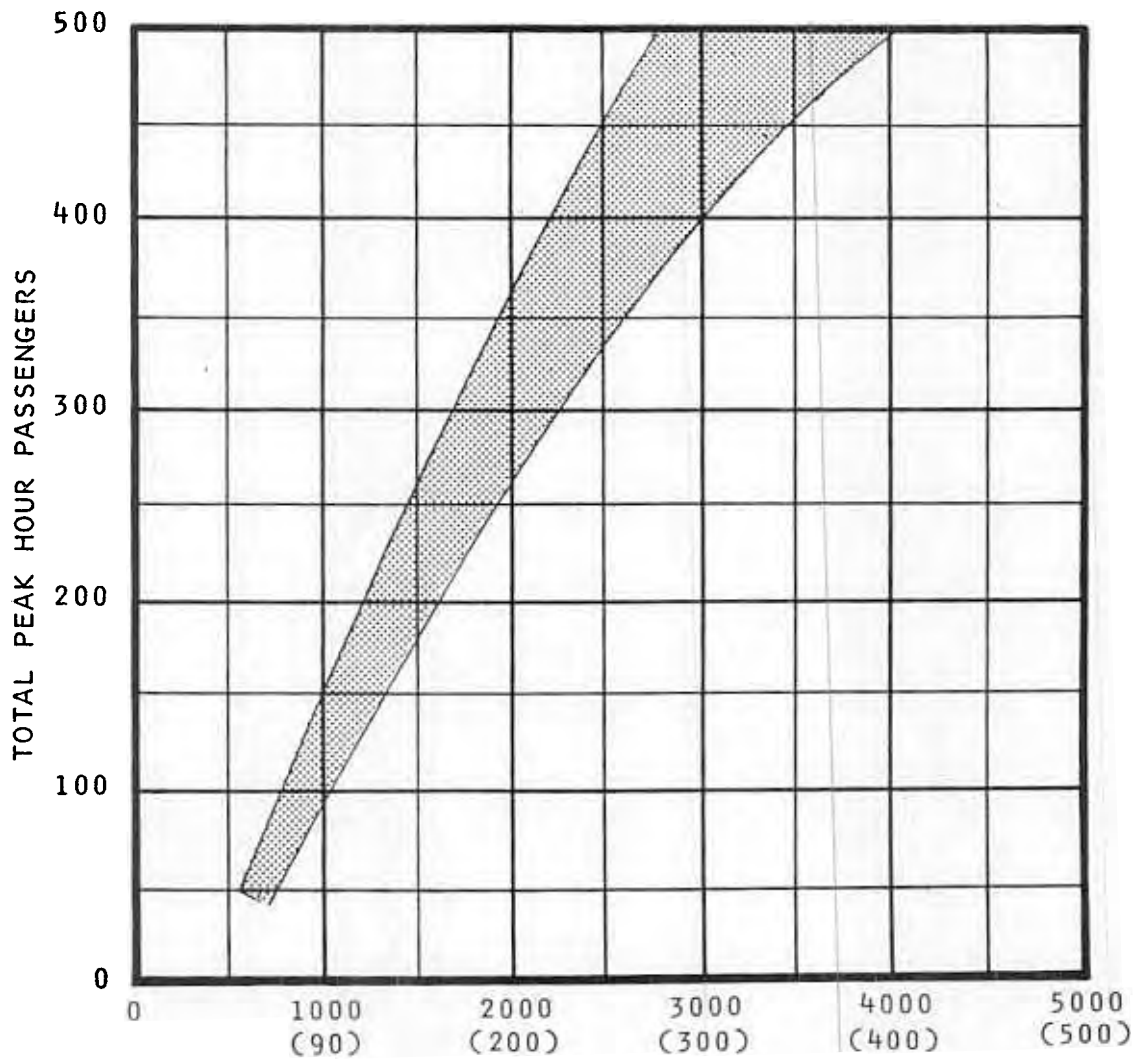


FIGURE 6-8. BAGGAGE CLAIM COUNTER LENGTHS



FOOD, BEVERAGE AND MISCELLANEOUS CONCESSIONS IN SQUARE FEET AND (SQUARE METERS)

FIGURE 6-9. CONCESSION SPACE



the food facility or be a separate, independent facility. The size of such facilities is dependent on local conditions with 200 square feet (20 m<sup>2</sup>) considered as a minimum.

c. Miscellaneous. A newsstand and a gift shop can usually be supported at many small to medium volume nonhub airports if they are combined with eating facilities. Additional concessions, such as drug and sundries shops, a branch bank, and flight insurance policy dispensers, may be included where sufficient traffic and patronage is anticipated.

d. Telephones. Public telephones should be in proximity to the ticket lobby, baggage claim area, and eating facilities. Additional telephones should be located in the secure boarding areas. Specialized telephones and displays are often provided in or near the baggage claim area for ground transportation and hotel/motel room reservations.

e. Car Rentals. One or two car rental companies will usually serve most small airport terminals. Counters for car rental transactions should be located in or near the baggage claim area public circulation space. This space within the terminal often includes a small amount of office space behind or reasonably close to the counter. They should also be located so as to have direct access to the car rental parking area. A minimum space of 8 feet (2.5 m) in depth and 6 feet (2 m) in width for each company should be provided. Allow a minimum of 10 feet (3 m) for queues in front of the counters and circulation areas. In some situations where car rental facilities are not on the airport and a staffed counter is not provided, a direct line telephone is used to make arrangements to have the car delivered to the airport terminal.

34. AIRPORT AND BUILDING SERVICES. The nonpublic elements discussed below should not inhibit future expansion possibilities of the building. Those fixed elements such as utility equipment rooms should be in basements, on roofs, or at "core" locations.

a. Airport Management. Offices for the airport manager and staff are generally based on the size of staff in the terminal building. The amount of space is a local determination. The airport offices should be accessible to the public but not necessarily in the flow pattern of terminal users.

b. Building Mechanical Systems. Spaces for heating, ventilating, air conditioning, electrical, and telephone equipment usually require approximately 15% of the total gross terminal area. Additional space is required for a building maintenance facility, for storage of building supplies, and for janitor closets. Utility systems should be planned for possible future terminal additions or expansion. Air intake systems should be located to avoid drawing jet or automobile engine exhaust fumes.

35. FEDERAL INSPECTION FACILITIES. Nonhub airports that are designated to serve arriving international traffic may require facilities for the Federal Inspection Services (FIS) (Immigration, Public Health, Customs, and Agriculture). Arriving international passengers, if not precleared at the point of embarkation, must be segregated from other passengers beginning at the arrival aircraft and through the FIS facilities. Information of FIS facility requirements is contained in the booklet entitled "Guidelines for Federal Inspection Services Facilities," which is available from the U.S. Customs Service. The booklet covers the functional, spatial, and sizing aspects of FIS facilities. AC 150/5360-4, Guidelines for Federal Inspection Service Facilities at International Airports of Entry and Landing Rights Airports, current edition, provides information on obtaining this publication and lists the addresses of U.S. Customs Service Regions. These regional offices should be contacted for guidance and coordination when designing areas to serve FIS.

36. MINIMUM-SIZE TERMINAL REQUIREMENTS. Approximately 10 to 12 acres (4 to 5 hectares) are needed to accommodate a minimum-size terminal, a roadway system, and aircraft and auto parking. Terminal facilities can be housed in approximately 6,000 to 8,000 square feet (600 to 800 m<sup>2</sup>), exclusive of mechanical, utility, or building maintenance areas.