

Do You Have Enough Staff? An Update (part 2 of 2)

Editor's note: This is the second of a two-part article prepared by IMG on staffing levels. Part 1, covering staffing levels by airport type, showed how staff size generally grows by enplanement (EPAX) size and that being a large hub airport and outsourcing janitorial positions has unique effects on staffing levels. Read Part 1 in *AM*, November/December 2004, pp. 24-25.

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Predicting staff by department

The 2003 AAAE Rates and Charges Survey, published last summer, provides more consistent information than past versions in two important areas: it better defines airport departments and it provides the percentage of a department's budget allocated to outside private and public parties (i.e. outsourced). This information makes it easier to analyze staffing levels by airport department by allowing us to focus only on those departments that do not outsource heavily, which we consider to be more than 50 percent of their respective budgets.

Figure 1 (Fig. 1) presents the results of regression analyses by major airport department. As with the "whole airport" estimate discussed in Part 1, these equations can help in planning staffing needs. Each equation consists of an intercept added to one or more inverse coefficients that are divided by respective variables. For example the equation for determining maintenance staffing would be: $= 5.4 + (\text{EPAX})/73,654 + (\text{Airport Terminal Square Feet})/50,016$.

The variables in Fig. 1 were chosen based on hypotheses about what variables drive airport staffing decisions. EPAX is a primary one. The predicted lines are a solid fit with the actual data and each intercept and inverse coefficient has a high statistical probability of being relevant in the equation (high r2 and positive t-tests at the 95percent confidence level, respectively, in statistical terms).

Here's a summary of what this all means by airport department, including average staffing levels by department shown in Fig. 2:

Administration: Staffing for administrative duties, which includes overhead functions such as accounting, finance, human resources and legal, is best predicted by EPAX levels; most airports need at least three to four people in this area plus one staffer per 80,741 EPAX. As Fig. 2 shows, the average administration department has around 24 employees. Around two-thirds of all airports in the survey had between one and 47 administrative staff members (within one standard deviation in statistical terms).

Operations: Operations staffing estimates are similarly straightforward, with most airports requiring at least one operations position and an additional staff member for every 106,983 EPAX. On average, airports employed 17 operation staff members and two-thirds of them had between 0 and 36 such positions. Those airports that reported zero operations positions probably listed these positions elsewhere (such as in administration or maintenance) or cross-trained their staff, as is common in smaller airports.

Maintenance: For maintenance, our hunch was that in addition to EPAX, the area of the terminal (and probably of other facilities) had an influence on staffing levels. This tended to be the case with airports generally requiring a minimum of five maintenance staff and one staff member per 73,654 EPAX and per 50,016 square feet of terminal space. The average airport employed 34 maintenance staff workers, with a range of between one and 67 within one standard deviation.

Janitorial: Similarly, we surmised that janitorial staffs are sized to an ex-

Fig. 1 EQUATIONS USEFUL IN ESTIMATING AIRPORT STAFF

	Intercept	Inverse Coefficient ³			
		EPAX	Term. Sq. Ft.	Parking Spaces	Janitorial Outsource ⁴ Large Hub ⁴
Administration	3.7	80,741	-	-	
ARFF and Police ¹	13.6	106,306	22,645	-	
Maintenance ¹	5.4	73,654	50,016	-	
Janitorial ¹	6.8	119,698	760,218	-	
Operations	1.3	106,983	-	-	
Parking ¹	1.1	-	-	373	
Whole Airport Estimate ²	28.2	15,221	-	-	-2.0 -102.9

1 For airports that do not outsource jobs to private firms or other government organizations.

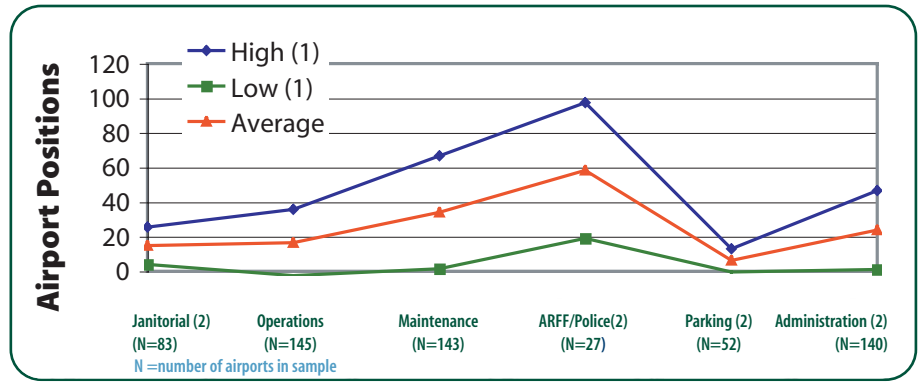
2 Estimate for entire airport. Estimates by department will not add up to whole airport estimate, since different samples were used.

3 For ease of understanding, coefficients are shown in their inverse; divide the respective variable by the coefficient, i.e. the operations staffing equation is $= 1.3 + \text{EPAX}/106,983$.

4 These are "dummy" variables; if the airport has this characteristic, then these are the net staff positions that are expected, i.e. every large hub is expected to have 102.9 fewer staff positions, everything else being equal.

Fig. 2 STAFFING BY KEY DEPARTMENTS

- (1) One half of a standard deviation above (high), or below (low) the average, respectively.
- (2) Only includes airports that maintain such activities in house. Number in parenthesis below the departments on the x axis are the sample size used in each respective departmental analysis.



tent on how much area they clean. Unfortunately, the data supports this weakly. Unlike the analyses above, we had to use a smaller sample of airports (83 instead of 145) to exclude airports that outsource janitorial activities; this generally reduces the robustness of statistical conclusions from this data. The equation indicates that airports have a minimum of seven janitorial positions with an additional position for every 119,698 EPAX and 760,218 square feet of terminal. The latter inverse coefficient seems too high, i.e. area does not appear to influence janitorial staffing much, contrary to expectations. One explanation may be that janitorial staffing is primarily determined by the frequency of cleaning—the number of people who trek in dirt—which means EPAX levels serve as a proxy. Another may be that in some airports janitorial and maintenance duties overlap. A third may be that the sample is simply too small. Indeed, this inverse coefficient does not pass a key statistical test, the t-test, suggesting that we should not rely on it.

ARFF and Police: We found that airport rescue and firefighting (ARFF) and police department data had several problems. Among them: many airports have agreements with neighboring governments to provide these services, a form of public outsourcing. Other airports cross-train their staffs to fulfill both functions.

As a result, we had to reduce our sample to 27 airports and combine ARFF and police employment as if they were one department. The analysis suggests that airports employ a minimum of 14 ARFF/police staff with an additional position per 106,306 EPAX and 22,645 square feet

of terminal space. The latter inverse coefficient makes sense in that larger (and probably more complex) buildings require greater oversight. Airports employed an average 58 ARFF/police personnel with a range of between 19 and 97 for two-thirds of the airports in this smaller sample.

We also assessed staffing levels of non-TSA security personnel and found that with a similarly small sample size—because so much non-TSA security is outsourced—that the results made little sense. This area merits more investigation as airports consider opting out of the federal screener program.


Parking: The parking analysis also required exclusions—around two-thirds of the sample—since so many airports had some form of management agreement with third parties. Of the 52 airports that manage parking, they usually employed one parking employee and additional ones for every 373 parking spaces. Parking departments for these airports were generally small, despite their significance to many airports’ bottom lines, with an average of six employees per airport and a range of zero to 13 for two-thirds of the airports in this smaller sample.

It is important to note that not all typical departments were analyzed; besides security and the combining of ARFF and police, some airports have additional overhead activities not captured in administration. In addition, estimating total airport staffing levels using the above departmental equations will not lead to the same results as using the “whole” airport method, due to the fact that different samples were used.

Growth and hiring

A larger sample might have made it possible to examine the impact of other important variables on staffing, such as level of international traffic, transfer hub role, governance (authority versus city department), and regional location on staffing. In addition, a more perfect (and longer) survey would contain data on the quality of staffing positions; for instance, we would expect that skills requirements would change as airports grow and become more complex.

Nevertheless, the results largely corroborate with our pre-9/11 analysis that there are a minimum number of employees to operate an airport and thereafter that staffing decisions should be closely based on traffic growth, with some economies of scale for larger airports. In addition, terminal size does have some staffing implications – an important message for terminal designers and for airports focused on ensuring that their team of first responders is appropriately sized to the facilities they protect.

Assuming traffic continues to grow, airport managers need to use these types of tools to ensure they are providing the best services to passengers and partners and not just barest budgets. 

How does this experience compare to your airport? If you would like to share your ideas and information, please e-mail spage@imggroup.com.

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