Communications Center Staffing: When is Enough, Enough?

By Bill Weaver

Henri Fayol defined the 14 universal principles of management[1]. He was also instrumental in identifying the elements of the management process as planning, organizing, staffing, directing and controlling. This article addresses staffing.

Staffing is the executive function that involves selecting, training and promoting personnel. The traditional method of selecting personnel includes six discrete elements or components. They involve:

1. Studying the characteristics and desired behavior of the job,
2. Developing hypotheses on what aptitudes, characteristics, and personality traits are required/desired in applicants,
3. Choosing instruments to measure and compare the applicant's individual intelligence, knowledge, skills and aptitudes,
4. Hiring applicants who best meet the position's selection criteria,
5. Checking back to determine anticipated performance versus actual performance on the job, and
6. Reexamining the process if correlation between actual versus anticipated performance is low.

The tasks associated with staffing a communications center are no different than staffing a patrol beat (zone, sector, etc.), a secretary's position in an office setting, or any other position in an organization. There is, however, a common attribute between the position in the communications center and the position in the patrol beat or zone that make the two positions unique. Unlike the secretary's position, the dispatcher position and patrol officer position each must be continuously staffed every day of the week, every hour of the day[2].

Another executive function, and related to the staffing function, is the allocation of personnel according to need, specialty or skills set. In its simplest form, this involves taking a pool of personnel and distributing them when and where they are needed most (also called "just in time staffing"). This article's focus is on the allocation function and knowing when, or if, you have enough personnel in communications to do the job, and how to assign them to achieve maximum efficiency. This article hopes to provide answers to three key questions communications center managers often ask themselves or their management team:

- How do I know when my division/unit has enough personnel to provide the required 24/7 coverage?
- What formulas are available to calculate the number of personnel needed in communications, including supervisors, call takers and radio dispatchers?

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[1] Originally published in France in 1916, Fayol's *General Industrial Administration* was not widely known in the United States until 1949 when an English translation of his original work was published.

[2] The author recognizes that two beats can be covered by a single patrol unit, just as two radio dispatch positions can be combined and managed by a single radio dispatcher, and that some agencies may regularly do this.

- How can I assign personnel where they can provide the best, most effective service possible?

The remainder of this article provides a (somewhat) simple method to determine staffing in fixed-post and volume influenced positions. Common fixed-post positions in emergency services include patrol beats, radio dispatcher, and shift supervisor positions. Volume influenced positions include mail processing positions in a post office or call receipt positions in a communications center.

Before we present the data, a key point must be made: The staffing formula presented assumes a standard 8-hour shift, 5-day workweek. One would have to adjust accordingly for any other shift assignment pattern (i.e., 4/10s, 3.5/12s hour shift). There are a number of personnel scheduling models on the market today that can be modified for variable shift start and stop patterns.

Fixed-post positions
These are positions that are staffed regardless of the amount of activity experienced. Examples include 1-person dispatch centers (calls are received and dispatched by the same person), guard positions, supervisor positions, and radio dispatch positions in communications centers where a division of labor is employed (i.e., call takers receive calls, radio dispatchers dispatch, exclusively). The formula for this calculation has three elements: positions, shifts and relief factor.

P= Positions
The number of positions that must be continuously staffed. Positions that must be taken into consideration include the primary positions and any support positions used. The latter includes relief positions (a "floating" dispatcher used for primary position lunch and restroom breaks).

S= Number of shifts
The number of standard 8 hour shifts the position must be staffed

RF= Relief factor (usually 1.65 or 1.7)
The relief factor takes into account holidays, vacations, days off, sick time, etc.

Calculation expression: P x S x RF = Number of bodies needed

Problem example:
A small communications center has three combined call taker/radio dispatcher positions that must be covered 24/7. One lead dispatcher/supervisor position per shift is also needed. The lead dispatcher/supervisor is responsible for shift supervision, and may also provide relief to the call fixed post dispatch positions when necessary. A total of 4 positions per shift are needed. Three shifts per day are used. We'll need to include our relief factor to cover holidays, vacations, sick time, etc., used by the employees.

EXAMPLE:

3 x 3 x 1.7	15 people are needed to staff 3 call taker/radio dispatcher positions on each of the three 8 hour shifts.
3 x 1 x 1.7	5 people are needed to staff 1 lead dispatcher/supervisor position on each of the three eight hour shifts.
15 + 5	A total of 20 people are needed to staff 3 call taker/radio dispatcher positions and one lead dispatcher/supervisor position on each of the three 8 hour shifts.

The same calculation can be used in larger communications centers that have fixed-post positions. For instance, a large metropolitan police department communications center continuously staffs 15 radio dispatcher positions, in addition to 3 relief radio dispatchers per shift. The relief radio dispatcher's job is to—position by position—relieve personnel for scheduled lunch and personal/stress breaks. To calculate this staffing standard, the formula would look like:

(15+3) x 3 x 1.7 = 91.8 (92) people are required to staff 15 radio dispatcher positions and 3 relief positions each shift 3 times a day.

If we were to reduce the relief positions by 1, then 86.7 (87) people would be needed.

Volume Influenced Positions
These are positions that can be staffed according to an expected or known volume of activity experienced (i.e., volume of emergency and non-emergency telephone calls), and uses an expected "reasonable" performance factor to determine the number of personnel required (i.e., calls per person, per hour).

This formula is especially useful in communications centers and work settings where there is a division of labor between those who receive the calls, and those who dispatch the screened calls. This is usually common in medium to large dispatch centers in which annual call volume exceeds 300,000 calls per year or more. It would be overly burdensome to expect a call taker with a high volume agency like the New York Police Department, for instance, to also perform radio dispatcher duties and manage patrol response to calls for service. The formula used to determine the number of persons needed in a volume influenced position looks like this:

CPH= Calls per hour
The number of calls per hour a call taker would be expected to process and be considered efficient. This factor also considers that the operator will be doing other tasks in support of these calls. The tasks include database entry, logging, call documentation, etc. The value we use is an average of the day, evening and night shift call takers. It is not representative of a single, specific shift.

HW= Hours worked in a shift
The number of hours actually worked during a tour on shift. Though the employee is really assigned to an 8-hour shift, he/she may actually work only 7 hours. The "missing" hour is consumed by scheduled personal and lunch breaks.

DW= Days worked in a work year (usually 240)
The days-worked standard will vary from agency to agency and depends on the vacation and benefits package the employer provides. It starts with a calendar year, 365 days, and subtracts scheduled days off, vacation, holidays, sick time use, etc., for the work year. The end result after one subtracts these benefits is the "work year".

TC= Total emergency and non-emergency calls received
Include 9-1-1, 3-1-1, non-emergency, administrative, etc., calls in this calculation.

TP= Total positions required
Total "production" positions required in a 24-hour period to process the calculated number of calls per year using the CPH standard.

RF= Shift Relief factor (usually 1.65 or 1.7)

Previously discussed (see above in "Fixed-post Positions").

Expression: $\dfrac{CPH \times HW \times DW}{TC}$ = Total number of production positions required

Example:
We'll use the hypothesis that a "productive" call taker in our large public safety communications center is expected to process 20 calls per hour (1 call every three minutes, on average). This expression would be:

20 x 7 x 240 = 33,600 calls per year, per call taker handling an average of 20 CPH as the performance standard.

Using the calculated call taker/work year productivity standard, we then divide the work year production value into the total number of calls projected (or known) for the year. We'll use some large numbers to get a sense of scale and how this equation can be applied to large center operations:

Our sample agency processes 2.5 million calls per year. Based on 20 calls per hour production standard, a productive call taker in this agency can be expected to process 33,600 calls for service in a representative work year. We divide the total number of calls to be processed by the total production value per call taker:

$\dfrac{2{,}500{,}000}{33{,}600}$ = 74 production positions handling 140 calls per shift (20 x 7 hours) are needed to successfully process 2,500,000 calls for service.

How may people to we need to staff 74 positions 24/7?
We used the relief factor and multiple the number of production positions needed to determine the number of people we need to hire.

Expression: 74 positions x 1.7 relief factor = 126 persons needed to staff 74 positions in a call taking function[3].

Example: Using the same 2,500, 000 calls per year

15 calls per hour = 25,200 calls per work year 168 people needed
25 calls per hour = 42,000 calls per wok year 101 people needed

The key is to set a performance standard that's reasonable and truly reflective of your agency's operations.

Personnel Allocation

It makes little sense to employ equal shift staffing in call centers (commercial or public safety) where there is a division of labor and volume varies from one hour to the next. The result would be overwhelmed call takers on one shift and truly bored (and unproductive) call takers on another.

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[3] The lower the call per hour value, the more people are required. Conversely, the higher the CPH standard, the fewer people are required.

The idea behind volume based staffing is to identify a model and intelligently distribute personnel when and where they are needed.

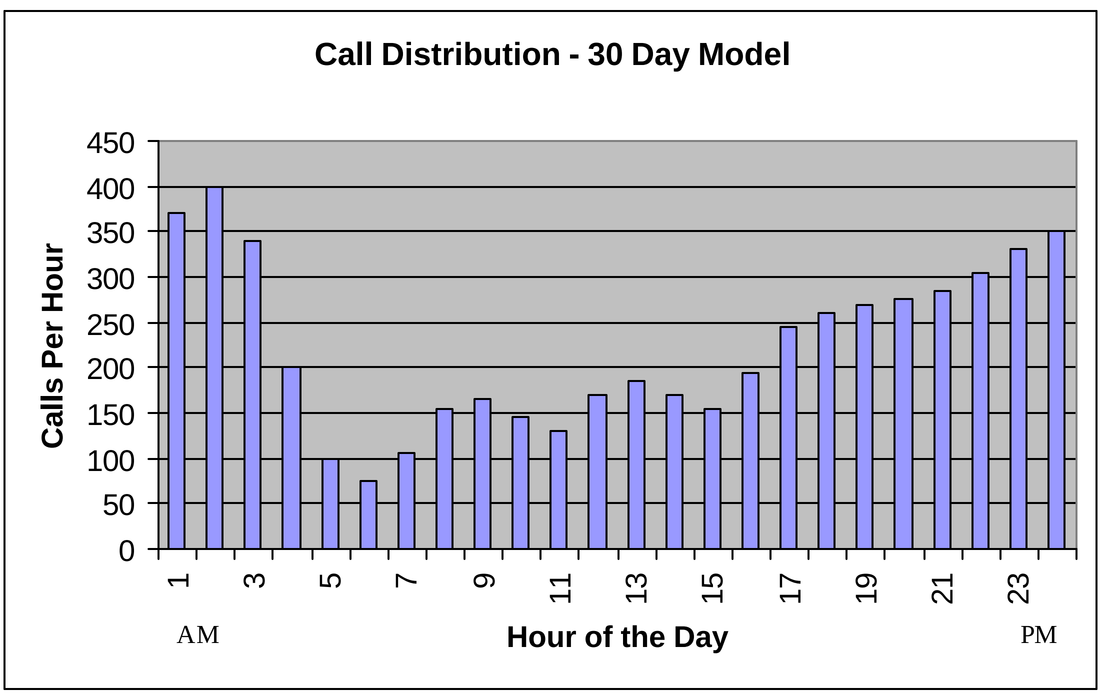
The concept of discerning and using volume influenced staffing calculations is to have a sufficient number of persons answering calls at the particular point in time when they are needed. This is because we know from the data (or we can find out from the data, with a little effort) that the inbound call distribution algorithm varies from one day to the next, and one hour to the next. We also know that certain holidays and other cyclic periods have dramatically different distributions. These include, but are not limited to, Thanksgiving, Mother's Day, Christmas, New Years Eve, major league playoffs, etc.

If we collect enough call data for a specified period of time for each hour of the day (say a sample 30 day period), we can develop a model that displays an amalgamated distribution algorithm that is representative of a 24-hour period for the sample. The greater the sample period, the more representative—and useable—the developed model becomes. When developing models, more really is better!

So, we need to complete three tasks to finish the effort and allocate personnel to the various shifts based on some reasonable standard:

Step One: Identify the distribution model

Step One involves collecting data for the sample period and identifying a call-per-hour distribution. One way to do this is to pull hourly activity reports for the past 30 days and, using a spreadsheet (i.e., Excel, Lotus 123, Quatro Pro), enter the data into a row and column database. When finished you should have a total of 720 cells containing a value of the calls received per hour for each hour of the 30-day sample. Then, sum for each hour and calculate an average for a representative 24-hour period. The result is a call distribution model for a sample 24-hour period using the hour-by-hour totals for the last 30 days of activity.

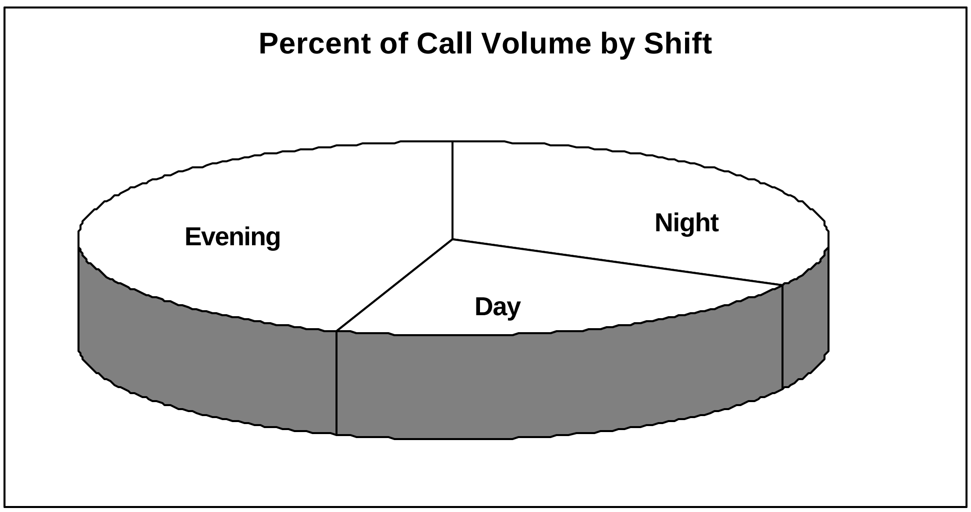


Step Two: Identify representative shift volume percentages

Step Two involves determining the by-shift volume percentages. This is best done by identifying the shift start and stop times, calculating the total number of calls for the period(s), and subtracting the shift totals by the total number of calls for the sample period and then dividing the result by the total calls for the sample period[4].

For instance, let's assume we have a 2-10 p.m. shift. From the data, we know that we processed 15,000 calls for the month, and the 2-10 p.m. shift handled 6,750 of them. That would mean the evening shift's activity represents 45 percent of the total calls for the period. We do the same with the day and night shifts. The result is a percent sample for the three shifts. Again, the larger the database, the more representative the shift percentage calculations will be.

Day Shift:	22%
Evening Shift:	45%
Night Shift:	33%



Step Three: Distribute personnel accordingly
Now that we know the distribution algorithm for our sample 24-hour period, and we know the shift volume percentages, we now turn our attention to distributing personnel according to the model.

From our previous calculations, we know that we need to hire 126 people to staff 74 positions continuously.

20 x 7 x 240 = 33,600 calls per year, per call taker handling an average of 20 CPH as the performance standard.

[4] If you're using automated reports, remember that the 2 p.m. report usually accounts for activity between 1-2 p.m. Conversely, the 3 p.m. report would report on activity from 2-3 p.m.

2,500,000/33,600/ = 74 positions processing 140 calls per shift (20 x 7 hours) are needed to process 2,500,000 calls for service.

74 positions x 1.7 relief factor = 126 persons needed to staff 74 positions in a call taking function.

We also know from Step Two's calculations the various shifts account for a certain percentage of the sample period call totals. Using this information, we assign the number of personnel per shift based on that particular shift calculated percentage:

	Shift Percent	Calculation	Staff Assigned
Day Shift:	22%	126 x .22	28
Evening Shift:	45%	126 x .45	57
Night Shift:	33%	126 x .33	41
Total:	**100%**		**126**

You may find that the current shift start/stop times may not be representative of the most efficient assignment of personnel. You may also find that the distribution algorithm warrants assigning a special shift (usually called a power or swing shift) to handle the spikes of calls that occur between certain periods of the day (10 a.m. to 6 p.m., and 7 p.m. to 3 a.m.).

There's no doubt that properly staffing a public safety center with the proper number of personnel is a challenge. The objective of this article is to provide the professional communications center manager or supervisor with an additional reference tool whereby proper staffing levels can be determined and personnel can be distributed to the various shifts in the most efficient manner possible.

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