Efficient Scheduling Options for Communications Centers

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When managers of communications centers are faced with the challenge of finding a new shift schedule for their organization, they may find themselves completely overwhelmed. After all, this is not something they do every day. Few managers have the expertise to design a shift schedule that satisfies multiple concerns, such as coverage requirements, staffing constraints, overtime restrictions, and employee preferences. They could waste days or weeks searching for examples or trying to develop possible solutions on their own. This article is intended to help managers who face this challenge by providing an overview of several effective scheduling solutions.

Coverage Requirements

Schedule design should always begin with the coverage requirements, i.e. the number of dispatchers needed at different times of the day on each day of the week. Unlike many 24/7 operations, the workload in communication centers is not evenly distributed. Call volumes, which determine the workload, tend to vary by time of day or day of the week. There is usually a period every day in which the call volumes are so high that it would be advantageous to schedule extra operators. The commonly-used options for addressing these periodic increases in workload are listed below:

- **Staff for the peaks.** Schedule enough operators to meet the peak workload at all times. For example, schedule four operators to work every shift, even though only three are needed for most of the day. This approach will maintain service levels during the busy times, but it results in overstaffing during the less busy times.

- **Ignore the peaks.** Schedule enough operators to meet the minimum staffing requirements and simply ignore the peak activity periods. For example, schedule two operators to work every shift, even though three operators really could be used during the peak period. This approach will result in reduced service levels (e.g., slower response times and dropped calls) during the busy periods.

- **Use overtime.** Schedule enough operators to meet the minimum staffing requirements and use overtime to increase the number of operators at work during the peak activity periods. Operators working a shift that ends near the start of the peak period could extend their shift. Operators starting a shift around the end of the peak period could come in early. Another possibility is to bring in operators who have the day off. The problem with continued reliance on overtime is that, over the long term, there could be negative consequences such as employee burnout, morale problems, increased absenteeism, and higher employee turnover.

- **Hire part-time operators.** Another way to handle the increased workload is to supplement the regular staff with part-time employees. Part-timers can be assigned to a shorter shift that matches the peak workload period. This is an effective solution in smaller departments, but it is not always easy to find qualified personnel (e.g. POST or EMD-certified) who are willing to work on a part-time basis.

- **Schedule for uneven coverage.** An earlier article in *ENPM* recommended scheduling personnel according to the percentage of calls handled by each shift[1]. Although this is certainly better than assigning the same number of personnel to each shift, it assumes the calls are spread evenly over the length of the shift. Since this is unlikely, there still can be periods of understaffing and periods of overstaffing.

- **Create overlay schedules.** By adopting multiple schedules that overlay one another, coverage can be increased during the periods of heavy workload. For example, one schedule may satisfy the minimal coverage requirement of 3 operators on every shift. By adding another single 8-hour or 12-hour shift during the busy period, additional personnel can be added to better match the workload.

- **Adopt multiple shift lengths.** In a standard shift schedule, each shift is the same length, e.g., 8-hours long. If one of the shifts is increased to 10 or 12 hours, it will overlap the other shifts. If the timing of this overlap is matched with the busy period, additional staff will be available when they are needed the most.

- **Switch to 10-hour shifts.** When three 10-hour shifts are squeezed into a 24-hour day, there will be six hours of overlapping shifts (30 hours – 24 hours = 6 hours). By aligning these overlapping shifts with the periods of greatest activity, the coverage is better matched with the workload.

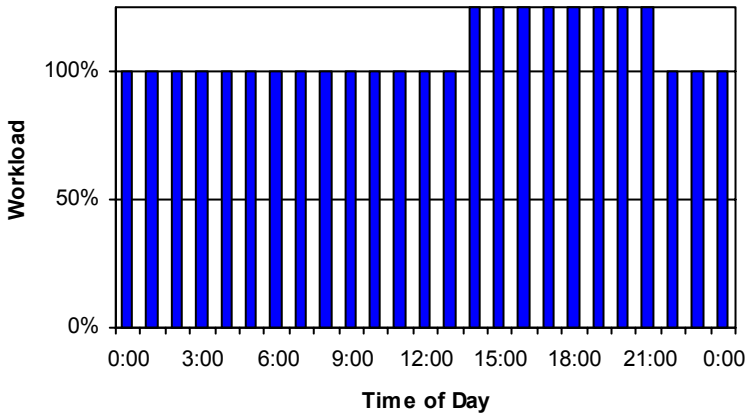
This article will focus on the last three options: overlay schedules, multiple shift lengths, and 10-hour shifts. Once the basic concepts are explained, tactics for addressing the major issues related to these options will be discussed.

Overlay Schedules

The daily variations in call activity levels tend to follow a regular pattern. A simple example is shown in Figure 1 below, in which the workload increases by roughly 25% every day between roughly 1400 and 2200 (2 p.m. to 10 p.m.).

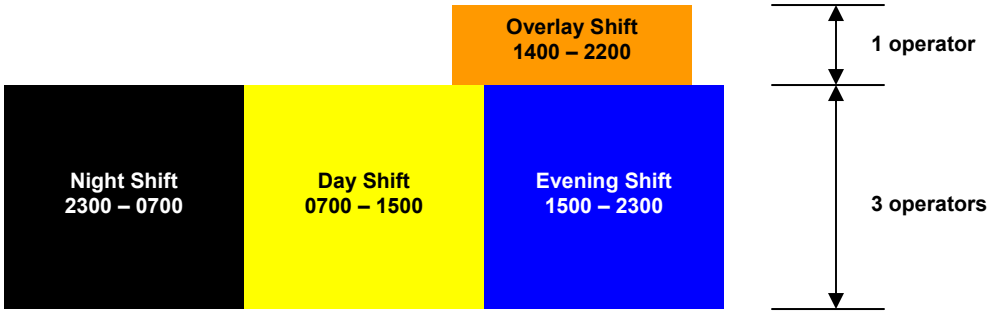
[1] Weaver, Bill, "Communications Center Staffing: When is Enough, Enough?" *ENPM*, Winter, 1999

Figure 1: Example of Daily Workload Variations



Two schedules can be used to provide efficient coverage for this workload pattern. One schedule would provide the minimum required coverage for the day (assume 3 operators per shift). A second schedule would provide an additional operator for the 8-hour peak workload period from 1400 to 2200. This is a perfect match with the workload. The number of operators is increased by 25% at the same time the workload increases by 25%. This is illustrated in Figure 2 below.

Figure 2: Example of Increased Coverage with an Overlay Schedule



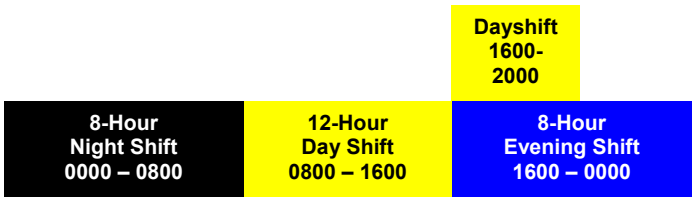
If the busy period is longer than 8 hours, longer shifts can be used as the overlay, e.g., 10-hour or 12-hour shifts. If the busy period is shorter than 8 hours, the organization could use part-time employees or one of the approaches discussed below.

Multiple Shift Lengths

One way to increase the coverage for a period that is shorter than 8 hours is to adopt more than one shift length. If the primary schedule consists of three 8-hour shifts a day, one of the shifts could to be increased to 10 or 12-hours in length to provide extra coverage for 2 to 4 hours a day. In the example below, the longer day shift doubles the coverage from 1600 to 2000.

Day shift:	0800 to 2000	12-hour shift
Evening shift:	1600 to 0000	8-hour shift
Night shift:	0000 to 0800	8-hour shift

Figure 3: Example of Increased Coverage with Multiple Shift Lengths



If the busy period is more than 4 hours, two shifts would have to be made longer. For example, if the peak activity period lasts for 6 hours, from 1500 to 2100, the following shift lengths would increase the coverage during this period of time:

Day shift:	0900 to 2100	12-hour shift
Evening shift:	1500 to 0100	10-hour shift
Night shift:	0100 to 0900	8-hour shift

Figure 4: Second Example of Increased Coverage with Multiple Shift Lengths

10-Hour Shifts

10-hour shifts will overlap one another for 6 hours every day. If the overlapping shifts are aligned with the period of peak call volumes, the coverage will be matched with the workload. If the peak period runs from 1500 to 2100, the best shift start and end times are shown below:

Day shift:	1100 to 2100
Evening shift:	1500 to 0100
Night shift:	0100 to 1100

In this schedule, the Day shift and Evening shift overlap from 1500 to 2100, which corresponds with the period of highest activity. The number of operators on duty during

this six hour period would be double the number working the rest of the day. This is illustrated in Figure 5 below.

Figure 5: Example of Increased Coverage with 10-Hour Shifts

Now that the three basic approaches to addressing the variable workloads of communication centers have been described, let's examine the most significant issues raised by these scheduling options: (1) unusual start and end times and (2) increased staffing and overtime.

Unusual Shift Starting and Ending Times

Many communication centers set the shift starting and ending times to make them convenient for their employees, or they make the start times similar to those used with 8-hour shifts. If the managers want to take advantage of the overlapping shifts, these traditional start and end times may have to change. That is the only way to ensure that the number of operators is matched with the workload. Anything else will be an inefficient use of personnel, since coverage will be increased when it is not needed.

Three steps are recommended to address this issue. First, prepare a solid justification for the change. A historical analysis of the call volumes should support the need for additional operators at certain times of the day. Second, try to develop more than one schedule alternative. Third, involve the operators in the selection process. Managers should never underestimate the turmoil that new shift start and end times will generate among the staff.

A good example is the Kern County Emergency Communications Center. This group was suffering from high levels of overtime, absences, and workers compensation claims. They concluded that these problems were caused by the current shift schedule. The manager, Walter Moulton, describes the process and outcome:

> "We assembled a team that included shop stewards to look at other scheduling possibilities. When the team exhausted all ideas, they turned to outside help to identify three alternatives. The proposed schedules were submitted to the dispatchers for a vote. This is where we made a critical error, because they rejected all of the proposed changes. The turmoil it caused is still settling. We should have identified the employees' preferences earlier in the process, and then used their input to narrow the choices rather than putting it up for an all-or-nothing vote."

Increased Staffing or Overtime

Many communication centers are staffed with just enough employees to meet the minimum required coverage. This was called "ignore the peaks" earlier in the article. If the organization decides it want to improve coverage during the busy workload periods, it may be necessary to hire more employees. If that isn't possible, they may have to adopt a schedule with overtime built into it. If an organization is opposed to using overtime, its staffing levels may have to increase. On the other hand, if an organization's staffing levels are frozen, it may have to accept more overtime. There will always be a tradeoff between staffing levels and the amount of overtime.

To illustrate the tradeoff between staffing and overtime, examples of several communication center schedules will be compared with a typical 8-hour schedule that provides coverage of one employee around-the-clock (see Figure 7 below).

Figure 7: Example of an 8-Hour Shift Schedule Using 4 Operators

Operator / Week	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Hours
A / Week 1	-	D8	D8	D8	A8	-	A8	40
B / Week 2	A8	A8	A8	A8	-	A8	N8	48
C / Week 3	N8	N8	-	-	D8	D8	D8	40
D / Week 4	D8	-	N8	N8	N8	N8	-	40

D8 = 8-hour day shift A8 = 8-hour afternoon shift N8 = 8-hour night shift

This is a 4-week, rotating schedule. When the schedule first starts, each operator is assigned to a specific week in the cycle. For example, Operator A is assigned to start in week 1 and Operator B is assigned to start in week 2, etc. At the end of each week, the operators rotate down to the next week in the cycle. When an operator completes the 4th week, he or she rotates up to week 1. This schedule requires four operators and has one week (week 2) with 8 hours of built-in overtime.

To make this schedule work for a communication center with a 4-hour peak workload period that runs from 4 p.m. to 8 p.m. every day, the day shift could be increased to 12 hours. The resulting schedule might look like Figure 8 below:

Figure 8: Example of an 8 & 12-Hour Shift Schedule Using 4 Operators

Operator / Week	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Hours
A / Week 1	-	D12	D12	D12	-	-	A8	44
B / Week 2	A8	A8	A8	A8	-	A8	N8	48
C / Week 3	N8	N8	-	-	D12	D12	D12	52
D / Week 4	D12	-	N8	N8	N8	N8	-	44

D12 = 12-hour day shift A8 = 8-hour afternoon shift N8 = 8-hour night shift

Note that there is overtime in every week of this schedule, especially in Week 3. For most organizations, this amount of overtime is unacceptable. But it can be eliminated by hiring an additional operator. The adjusted schedule might look like the one shown below in Figure 9:

Figure 9: Example of an 8 & 12-Hour Schedule Using 5 Operators

Operator / Week	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Hours
A / Week 1	-	D12	D12	-	A8	A8	-	40
B / Week 2	A8	A8	A8	A8	-	-	N8	40
C / Week 3	N8	N8	-	-	-	D12	D12	40
D / Week 4	D12	-	N8	N8	N8	N8	-	44
E / Week 5	-	-	-	D12	D12	A8	A8	40

D12 = 12-hour day shift A8 = 8-hour afternoon shift N8 = 8-hour night shift

This schedule only has one week with overtime. It also has two afternoon shifts every Friday. This occurs because an extra afternoon shift was added to week 5 to increase the hours to 40 and to avoid scheduling a single, isolated work day (Saturday).

An example of a 10-hour shift schedule that provides similar coverage is shown below:

Figure 10: Example of 10-Hour Shift Schedule Using 5 Operators

Operator / Week	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Hours
A / Week 1	-	D10	D10	D10	-	-	E10	40
B / Week 2	E10	E10	E10	-	-	-	N10	40
C / Week 3	N10	N10	-	-	D10	D10	D10	50
D / Week 4	D10	-	-	E10	E10	E10	-	40
E / Week 5	-	-	N10	N10	N10	N10	-	40

D10 = 10-hour day shift E10 = 10-hour evening shift N10 = 10-hour night shift

This schedule has one week (week 3) with 10 hours of built-in overtime. It has more overtime than the previous schedule (Figure 9) because there are six overlapping hours every day rather than four. Yet the average overtime from this schedule is only two hours per week for each employee. This is identical to the overtime with the original 8-hour schedule shown in Figure 7, though it does require five operators instead of four.

Summary

Three effective options for tackling the variable workloads found in many communication centers are overlay schedules, multiple shift lengths, and 10-hour shifts.

Overlay schedules are best for addressing extended busy periods of 8 hours or more. 10-hour shift schedules are best for busy periods of exactly 6 hours. Multiple shift lengths are best for busy periods of 2 to 4 hours.

These three scheduling alternatives produce a couple of unique issues. One is the unusual start and end times for the shifts. Another is the increased staffing and overtime. Managers should be aware of these issues before launching a schedule change. This may involve some extra effort, but the advantage of being able to match the number of operators with the workload is certainly worth it.

About the Author

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