

The Math of Shift Configurations

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This is the eighth article of a series on jail staffing analysis, exploring the methodology developed by the National Institute of Corrections and presenting enhancements developed since NIC's latest workbook¹ was published. This article continues our examination of the critical and sensitive process of developing and evaluating staff schedules.

In the previous article we emphasized the importance of determining coverage needs before developing or evaluating schedules. A good schedule efficiently meets jail coverage needs, but schedules often take on a life of their own and begin to drive operations, rather than respond to operations. We described methods to evaluate current and potential schedules in terms of:

- **SUFFICIENCY.** Providing at least as many staff for each hour of each day that has been determined in the coverage plan (and the right *type* of staff).
- **EFFICIENCY.** Minimizing the number of “extra” staff deployed by the schedule
- **CONSISTENCY.** Minimizing variations throughout the schedule cycle
- **ATTRACTIVENESS** to employees by meeting their needs, being considerate of their personal preferences, and offering incentives to stay with the organization.
- **HEALTH.** Promoting staff physical well-being and performance.

As we examine the math and mechanics associated with schedules, we will start with the big picture--shift configuration.

Shift Configurations

From a distance, scheduling often looks pretty simple-- pick your basic “shift configuration” which consists of:

- Number of hours that comprise a shift
- Start and end times for each shift
- Employee **Regular Days Off (RDO)**

¹ **Staffing Analysis Workbook for Jails**, First Edition. Rod Miller and Dennis Liebert. National Institute of Corrections, Washington D.C. 1987. Second Edition published 2003. The NIC methodology has been embraced by jails throughout the United States and has also been adopted by police, fire, transportation, health care and nursing home operations.

A growing number of jails use more than one shift configuration as a creative solution to meet staffing needs. For example, the 4/10 (4, 10-hour days) pattern may work for an officer assigned to supervise an 8-hour inmate work crew because a 10-hour shift allows time to set up and wrap up each day. Similarly, a 9- or 10-hour shift might fit better into the hours of coverage needed for court movement, transport, or other functions that span more than 8 hours.

The NIC staffing analysis methodology introduced the Net Annual Work Hours (NAWH) tool, to replace the less accurate “shift relief factor.” NAWH makes it much easier to use more than one shift configuration.

Many jurisdictions have adopted two 12-hour shifts with varying degrees of success and satisfaction. Some facilities have tried 12-hour shifts and decided to return to 8-hour configurations, while others are very pleased with 12-hour shifts. We have encountered several jurisdictions that moved to 12-hour shifts in response to chronic problems with scheduling staff for 8-hour shifts. Shortages prompted mandatory assignment of staff to extra shifts, often resulting in a 16-hour work-day when a staff member was required to work two consecutive shifts. Employees often support 12-hour shifts because they eliminate the possibility of working two consecutive shifts. There are many considerations associated with adopting 12-hour shifts. These will be explored in depth in a later installment of this series. For now, we will examine the characteristics of several different shift configurations.

The Math of Shift Configurations

Shift pattern variations are virtually limitless. One source of many examples is *The Manager’s Guide to Alternative Work Schedules—Second Edition*, by W.L. Booth. This book is available on loan from the NIC Information Center², or a copy may be purchased from the publisher, the Institute of Police Technology and Management.³

Because a jail is such a complex organization and staffing needs are often unique, adopting *varied* work schedules may be effective. Changing your shift configuration, or even adding another type of configuration for some of your coverage needs, can be emotional and initially difficult, but it may result in certain benefits, such as:

- Improved staff morale as job satisfaction increases
- Less turnover, less sick time, and improved quality and quantity of work
- Financial savings due to more efficient use of staff

Figure 1 is drawn from *The Manager’s Guide to Alternative Work Schedules*. It summarizes the descriptive statistics for 21 different alternative schedules and allows

² National Institute of Corrections Information Center, www.nicic.org. (800) 877-1461, (303) 682-0213

³ University of North Florida, 12000 Alumni Drive, Jacksonville, FL 32224-2678; <http://iptm.org>.

comparison of the features of each schedule. The chart depicts work schedules that range from 8- to 12-hour days. Scheduling patterns such as split shifts and flextime are not included on the chart, as they do not lend themselves to this type of analysis.

Figure 1: Descriptive Statistics for Alternative Work Schedules

		8-Hour Workday			9-Hour Workday	10-Hour Workday			12-Hour Workday	
Shift Schedule		5-2	5-2 Variable	3-2 7-2 5-2	5-2 5-3	4-3	4-3 3-4	4-2 4-3	3-3	4-4
Consecutive Time Required	-Hours per Day	8	8	8	9	10	10	10	12	12
	-Days Per Week	5	5	3, 5, 7	5	4	4	4	3	4
Workdays and Offdays in Cycle	-1st Shift	5-2	5-2	3-2	5-2	4-3	4-3	4-2	3-3	4-4
	-2nd Shift	5-2	5-2	7-2	5-3	4-3	4-3	4-3	3-3	4-4
	-3rd Shift	5-2	5-2	5-2	5-3	4-3	4-3	4-3	None	None
Schedule Work Cycle-	-Days Per Cycle	21	21	21	23	21	21	20	12	16
	-Cycles Per Year	17.33	17.33	17.33	15.83	17.33	17.33	18.2	30.33	22.75
Number of Workdays	-Per Shift	5	5	3,5,7	5	4	4	4	3	4
	-Per Cycle	15	15	15	15	12	12	12	6	8
	-Annually	260	260	260	237	208	208	218	182	182
Number of Offdays	-Per Shift	2	2	2	2 or 3	3	3	2 or 3	3	4
	-Per Cycle	6	6	6	8	9	9	3	6	8
	-Annually	104	104	104	127	156	156	8	182	182
Weekends Off Annually	-Full	52	0 to 26	34	14	52	52	10	16	18
	-Partial	0	0 to 26	0	14	0	0	18	18	12
Number of Other Offdays	-Holidays	9	9	9	8, 9-hour	7.2	7.2	7.2	6	6
	-Vacation	12	12	12	11, 9-hour	9.6	9.6	9.6	8	8
	-Compensatory	0	0	0	6	0	0	10	9	9
Total Scheduled Hours Annually	Workdays times	260	260	260	237	208	208	218	182	182
	Hours =	8	8	8	9	10	10	10	12	12
	TOTAL	2,080	2,080	2,080	2,133	2,080	2,080	2,180	2,184	2,184

Adapted from *The Manager's Guide to Alternative Work Schedules—Second Edition*, by W. L. Booth. Institute of Police Technology and Management. University of North Florida, 12000 Alumni Drive, Jacksonville, FL 32224-2678; <http://iptm.org>.

Evaluating alternative work schedules

When considering alternative work schedules, several factors should be weighed. Benefits and costs are often traded off as decisions are made.

- Hours of operation and timeframes. While many jail activities operate 24 hours per day, others may have substantially shorter hours (visiting areas, public reception, etc.). Examine each function of the jail to find out if different work schedules would be effective.
- Days operated each week. Many jail operations continue 7 days per week, but others may vary. For instance, a jail may operate an industry or work program that closes on weekends. Scheduling staff for these functions might require alternative approaches.
- Objectives of the organization. The goals and objectives of the jail may suggest appropriate scheduling. If the jail places a high priority on inmate visiting, visiting hours might be scheduled at the convenience of visitors, rather than staff. As a result, work schedules might change.
- Levels of activity. Different components of the jail might require more intense staffing. For example, maximum-security inmates are more difficult to supervise

during outdoor recreation, suggesting the need for additional staff. A creative staffing plan might provide more staff for that function through overlapping shifts.

- Employee contracts and labor laws. Any potential change in work schedules must be evaluated in light of existing contracts and laws. Involving labor representatives and legal counsel early in the process is advisable.
- Staff training. If it is difficult to provide in-service training for staff, alternative schedules (such as over-lapping shifts) may create new opportunities for this key activity.
- Fatigue and productivity. Research indicates that longer work days decrease productivity, but that corresponding shorter workweeks may offset fatigue. Alternative work schedules must be carefully weighed to ensure that staff are not overtired and less able to perform critical duties.
- Scheduling for different positions. Some new jobs created in the jail may be amenable to, or even require, alternative scheduling.

The decision to change your shift configuration will ultimately hinge on the assessment of their feasibility and on whether the changes can be implemented without too much disruption or negative reaction. The rewards for creative use of alternative work schedules are often great enough to overcome most potential logistical problems.

Changing shift configurations often *requires* negotiation with employees' bargaining units. But even if you are not required to negotiate changes in shift configurations, you should consult with employees and their representatives when you are considering changes. Solicit their suggestions and work with them to craft changes that work for them, as well as the facility.

The NIC staffing analysis process strongly suggests that you have union members or other employee representatives "around the table" throughout the process. Giving employees meaningful opportunities to shape changes in jail operations and scheduling not only brings important insights and ideas to the process, but also increases the likelihood that employees will accept the changes that result.

This article focused on the shift configurations, the first and biggest element of scheduling decisions. In the next issue we will examine the manner in which various shift configurations actually *schedule* individual employees and the consistency associated with shift configurations. We will also introduce a method that you may use to evaluate the consistency and efficiency of your current schedules.

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The materials identified in this article, along with many other resources, are available at no cost at our on-line staffing analysis clearinghouse: www.staffinganalysis.com.

The clearinghouse is a service provided by CRS, Incorporated, a non-profit organization (www.correction.org).

Rod Miller has headed CRS Inc. since he founded the non-profit organization in 1972. He is the author and co-author of numerous texts and articles on various aspects of jail planning, design, and operations. For more information, contact him at rod@correction.org, 925 Johnson Drive, Gettysburg, PA 17325, and (717) 338-9100.

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Glossary of Staffing Analysis Terms	
Coverage Plan	The description of the <i>minimum</i> numbers and types of staff needed to operate the facility at each hour of each day in the week.
Shift Configuration	The combination of: <ul style="list-style-type: none"> • Number of hours staff will work on a given shift • Start and end times for each shift • Number of days to be scheduled on and off Many jails have more than one shift configuration.
Schedule	The assignment of individual staff to shifts on specific days, using one or more shift configurations. The schedule assembles all of the shift configurations and matches them to employees.
Cycle	The number of consecutive days needed to reach the point at which the schedule repeats itself.
RDO	Regular days off. The specific days of the week that each employee will not be scheduled to work. In a 5-2 schedule (5 days on, 2 days off) the days will be the same each week. Other schedules, such as a 3-3 or 4-4 (often used for 12-hour shifts) will result in different days off each week until the cycle is complete and the schedule repeats itself.