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**ISSUES &
PRACTICES**

Police Work Scheduling

**a report for the
criminal justice professional**

- Current trends and innovations in the police work week
- Schedule impact on the employee and the organization
- Choosing the best schedule for your agency
- Devising and administering an effective leave policy



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Police Work Scheduling: Management Issues and Practices

by
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ABSTRACT

Police Work Scheduling is intended for persons who review, design, implement, and administer work schedules for police personnel. The primary focus of the document is work schedules used by patrol personnel that provide service-on-demand around the clock, seven days a week. The terms "work schedule" and "work scheduling," used interchangeably in this report, refer both to the form of a schedule (i.e., a roster or chart that indicates when each officer is to report for duty) and to the functioning of a schedule (i.e., the administrative procedures associated with vacation time, holidays, sick leave, etc.).

This report is not a "how-to" manual for designing work schedules. Rather, it is an examination of ways in which work schedules may enhance or hinder management objectives, agency operations, and individual officer performance within a police department. This examination will reveal that work schedules serve many purposes which dictate the kinds of work schedules that are used. Less often recognized, but equally important, is the fact that work schedules, once implemented, also influence the management objectives to be met.

Also included is an examination of the incompatibility of many management and personnel objectives which frequently precludes the possibility of finding a schedule that can adequately meet all objectives. Accepting this premise, it is argued that every work schedule represents a compromise between an array of objectives (often most clearly divided into management and personnel issues) and that effective management of police work schedules requires an awareness of the relationship between schedule properties, management objectives, and department operations.

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PREFACE

People who work nine to five, Monday through Friday, tend to view their work schedules as simple and unimportant facets of their employment. For police officers and administrators, however, the need to provide service-on-demand, 24 hours a day, seven days a week, poses special scheduling problems that are not simple or unimportant. Most would agree that effective work schedules can:

- reduce sick leave,
- produce less wasted effort,
- permit more efficient use of equipment,
- reduce overtime,
- improve service,
- allow more leisure time,
- raise morale, and
- enhance recruitment capabilities.

Yet, despite the fact that every police agency must provide work schedules to specify which officers are to be on duty on each shift and day, the design, implementation, and use of work schedules continues to be a largely "unmanaged" police function--often ignored until a specific problem or need arises. The nature of the difficulty can take many forms. For example:

- A city manager, faced with a growing "tax revolt," questions a request for additional police officers to handle increased calls-for-service on Friday and Saturday on the 4 p.m. - midnight shift when the department continues to use a schedule which provides an equal number of officers on each shift and day of the week. The manager argues that the department should use work schedules that provide additional staffing on busy days and lower staffing levels during lighter workload periods. The police chief justifies the current scheduling system as the only way to provide shift rotation and an equitable distribution of time off for all officers. Unconvinced, the manager urges the chief to try a new set of schedules with fixed days off for each officer and fixed shift assignments. Reluctantly, the chief agrees. He is immediately hit with a chorus of criticism from both supervisory and line staff suggesting that he has buckled under pressure from city hall. His supervisors point out that since shift assignments will be decided on the basis of seniority the fixed shift

system will result in a disproportionate number of inexperienced officers on the busy 4 p.m. - midnight shift. In addition, it is argued that morale among younger officers will be damaged because they will be required to work on unattractive shifts without weekends off for years before they will be able to obtain a better schedule. After six months, the department returns to its old schedule--and does not receive any additional officers.

- A police administrator, asked to find a work schedule to satisfy new work rules negotiated by the city and the local police association, discovers that the city has agreed to a requirement that each officer must be scheduled for exactly 40 hours of work per calendar week. He painfully discovers that this requirement, almost thrown in as an afterthought, virtually eliminates the use of most types of work schedules except those with fixed days off such as "5 on - 2 off" with eight-hour shifts or "4 on - 3 off" with ten-hour shifts. When he proposes a set of "5 on - 2 off" schedules for review, there is criticism from field personnel over the loss of all three-day off-duty periods (which occur at regular intervals in the current schedule) and over the perceived unfairness in allowing some officers to have every weekend off while others may not have one off for months at a time. After considerable discussion, the administrator submits a revised schedule that includes some three-day off-duty periods and an equitable work pattern for all officers. The 40-hour per week requirement is quietly ignored by both the administration and the police association.
- A patrol commander in a department that has implemented a schedule with 10-hour shifts to provide additional patrol strength at peak workload times finds that the department does not have enough vehicles for all officers during the shift overlap period. In addition, considerable officer dissatisfaction has arisen over the city's method of defining the amount of vacation time each officer will receive with the new schedule. The city attorney has advised that the contract between the city and each municipal employee guarantees a total number of hours (rather than days) for each employee for annual leave. Consequently, officers who earn 80 hours per year will receive 10 days off if they work eight-hour shifts, but only eight days off if they work ten-hour shifts! Most patrol officers feel that the city is cheating them out of two vacation days a year. The smoldering discontent along with a continuing problem with equipment shortages undermines officer morale to the point where the anticipated benefit of better service during peak workload times is never realized.
- In his frustration to find a suitable work schedule, a chief requests assistance from the city data processing department. A

young, bright technician, unfamiliar with police operations, proposes a new schedule which he claims meets all department needs. Implemented on a three-month trial basis, the schedule is quickly criticized. The most vehement opposition comes from patrol officers who experience considerable fatigue and stress due to the fact that the schedule requires them to work four 8-hour tours in a 72-hour period (alternating assignments between the midnight - 8 a.m. and 4 p.m. - midnight shifts). Their frustration is further aggravated by the fact that officers assigned to the 8 a.m. - 4 p.m. shift work a straight "4 on - 2 off" pattern and are not required to rotate shift assignments. The new schedule is quietly dropped after three months.

These examples touch on several common police work scheduling problems and issues:

- the use of schedules that provide staffing levels that are not proportional to workload by shift or day of the week;
- attempts to design schedules to satisfy pre-existing conditions that are not mutually compatible;
- a lack of adequate planning to anticipate and manage schedule changes; and
- the use of schedules that are viewed as unfair and inadequate by patrol officers.

The basic premise of this report is that police work scheduling is both an important and manageable police function; and that the key to the effective management of work schedules is understanding their purposes, forms, and use. This document examines the relationships between management objectives, field operations, and individual goals as they are operationalized in schedules. These relationships are examined in a number of ways:

- identification of the impact of work schedules on department operations,
- examination of work schedules in terms of their key properties and features,
- review of the design and implementation of work schedules as a process of organizational change, and
- analysis of schedule administration.

The material presented in this report is based on information obtained from police departments throughout the United States. Department reports,

a mail survey to over 200 agencies, 40 personal interviews with officers from 28 departments, and an extensive literature review were used to collect information about the objectives of police work schedules, the kinds of schedules used, and problems encountered with schedule administration. This information was reviewed by an Advisory Board comprised of police administrators, an officer association representative, and a police researcher. It is presented below in seven chapters and six appendixes. Each chapter focuses on a specific scheduling issue and can be read without reference to other chapters.

Chapter 1 examines the nature of police work scheduling: the diversity of schedules, what schedules are used for, problems that arise, and the contributing causes to these problems. Chapter 2 explores the impact of schedules and scheduling practices upon department operations. Specific topics include management issues (shift rotation, staffing, and unity of command), operations issues (efficient use of resources, ease of schedule design and use, and schedule compatibility with other units), and employee-related issues (stress, schedule equity, and outside activities). The basic properties of all work schedules are defined and illustrated in Chapter 3 to provide police administrators with a basis for comparing scheduling alternatives. The types of schedules used by virtually all police agencies in the United States are discussed in Chapter 4 with an analysis of the advantages and disadvantages of each. Chapter 5 examines the management of schedule change in terms of key participants, pre-implementation planning, finding a new schedule, and the implementation process. Administration of all forms of planned and unplanned time off is reviewed in Chapter 6. The policies and procedures of numerous departments are used to illustrate specific administrative alternatives. Chapter 7 presents a number of guidelines for assessing schedule effectiveness in terms of management and officer objectives.

An overview of the relationship between police work schedules and department operations can be obtained by reading chapters 1, 2, and 7. Persons with direct responsibility for the implementation and use of work schedules should focus on chapters 2, 5, 6 and 7. Chapters 3 and 4 should be useful for persons who have the responsibility of designing work schedules with specific properties.

The six appendixes contain considerable supplementary material. A glossary of scheduling-related terms is contained in Appendix A. Collections of widely-used police work schedules and schedule representations obtained from police agencies for this report are presented in appendixes B and C. A summary of the responses to 45 questions in the mail survey is presented in Appendix D, and a list of all police departments that provided information for this report is contained in Appendix E. An annotated bibliography based on the scheduling literature review conducted during the preparation of this document is contained in Appendix F.

CHAPTER 1: THE NATURE OF POLICE WORK SCHEDULING

For police agencies in the United States, the necessity of responding quickly and adequately to service requests that may appear at any hour dictates that some level of patrol presence be maintained around the clock, seven days a week. To provide such coverage, police administrators have experimented with many varieties of schedules and scheduling procedures.

In collecting information for this document, the schedules and scheduling practices of 160 police agencies in the United States were examined.¹ A composite schedule based on information obtained from these agencies would possess the following characteristics:²

- The schedule has three 8-hour shifts and an average work week of 40 hours.
- The daily work pattern is 5 on - 2 off which gives an officer the same days off each week.
- Shift assignments change monthly.
- Each officer receives 11 holidays per year and earns 10 vacation days after one year of service.

In addition, the current schedule is more than three years old, was last modified because of changing workload patterns, and was designed by someone in the department.³

Persons familiar with police work scheduling will not be surprised at

¹A list of these departments is presented in Appendix E.

²The results listed are based on responses obtained from the Police Work Scheduling Survey. A list of the responses to all questions in the survey is presented in Appendix D.

³Responses to questions 2, 4, 5, 13, 14, 26, 30, 34, 41, 42, and 43, Police Work Scheduling Survey, Appendix D.

any of these features. Most are representative of scheduling practices that have been common in law enforcement for many years although the 5 on - 2 off pattern is a feature that has only achieved wide acceptance within the past decade.

The Diversity of Police Work Schedules

Care must be taken in interpreting the features of the "average" police schedule presented above. Data collected for this document revealed an enormous diversity in the kinds of schedules and scheduling practices used by police agencies. To illustrate, consider the following:⁴

- Shift lengths of 9, 10, 11, and even 12 hours are used by approximately 25% of departments for one or more shifts.
- Approximately 25% of departments have average work weeks that are either less than or greater than 40 hours. Of these, 6% have work weeks that equal or exceed 45 hours.
- One-third of departments use four or more shifts.
- Among departments that use rotating shift assignments, more than 20% rotate either weekly or bi-weekly.
- One-third of departments do not use rotating shift assignments.
- Almost 40% of police agencies use schedules that require officers to work more than five days in succession; over 21% require 7 to 10 on-duty days in a row.
- The number of annual holidays ranges from 3 to 14. Vacation days earned during the first year of service range from 5 to 20.
- Several police agencies in the United States do not increase annual vacation time with seniority.
- Approximately 22% of departments have modified their patrol force work schedule within the past year.

No single reason can be put forth to explain this diversity. These variations appear to be the result of different factors whose individual importance varies from one agency to another. The most significant of these factors are:

⁴Responses to questions 5, 7, 13, 14, 26, 30, 31, 34, and 41, Police Work Scheduling Survey, Appendix D.

- Management objectives. Objectives to be met by a schedule play a significant role in determining its particular features and characteristics. As an example, a schedule that provides staffing levels that are proportional to workload by hour and day may not provide the desired level of unity of command. Similarly, an objective to provide weekends off for all officers may not be compatible with the need to provide increased patrol coverage on Friday and Saturday.
- Administrative issues. Often the kinds of the work schedules that can be used are limited by administrative rules and procedures. As an example, in a large midwestern police agency, the work schedule for each officer must provide exactly 80 on-duty hours every two weeks because bi-weekly paychecks for all municipal employees are based strictly on the number of hours worked. Although not immediately obvious this procedure limits the kind of work schedules that can be implemented by the agency.
- Local traditions. The significance of tradition within the police community cannot be overlooked. It influences work scheduling practices in many departments. Police administrators have encountered strong negative reactions when they have proposed what they view as minor changes in a work schedule. When pressed to explain their preference for the status quo, officers instinctively counter with "That's the way it has always been done." This factor may become particularly important if a police association identifies scheduling as a bargaining issue. At that point, legitimate consideration of the relative merits of alternative scheduling approaches may not be possible.
- Absence of scheduling information. The analysis, design, implementation, and use of work schedules for police personnel have not been routinely included as topics within the curricula of professional training courses for police administrators and supervisors. This fact, coupled with the lack of widely-distributed written materials (e.g., manuals or reports which synthesize the concepts and practices of personnel scheduling) has resulted in an environment where those responsible for designing or implementing schedules for police personnel have few if any resources to draw upon.

What Do Work Schedules Do?

A work schedule tells an officer when to report for duty. This simple explanation masks the numerous facets of department operations influenced by the kind of schedule that is used. An alternate view of a work schedule is that it represents an agreement between management and each officer, and that the schedule roster and associated administrative procedures operationalize the terms of that agreement. This latter view

becomes readily apparent when the number and scope of management and individual objectives imposed on police work schedules are considered.

Management Scheduling Objectives

Police agencies use work schedules to achieve the following objectives:

- Maintain adequate staffing levels. The primary police mission is to provide service-on-demand around the clock, seven days a week. The difficulty of providing 24-hour coverage is compounded by the variability in the demand for police services in many communities. Since call-for-service levels often follow predictable patterns by hour of the day and day of week, it is usually possible to determine what proportion of the patrol force should be on duty on each shift and day.
- Provide proper supervision. In most departments, work schedules are sought which provide continual contact between each officer and one immediate supervisor.
- Promote an effective patrol force. Among the many factors that influence the effectiveness of a patrol force, officer attitudes about the work environment play an important role. As a result, many departments seek schedules that provide staffing levels that are proportional to the workload to avoid excessive fatigue on busy shifts and boredom on lighter ones. Better morale is maintained when each officer works a schedule which allows him/her to report to the same supervisor and work with the same group of officers.

Officer Scheduling Objectives

Although often not explicitly identified as objectives, individual officers also look for certain features in the schedules they must use. These include:

- Ability to do the job. Officers do not want to work schedules they feel will interfere with their ability to perform their duties in a safe and professional manner. Hence, schedules which cause undue fatigue or stress because of long hours, long intervals without time off, or frequent shift changes are often viewed as unsatisfactory.
- Compatibility with personal life. It may be in this area more than any other that the underlying nature of police work has changed. While the concept of the "police fraternity" with its

emphasis on fellowship and dedication to the police mission is still strong in this country, it appears that attitudes about the relationship between an officer's responsibilities to his profession and those to his family and personal life have changed. This has brought about a demand for schedules that provide work patterns that are more compatible with outside activities and provide flexibility in taking earned time off.

- Schedule equity. The compatibility objective discussed above arises because police officers compare the time off features of their schedules with those enjoyed by the public. Officers also compare their schedules with others in the department. Schedule equity refers to the degree that all officers enjoy (or put up with) identical schedule features. Typical equity issues are the number of weekends off and the method used to select vacations. In many applications, the inherent inequities of certain schedule features (e.g., who gets Saturday-Sunday off in a schedule with fixed days off) are resolved by using seniority.

The Quiet Headache

Police work schedules, though they appear to be simple on the surface, often support a complex mixture of management and individual goals. These objectives touch on virtually every key management issue (productivity, budget, morale, field operations, etc.) and give evidence to the claim that the design and use of work schedules merit continual management attention. The diversity in police work schedules has evolved, in part, in response to the need to support this variety of objectives. That diversity, however, does not mean that continuing problems in the design and use of schedules have eased.

The design of schedules continues to be primarily a "hit-and-miss" operation in most police agencies hampered by the lack of schedule design resources, the absence of concrete performance measures to assess the impact of alternative schedules on department operations, the lack of a basic vocabulary of scheduling terms, and often a resistance to any schedule change based on a "That's the way it has always been," mentality. These problems are familiar to every police administrator who has had to struggle with the responsibility of designing a new work schedule with little documentation about the current schedule, no way to quantify the potential impact of alternative schedules, an inability to understand the scheduling jargon used by a planner in a neighboring jurisdiction, and an undercurrent of suspicion about change from both line and supervisory officers. As a result, although most police agencies have workloads that vary predictably by shift and day of the week, many departments still

continue to use the "seemingly" simple solution of uniform staffing levels across all shifts and days even though the disadvantages of non-proportional staffing include the possibilities of excessive fatigue, increased sick leave, lower morale, inefficient use of equipment, greater overtime, increased response times on busy shifts, and officer boredom during light workload times.⁵

Although assessing the attractiveness of individual schedule properties is a subjective process, poorly-designed schedules may also contribute to fatigue and boredom with the attendant problems of absenteeism and lower morale. Schedule features that may exacerbate these problems include frequent shift changes with inadequate time-off between assignments, long periods of consecutive on-duty days, few weekends off, and unequal distribution of desirable schedule features among officers.

Reasons for Scheduling Problems

A number of factors contribute to the problems cited above. These include:

- Lack of awareness of a problem. Often police administrators, unaware of scheduling alternatives, do not view the deficiencies of their current schedule as a problem. Frequently, they consider unattractive schedule features (e.g., a short changeover between shift assignments) as inevitable properties of all schedules.
- Problems not seen as manageable. The failure to see schedule design and use as legitimate management issues may also arise from the inability to consider work schedules in terms of their component parts that can be individually adjusted. Viewing schedules as complete entities, not susceptible to systematic analysis, has given rise in many departments to the delegation of schedule design responsibilities to a department "puzzle-solver;" a person who enjoys manipulating figures but often does not understand the underlying elements of schedule design.

In addition, the reasons cited above for schedule diversity (i.e., multiple management objectives that may not be compatible, the absence of scheduling-related resources, limited information transfer among police agencies, and resistance to change grounded in local tradition) also contribute to scheduling problems.

⁵Responses from 119 police agencies surveyed indicated that 29.9% of the departments provide uniform staffing by shift and 45.7% provide uniform staffing by day of the week.

Scheduling Successes

At first view, the array of scheduling problems cited above could suggest that all police agencies are mired in a thicket of officer complaints and unmet department objectives. In fact, many agencies have found work schedules that represent good solutions to the conflicting objectives of officer preferences, personnel issues, and patrol operations. With very few exceptions, however, these scheduling "successes" have not been generally recognized or publicized in the police community. This has been due, in part, to the following circumstances:

- The descriptions of work schedules in police journals and reports are usually presented in terms of the local traditions and idiosyncrasies of individual departments which make it difficult to identify core schedule features that may be applicable to other departments.
- The absence of a widely-accepted vocabulary to describe schedule properties and procedures.

These factors, often combined with a sense that "scheduling" is not a manageable process, continue to retard the development of an objective-based, systematic technology of scheduling for police applications.

This report addresses these difficulties by using successful police work schedules to describe key schedule properties in terms of a common vocabulary. By extracting schedule features and procedures from the organizational and management styles of individual departments, it becomes possible to compare scheduling alternatives. The material presented is intended to enhance a police administrators' ability to identify how specific schedule features affect patrol operations and how department policies and procedures may influence the kinds of schedules that can be used. As the connection between schedule features and operations become evident, it will also become possible to recognize scheduling alternatives that are consistent with department objectives.

CHAPTER 2: IMPACT OF THE WORK SCHEDULE ON DEPARTMENT OPERATIONS

Ask a police chief or administrator what aspects of the job are important to every sworn officer in the agency; he will probably answer: "paycheck, rank, and the hours worked." Work scheduling is important to officers, yet it is often not recognized how many aspects of department operations are influenced by or related to the work schedule. The basic manuals and textbooks in police management and administration barely mention work scheduling in connection with operations.¹ And while presenting a blueprint for effective management of a police agency, the Police report of the National Advisory Commission on Criminal Justice Standards and Goals does not list scheduling in its index.²

The law enforcement chief executive and the patrol division commander can benefit from considering the influence of scheduling and operations upon one another. The survey on police work scheduling conducted to prepare this document concerned itself with a number of scheduling issues including:

- lengths of work periods,
- shift rotation,
- time-off periods,
- staffing levels,

¹See for example N. F. Iannone, Supervision of Police Personnel, 3rd edition (Englewood Cliffs: Prentice-Hall, 1980); International City Management Association, Local Government Police Management, (Washington, D.C., 1977); R. G. Lynch, The Police Manager, Professional Leadership Skills, 2nd edition (Boston: Holbrook, 1978); H. W. More, Effective Police Administration: A Behavioral Approach (San Jose: Justice Systems Development, 1975); D. T. Shanahan, Patrol Administration: Management By Objectives (Boston: Holbrook, 1975); S. S. Souryal, Police Administration and Management (St. Paul: West, 1977); P. M. Whisenand and R. F. Ferguson, The Managing of Police Organizations, 2nd edition, (Englewood Cliffs: Prentice-Hall, 1978); P. M. Whisenand, The Effective Police Manager (Englewood Cliffs: Prentice-Hall, 1981); O. W. Wilson, Police Administration, 4th edition (New York: McGraw-Hill, 1977).

²National Advisory Commission on Criminal Justice Standards and Goals, Report on Police (Washington, D. C.: U. S. Government Printing Office, 1973).

- holidays and vacation time,
- the "work week" and overtime,
- outside influences on schedules,
- schedule changes, and
- departmental problems related to scheduling.

The survey data clearly indicate that schedule and department operations, policies, and procedures influence one another in many ways. Discussion of these influences is the central focus of this chapter. Three sets of issues are presented: management issues, patrol operations issues, and employee-related issues.

Management Issues

There are many management issues that interact with the work schedule of a law enforcement agency. Three are discussed here: shift rotation, staffing levels, and unity of command and team integrity.

Shift Rotation

A frequent topic for discussion among police officers and administrators is the question: Which is preferable, shift rotation or permanent shift assignments? Perhaps the topic arises because personnel from one agency are surprised to find that other departments do it differently. Among patrol officers, the advantages of one method over another are discussed in terms of changing working conditions for different shifts, adequate time off between shift assignments, and seniority considerations. Among command-level officers, issues of staffing levels, team integrity, and officer motivation are mentioned. Whichever method a police department uses, administrators are aware that the issue is one that can evoke strong feelings and opinions since it affects the personal habits and family life of all officers in the patrol division.

Data collected for this report indicate that 65% of the departments surveyed rotate officers through all shifts while 35% permanently assign them to a shift.³ The rotation frequency for departments that use rotating shifts is indicated in Table 2-1. A high percentage of departments use "Monthly" and "Quarterly" rotation patterns. Among departments that use rotating schedules, 19% indicated they had problems with rotation.⁴ Frequently mentioned were disruption of outside education

³Question 13, Police Work Scheduling Survey, Appendix D.

⁴Question 15, Police Work Scheduling Survey, Appendix D.

TABLE 2-1

ROTATION FREQUENCY FOR POLICE DEPARTMENTS WITH ROTATING SHIFT ASSIGNMENTS^a

Rotation Frequency	Number of Departments	Percentage of Departments
Weekly	14	18.7
Bi-weekly	2	2.7
Monthly	31	41.3
Every six weeks	1	1.3
Bi-monthly	3	4.0
Quarterly	20	26.7
Annually	4	5.3
Total	75 ^b	100.0

^aResponses to Question 14, Police Work Scheduling Survey, Appendix D.

^bDoes not include 41 departments that have permanent shift assignments and three non-responses.

and employment commitments, problems with homelife, and fatigue from short off-duty periods at changeover from one shift to another. Strong feelings about the disadvantages of shift rotation are reflected in the following comments:

- The rotation system makes young men old before their time, and encourages abuses since few men can go without sleep.
- Wives are unhappy with rotation but officers do not want to change.
- The physical adjustment to new work hours after a change of shifts is like "jet lag."

Among departments that assign officers permanently, several operational problems were also cited. Respondents to the survey said that officers are "locked" into the shift and "become stale." When asked if "lack of communication between personnel assigned to the various shifts" is a problem, 50% of departments using permanent shift assignments indicated

this was an occasional or frequent problem, and 23% indicated that "employee fatigue, boredom, and/or low morale associated with scheduling" was an occasional or frequent problem. Whether they use permanent or rotating shift assignments, police departments will want to identify problems associated with current practice to alleviate or minimize them.

In departments of more than 100,000 population, permanent shift assignments are widely used to facilitate the assignment of officers to shifts according to workload. This may be particularly important for departments with significant workload differences by shift, since the use of shift rotation may cause a police department to adopt the same number of beats for each shift to minimize staffing and scheduling difficulties. In January 1981, the Indianapolis (Indiana) Police Department went to fixed shift assignments for its 340 patrol officers, assigning 44% of the patrol force to the period 7:00 p.m. to 3:00 a.m. when the police department receives 44% of its calls for service. In a department memo the following advantages and disadvantages for permanent shift assignments were listed:

Advantages:

- Efficient use of available manpower: shift strength based on need.
- Fewer adverse physiological problems.
- Gives shift preference as a fringe benefit to senior officers.
- Majority of officers want fixed shifts.
- Easier court scheduling to accommodate officers' duty time.
- Better supervision and evaluation of personnel.

Disadvantages:

- Organizational resistance from those who do not want fixed shifts.
- Additional stress on younger officer who must work high workload shifts.
- Increased vehicle fleet requirements to accommodate additional officers on "loaded" shifts.
- The current computer-aided-dispatching system cannot accept a multi-beat design; hence beat system must be established for maximum staffing only.
- Officer will not get full perspective of the beat over a 24-hour period.

Staffing Levels

A familiar principle of patrol deployment management is the belief that whenever possible patrol resources should be allocated in proportion to workload by day of week and time of day. The rationale for this tenet

is based on considerable evidence that indicates that non-proportional staffing levels may result in varying levels of service quality, disproportionate patrol unit workloads, increased officer overtime, and reduced officer morale. A number of different criteria for "proportional staffing" can be found in police management literature. Traditional approaches emphasize allocations based on the number of calls-for-service or the total time required for all calls for each shift and day of the week. Recent patrol deployment formulations based on queuing theory and travel distance models permit allocations to be based on average travel times, the probability that a call will be stacked, or the average time a call for service will be held in the stack before it is given to a free patrol unit.⁵

Departments in the scheduling survey were questioned if "current staffing levels by shift [are] proportional to the workload by shift" and also "to the workload by day of the week."⁶ Their responses are summarized in Table 2-2. These results indicate that 85.8% of the departments (cells 2, 3, and 4) vary staffing levels to meet workload demands,

TABLE 2-2
PERCENTAGE OF POLICE DEPARTMENTS THAT USE PROPORTIONAL
STAFFING LEVELS TO MATCH WORKLOAD VARIATIONS
BY SHIFT AND DAY OF THE WEEK (N = 113)^a

		Proportional Staffing By Shift	
		No	Yes
Proportional Staffing By Day of the Week	No	Cell 1 14.2	Cell 2 26.5
	Yes	Cell 3 7.1	Cell 4 52.2

^aSix missing observations.

⁵Jan M. Chaiken, Patrol Allocation Methodology for Police Departments, (Santa Monica, California: The Rand Corporation, 1975).

⁶Questions 22 and 25, Police Work Scheduling Survey, Appendix D.

and 52.2% strive to do this both by day of week and by shift.

When questioned further about whether "matching staff levels to the demand for service" is a problem, the responses, broken out by the four cells used in Table 2-2, showed significant differences (see Table 2-3).⁷

TABLE 2-3
DEGREE OF DIFFICULTY ASSOCIATED WITH MATCHING STAFFING LEVELS
TO WORKLOADS BY SHIFT AND DAY OF WEEK, PERCENTAGE
OF DEPARTMENTS BY STAFFING POLICY

Degree of Difficulty	Extent of Proportional Staffing			
	Not by Shift or DOW ^a (Cell 1) ^b	By Shift, But Not By DOW (Cell 2)	By DOW, But Not By Shift (Cell 3)	By Shift and DOW (Cell 4)
No Problem	6.7	17.2	12.5	35.6
Infrequent Problem	40.2	17.2	12.5	25.4
Occasional Problem	26.7	55.2	37.5	25.4
Frequent Problem	26.7	10.3	37.5	13.6
Totals	100.3 ^c (N=15)	99.9 ^c (N=29)	100.0 (N=8)	100.0 (N=59)

^aDay of week.

^bCell number refers to four cells in Table 2-2.

^cPercentage total does not equal 100.0 due to roundoff.

⁷Question 45, Police Work Scheduling Survey, Appendix D.

A majority (61%) of the departments whose staffing is proportional by shift and day of week (Cell 4) indicate infrequent or no problems, whereas 75% of the departments in Cell 3 (proportional by day of week only) report occasional and frequent problems.

Police agencies sometimes strive to solve the problem of matching staff levels to demand for service by establishing minimum staffing levels for each shift through the week. This is possible because workloads usually follow a weekly pattern that permits reasonable estimates of staffing requirements to be made. When insufficient personnel are available to meet a shift minimum (because of sick or injury leave, unexpected special assignment, or any other unplanned absence), one or more established emergency procedures may be used:

- on-duty officers from other shifts with more than the minimum number of on-duty personnel may be reassigned temporarily;
- designated officers, sometimes known as floaters, swing personnel, or relief personnel, may be used;
- on-duty officers may be held beyond the end of their assigned work shift (such "holdovers" are generally used as a temporary measure until other procedures can be activated); or
- off-duty officers may be "called back," with the officers to be recalled selected by supervisory discretion or chosen from a rotating list of volunteers.

Every patrol division commander wants to have patrol officers in sufficient numbers and effectively scheduled to make the invoking of these emergency procedures to maintain "minimums" an infrequent event. Extra hours worked by officers by serving as "holdovers" or "call-backs" usually are compensated with time-off (thus lowering staffing levels at a later date) or with overtime pay which impacts the budget. Excessive use of "call-backs" and "holdovers" may also contribute to employee fatigue and increased use of sick leave.

Unity of Command and Team Integrity

Traditional organizational theory emphasizes the ideal that every person should have only one superior from whom orders are regularly received, and to whom reports are made. O. W. Wilson affirmed that "confusion is created when more than one superior undertakes independent command of an operation performed by several subordinates . . . in such circumstances the orders given are not likely to be harmonious, and conflicting orders confuse subordinates and make the coordination of their efforts more

difficult."⁸ When supervisors' schedules differ from those of their officers, some damage is done to the unity of command principle which in turn can impact patrol operations.

Similarly, team integrity (i.e., squads of officers that work together as a team and have the same on and off-duty schedules) has been cited as a desirable management objective in recent studies of team policing. Staff levels and response tactics are used more flexibly and effectively to address area problems when consistent team membership is maintained.⁹ In addition, greater accountability for police service is achieved, and rapport between the police and the community is improved. While some police departments have not found the team concept to be a significant improvement over traditional operations, those that choose the team approach use schedules that enable supervisors to rotate (if there is rotation), receive training, and work with their officers as an integral team.

When departments in the survey were questioned about problems associated with "maintaining 'unity of command' or 'team integrity' when supervisors and subordinates may have to work different schedules," the responses, broken down by the size or type of jurisdiction served, reflect some differences (see Table 2-4). More departments in communities above 100,000 population identified the preservation of unity of command and/or team integrity as a problem, while departments from smaller jurisdictions reported less difficulty. Interestingly, when police departments are divided into those that use permanent shift assignments and rotating shift assignments, there is little difference between the two with reference to this problem.

Shift rotation, staffing levels, and unity of command/team integrity are only some of the management issues that may be affected by the work schedule of an agency. Others, such as accommodating training, meetings, and special assignments; outside influences from employee associations, legal constraints, or municipal policy; budgeting and political factors; and participatory versus management directed schedules are discussed elsewhere in this report.

⁸O. W. Wilson and R. McLaren, Police Administration, 3rd edition (New York: McGraw-Hill, 1972) p. 67.

⁹See International City Management Association, Local Government Police Management, (Washington, D.C., 1977) pp. 114-115, 181. For extended analysis see L. Sherman, et. al., Team Policing: Seven Case Studies, (Washington, D.C.: Police Foundation, 1973).

TABLE 2-4
DEGREE OF DIFFICULTY IN ACHIEVING UNITY OF COMMAND
AND/OR TEAM INTEGRITY, PERCENTAGE OF DEPARTMENTS
BY JURISDICTION SIZE AND TYPE^a

Extent of Problem	Population or Type of Jurisdiction						
	More than 250,000	100,000-250,000	50,000-100,000	25,000-50,000	10,000-25,000	Suburban County	Rural County
No Problem	23.5	40.9	71.4	41.2	64.7	57.1	37.5
Infrequent Problem	64.7	36.4	21.4	44.2	23.5	28.6	37.5
Occasional Problem	11.8	18.2	7.1	17.6	11.8	7.1	25.0
Frequent Problem	0.0	4.5	0.0	0.0	0.0	7.1	0.0
Totals	100.0 (N=17)	100.0 (N=22)	99.9 ^b (N=14)	100.0 (N=17)	100.0 (N=14)	99.9 ^b (N=12)	100.0 (N=16)

^aResponses to Question 45, Police Work Scheduling Survey, Appendix D.

^bPercentage total does not equal 100.0 due to roundoff.

Operations Issues

Not only is work scheduling associated with management issues and policies; it also affects and is affected by the operational aspects of patrol services.

Efficient Use of Resources

Patrol officers working on different shifts sometimes do not work

together as efficiently or effectively as they could, thus impairing the full achievement of patrol division objectives. Departments surveyed, for example, frequently report that inadequate information is exchanged between personnel assigned to different shifts (see Table 2-5).

TABLE 2-5
DEGREE OF DIFFICULTY DUE TO THE LACK OF COMMUNICATION
BETWEEN SHIFTS, PERCENTAGE OF DEPARTMENTS
BY JURISDICTION SIZE AND TYPE^a

Population/Type of Jurisdiction	Degree of Difficulty		Totals
	Infrequent Problem	Occasional Problem	
Municipal Police Agencies:			
More than 250,000	29.4	41.2	71.6 (N=12)
100,000 - 250,000	59.1	31.8	90.9 (N=20)
50,000 - 100,000	14.3	64.3	75.5 (N=11)
25,000 - 50,000	29.4	41.2	71.6 (N=12)
10,000 - 25,000	35.3	23.5	58.8 (N=10)
Suburban County Police Agencies	42.9	28.6	71.5 (N=10)
Rural County Police Agencies	37.5	56.3	93.8 (N=15)

^aResponse to Question 45, Police Work Scheduling Survey, Appendix D.

Officers on a shift just completed are tired and want to be on their way. Helpful information about suspects, locations to be watched, and developing situations can be forgotten and not passed on. Officers replacing them may be sensitive to their desire to go and thus hesitate to question and detain them. Law enforcement agencies reported that "lack of communication between personnel assigned to the various shifts" was an infrequent and occasional problem. The poor use of information resources may be further compounded for personnel assigned to a "power shift" (extra officers added during hours of extra activity). Because their hours overlap with other shifts, they may just "punch in" and not see anyone before they leave for the road.

Some communication problems may be remedied through small scheduling adjustments. For example, "early-arrivers" or "late-leavers" can be scheduled to overlap for up to 60 minutes to provide both for continuous service and an opportunity for information exchange at shift changes. Departments surveyed were asked if they have arranged to have "early-arrivers or late-leavers to provide for continuous service at shift changes;" 63% responded "Yes."¹⁰ When asked how many minutes of overlap were used, responses from 68 departments produced the following results:

Minutes Overlap Between Shifts	Percentage of Departments Responding "Yes"
1-14	1.5
15	23.5
16-29	2.9
30	29.4
31-59	1.5
60	39.7

Another area where a work schedule may impact patrol division resources is in the use of equipment. Surveyed departments were questioned whether "equipment shortages during periods of peak staffing" constituted a problem. Their responses are presented in Table 2-6. Whenever work shifts overlap or staffing levels are proportional to workload variations by shift, there may be a need for additional equipment and vehicles. This need is often given as the reason for not using schedules which involve significant overlap (for example, four-day ten-hour schedules) or as a current operational difficulty when such schedules are already in place. Hence, the inadequate fit between a particular schedule and patrol division resources may preclude the use of that schedule (which may be judged desirable for many other reasons), or it may constitute an ongoing difficulty with the use of that schedule.

¹⁰Question 6a, Police Work Scheduling Survey, Appendix D.

TABLE 2-6

EXTENT OF PROBLEMS ASSOCIATED WITH EQUIPMENT SHORTAGES, PERCENTAGE OF DEPARTMENTS BY JURISDICTION SIZE AND TYPE^a

Extent of Problem	Population or Type of Jurisdiction						
	More than 250,000	100,000-250,000	50,000-100,000	25,000-50,000	10,000-25,000	Suburban County	Rural County
No Problem	29.4	27.3	28.6	52.9	70.6	35.7	50.0
Infrequent Problem	23.5	13.6	35.7	41.2	23.5	28.6	31.3
Occasional Problem	29.4	50.0	28.6	5.9	5.9	28.6	18.8
Frequent Problem	17.6	9.1	7.1	0.0	0.0	7.1	0.0
Totals	99.9 ^b (N=17)	100.0 (N=22)	100.0 (N=14)	100.0 (N=17)	100.0 (N=17)	100.0 (N=14)	100.1 ^b (N=16)

^aResponses to Question 45, Police Work Scheduling Survey, Appendix D.

^bPercentage total does not equal 100.0 due to roundoff.

Ease of Scheduling Design and Use

Patrol division work schedules can vary significantly in the degree to which they strike a balance between meeting division objectives and employees' needs and desires. An imbalance toward the former may produce rigid, demanding schedules with low employee morale. A tip in the scales toward the latter may leave employees happy and content but limit management in dealing with minimum staffing levels, excessive overtime, and the disruption of other units' schedules.

Consider, for example, vacation leave. Often, employees prefer to take vacation leave during certain seasons of the year. To minimize operational disruptions and to ensure access to desired vacation times, the

scheduling of vacation leave is usually subject to restrictions, for example:

- The number of officers on vacation in a schedule group may be limited to a specified maximum which may depend on the season of the year, the demand for agency services, or the size of the group involved.
- The number of segments into which an officer's vacation can be divided may be restricted; a maximum may be imposed on the length of individual segments, or a minimum length may be imposed to prevent officers from randomly scheduling single days off duty.
- Limitations may be imposed on the amount of vacation that can be carried over from one year to the next.

Police departments surveyed reported significant differences in the amount of vacation time allowed and the kinds of scheduling restrictions used. The number of vacation days earned by an officer during the initial year of service ranges from 5 to 20 days with 10 days (39%) and 12 days (25%) being the most common.¹¹ It is interesting to note that 6% of the departments do not increase annual vacation time with longevity.¹² The maximum number of vacation days that can be earned ranges from 12 days to 36 days with 20 days (23%) and 25 days (20%) appearing most often.¹³ As to when vacation time may be taken, 64% of the departments indicated there are no rigid limitations; i.e., they may be taken whenever the schedule reasonably permits.¹⁴

When asked if the scheduling of vacations causes problems for the department, 42% indicated that it did.¹⁵ Some typical responses were:

- Limited personnel resources require overtime when activities dictate during vacation periods.
- The more officers we have, the more summer slots we need to open, (yet) summer is our busy time.

¹¹Question 30, Police Work Scheduling Survey, Appendix D.

¹²Question 31, Police Work Scheduling Survey, Appendix D.

¹³Question 31a, Police Work Scheduling Survey, Appendix D.

¹⁴Question 32, Police Work Scheduling Survey, Appendix D.

¹⁵Question 33, Police Work Scheduling Survey, Appendix D.

- It's a pain . . . to administer efficiently and fairly.
- Don't feel the proper level of coverage is maintained--causes extra workload for officers that are working.
- Vacations are scheduled six months in advance of the vacation being taken, this can cause problems with schools, courts, and other functions.
- Department is so small vacations are scheduled by seniority and this only allows one person off at one time.

Striving to change scheduling practices so that the patrol division can accomplish its objectives with more ease can stir up employees. An administrator of one surveyed suburban department (Deerfield, Illinois) discontinued the practice of allowing officers to add a few days of holidays or "time-coming" to vacation time to produce extended vacation periods. He did this to increase staffing levels during vacation times and to insure a more equitable distribution of summer vacations to less senior officers. A grievance was then filed by the union with the village manager, which went to the mayor. The union dropped the grievance prior to arbitration.

Vacation leave complications are one example of the balance between management objectives and employee desires. Others include scheduling holidays and time off for overtime, training, and special assignments. These issues are discussed in Chapter 6.

Schedule Compatibility With Other Units

The scheduling of patrol personnel frequently impacts and is impacted by different schedules used by other divisions. The effective patrol administrator will be aware of the objectives and problems of other divisions within the police agency, insofar as they interact with his own problems and objectives. Work scheduling will be a part of this "area of overlap."

When patrol division staffing levels are not adequate to meet unexpected heavy workload demands, and established emergency procedures do not fill the gap, the patrol division commander may have to use personnel from other divisions or units (e.g., traffic, criminal investigation, crime prevention, or community relations). This may disrupt the schedules and workload demands of effected units. Associated with this scheduling phenomenon, the patrol division commander may have to look to other divisions for motor vehicles if too many patrol units are "down," with consequent negative impact on those divisions.

Sometimes patrol division personnel must work with officers from other units on common assignments--criminal investigations, public events or demonstrations, traffic studies, incidents involving juveniles, etc. Whenever patrol division work procedures must be coordinated with those of other units the work schedule will play a part since it determines who and how many officers are available and ready to work, who and how many are fatigued and looking forward to getting off from a long tour of duty, and who is off and not available at all.

There is a broader sense in which the patrol division work schedule must be compatible. It must not conflict with department policies (maintaining each shift's minimum staffing level is one example); it must be consonant with the work rules of the jurisdiction, with state requirements (if there be any), and with union agreements. Municipalities, for example, often specify how many positions are allowed in each rank, or they determine how much vacation time is allowed for years of service. Unions frequently specify seniority procedures and other work conditions such as time off for meals or breaks.

Patrol division work schedules must also be compatible with court schedules to permit court appearances by officers. When questioned to what extent "compatibility with the schedules of courts and other public agencies" is a problem, surveyed departments responded as indicated in Table 2-7. Departments from jurisdictions with populations between 50,000 and 250,000 reported that lack of compatibility is a problem. Many factors, of course, may contribute to problems with court schedules. These include the adequacy of staffing levels, court procedures and schedules, and whether officers attend court on overtime or while on duty.

Employee-Related Issues

Work schedules may significantly influence employees who may react with higher or lower morale, with an attendant increase or decrease in productivity. The link between a patrol division work schedule and the personal reactions of patrol officers is a vital one.

Stress From Length of On-Duty Shift Assignments and Work Periods

The number of hours that an officer is on-duty may influence his/her productivity. Weariness and fatigue can take their toll at the end of a long shift. An overload of stressful situations can dull the edges of an officer's alertness or the simple willingness to get involved and do the job. Twenty-four percent of departments surveyed indicated their

TABLE 2-7

EXTENT OF PROBLEMS ASSOCIATED WITH THE INCOMPATIBILITY OF PATROL
DIVISION SCHEDULES WITH SCHEDULES OF OTHER UNITS AND
AGENCIES, PERCENTAGE OF DEPARTMENTS BY
JURISDICTION SIZE AND TYPE^a

Extent of Problem	Population or Type of Jurisdiction						
	More than 250,000	100,000-250,000	50,000-100,000	25,000-50,000	10,000-25,000	Suburban County	Rural County
No Problem	35.3	9.1	14.3	11.8	58.8	28.6	6.3
Infrequent Problem	29.4	36.4	21.4	64.7	11.8	21.4	37.5
Occasional Problem	29.4	50.0	64.3	11.8	23.5	42.9	50.0
Frequent Problem	5.9	4.5	0.0	11.8	5.9	7.1	6.3
Totals	100.0 (N=17)	100.0 (N=22)	100.0 (N=14)	100.1 ^b (N=17)	100.0 (N=17)	100.0 (N=14)	100.1 ^b (N=16)

^aResponses to Question 45, Police Work Scheduling Survey, Appendix D.

^bPercentage total does not equal 100.0 due to roundoff.

shift lengths were nine to twelve hours long, thus creating the possibility of undue fatigue for their officers.¹⁶

The length of the work period (i.e., the number of consecutive work days) can also be a factor in an officer's view of the job and thus an influence on morale and productivity. When asked for the maximum number of consecutive working days in their current schedule, 37.5% of the agencies

¹⁶Question 5a, Police Work Scheduling Survey, Appendix D.

surveyed indicated a work period of six days or more.¹⁷ When asked how often the typical patrol officer is scheduled for the maximum length work period, 64.4% of departments stated "weekly."¹⁸ Surveyed police departments were also asked to indicate what method(s), if any, are used to limit the maximum work period length. Their responses are noted in Table 2-8.

Shift rotation has an impact on natural biological rhythms. Several studies indicate that a number of health, family, and work problems can occur for employees on frequent shift rotation.¹⁹ In an article titled

TABLE 2-8

TYPE OF LEGISLATIVE AND ORGANIZATIONAL METHOD USED TO SET MAXIMUM WORK PERIOD LENGTHS, PERCENTAGE OF DEPARTMENTS^a

Legislative or Organization Method	Used To Set Limit	
	Yes ^b	No
Department Policy	60.9	39.1
Collective Bargaining	36.5	63.5
State Statute	6.1	93.9
Local Ordinance	2.6	97.4
Other	7.8	92.2

^aResponses to Question 8, Police Work Scheduling Survey, Appendix D.

^bTotal Yes percentages total more than 100.0 since more than one method may be used to set work period limits.

¹⁷See Table 3-4, Frequency of Maximum Length On-Duty Periods, p. 47.

¹⁸See Table 3-4, Frequency of Maximum Length On-Duty Periods, p. 47.

¹⁹See for example, Occupational Health and Safety News, Sept.-Oct., 1978, p. 21; Journal of Nursing Administration, Mar.-Apr., 1975, pp. 16-19; Aviation and Space Environmental Medicine, Feb. 1978, pp. 384-389; Ergonomics, 1976-78 (9 studies reported); and Supervisory Management, Jan. 1980, pp. 16-21.

"Why Rotating Shifts Sharply Reduce Productivity" it is stated:

Working on a rotating shift entails being able to alter one's sleep-work cycle and still perform competently. This is possible. But working a frequently rotating shift requires changing one's work cycle and time of sleep so often that it affects key mental processes - motivation, alertness, and judgement. The result is a loss of productivity.²⁰

When surveyed, police departments were asked to indicate to what extent "employee fatigue, boredom, and/or low morale associated with scheduling" are a problem. They responded as indicated in Table 2-9. Shifting sleep and work patterns can often cause sleeplessness and gastric distresses; for many people it takes 24 to 30 days to reverse most day-night time body functions. This can result in the officer feeling irritable, negative, and listless with consequent negative impact on both family and work relationships. Consequently, law enforcement publications have increasingly advised against frequent shift rotations simply because of the physical and mental toll it takes on patrol officers.²¹

Schedule Equity

How officers feel about the basic fairness of a work schedule is important to morale, and to their attitude toward the police department and its command personnel. This involves "schedule equity;" that is, the degree to which all officers share equally in shift assignments, weekends off, off-duty periods, and other schedule properties, both favorable and unfavorable. Departments in the national survey were asked if their current schedule provides "that over a one-year period every officer will receive some time off on weekends (i.e., either Saturday, Sunday, or both);" 34.5% answered "No" (56.3% of departments with populations of 25,000 - 50,000).²² When asked if "all officers

²⁰R. Fry, Supervisory Management, (Jan. 1980) p. 16.

²¹Kroes, Margolis, and Harrell published their stress research on Cincinnati patrol officers in Journal of Police Science and Administration, "Job Stress in Policemen," (1974) pp. 145-155. The 28-day rotating schedule was ranked fifth as a source of stress. For more recent analyses see H. Teten and J. Minderman, "Police Personal Problems - Practical Considerations for Administrators," in FBI Law Enforcement Journal, (Jan. 1977) pp. 8-15 and C. Gruber, "The Relationship of Stress To The Practice of Police Work," The Police Chief, (Feb. 1980) pp. 16-19 and 68-69.

²²Question 19, Police Work Scheduling Survey, Appendix D.

TABLE 2-9

EXTENT OF THE PROBLEMS OF FATIGUE, BOREDOM OR LOW MORALE
CAUSED BY CURRENT SCHEDULE, NUMBER OF DEPARTMENTS
BY PERMANENT AND ROTATING SHIFT ASSIGNMENTS^a

Extent of Problem	Type of Shift Assignments	
	Permanent	Rotating
No Problem	7	25
Infrequent Problem	24	28
Occasional Problem	6	19
Frequent Problem	3	1
Totals	40	73

^aResponses to Question 45, Police Work Scheduling Survey, Appendix D.

over a one-year period of time have the same number of weekend days off;" 48.3% responded "No."²³

The importance of schedule equity varies; in some departments with fixed shifts, seniority determines shift assignment. Younger officers may work the least preferred shift for years without resentment, knowing that eventually their turn will come. Many police agencies also use seniority to determine choice of holiday and vacation times. Other police departments operate with total schedule equity for all patrol personnel.

Surveyed departments were asked to indicate to what extent "fairness in the scheduling of holidays and weekend days" is a problem. They responded:

²³Question 20, Police Work Scheduling Survey, Appendix D.

No problem	52.1%
Infrequent problem	34.2%
Occasional problem	9.4%
Frequent problem	4.3%

Larger agencies (those serving populations above 100,000) found it more of a problem; more than 25% of them reported fairness in scheduling holidays and weekend days to be an "occasional" or "frequent" problem.²⁴

Outside Activities

Patrol officers, although their law enforcement employment must be a primary commitment, nevertheless have many outside interests and activities. The patrol division commander will be aware of these and, where it can be done without infringing upon division objectives, may choose to accommodate some outside activities with scheduling options. Such accommodations may include the officer who wants certain times off to work a second job or the officer who requires two nights each week to finish a degree at a local college, or another who wants his off-duty schedule to coincide with his working wife's days off.

Outside activities can be accommodated through the officer's pattern of days off. Surveyed departments were asked the maximum number of consecutive days off allowed their officers; 72.9% of the agencies indicated two and three days. When asked how often the typical officer is scheduled for the maximum length off-duty period, 55.9% of departments responded "every work period."²⁵ Departments were also questioned about "restrictions on officers' outside activities such as education and employment, due to variability in the work schedule (including shift changes)." Their responses, summarized in Table 2-10, suggest it is no problem or an infrequent problem in most departments.

Allowing officers to adjust their work schedule to meet outside activities complicates schedule design and administration. If accomplished, however, such accommodation can improve morale and productivity, or it may heighten problems of distance and withdrawal from patrol responsibilities.

²⁴ Question 45, Police Work Scheduling Survey, Appendix D.

²⁵ See Table 3-6, Frequency of Maximum Length Off-Duty Periods, p. 49.

TABLE 2-10

EXTENT OF PROBLEM ASSOCIATED WITH RESTRICTIONS ON OFFICERS' OUTSIDE ACTIVITIES, PERCENTAGE OF DEPARTMENTS BY JURISDICTION SIZE AND TYPE^a

Extent of Problem	Population or Type of Jurisdiction						
	More Than 250,000	100,000-250,000	50,000-100,000	25,000-50,000	10,000-25,000	Suburban County	Rural County
No Problem	35.3	40.9	21.4	47.1	52.9	21.4	31.4
Infrequent Problem	47.1	50.5	57.1	41.2	17.6	50.0	43.8
Occasional Problem	17.6	9.1	21.4	11.8	23.5	21.4	25.0
Frequent Problem	0.0	0.0	0.0	0.0	5.9	7.1	0.0
Totals	100.0 (N=17)	100.0 (N=22)	99.9b (N=14)	100.1b (N=17)	99.9b (N=17)	99.9b (N=14)	100.1b (N=16)

^aResponses to Question 45, Police Work Scheduling Survey, Appendix D.

^bPercentage total does not equal 100.0 due to roundoff.

Miscellaneous Personnel Matters

Work schedules influence the personal lives of officers which technically are not the concern of management. Yet if scheduling negatively impacts personal problems/situations, it may influence an officer's ability or willingness to do the job. What follows are examples of ways that a patrol division work schedule can effect an officer's personal life.

Spouse and family are a primary concern for most officers. It is generally known that an officer's work schedule has an impact upon the lives of family members. During a stress research project among patrol officers in the Cincinnati (Ohio) Police Department, 79 of 81 married

officers stated that police work does affect their homelife.²⁶ Married officers working twelve-hour shifts in Cincinnati reported they have no time for their family on workdays.

Spending habits can at times be influenced by a work schedule. Officers working in departments with 10 or 12 hour on-duty shifts sometimes report an increase in personal spending, reportedly because of access to more off-duty time for personal and family activities.²⁷ While not a responsibility of the police administrator, nevertheless, knowledge of this possible relationship might assist in understanding demands for salary increases that are associated with a particular schedule.

Administrators may also be concerned about psychological distance from the police job which may occur when the lengths of off-duty periods equal or even exceed the lengths of work periods (e.g., with 10-hour 4-day schedules or 12-hour shifts). When this occurs, the law enforcement job may begin to lose its primary place in the personal priorities of patrol officers. Secondary employment may begin to rival or even surpass police work in importance, while the officer becomes more difficult to reach while off-duty.

Surveyed departments were asked to indicate if there is a problem in "revising schedules to accommodate vacations, sick-time, comp-time, leaves, and other personal matters."²⁸ They responded:

No problem	- 17.1%
Infrequent problem	- 32.5%
Occasional problem	- 43.6%
Frequent problem	- 6.8%

Larger departments serving populations over 250,000 reported this to be much less of a problem--82% reported it is "No problem" or an "infrequent one."

²⁶See Kroes, Margolis, and Harrell, "Job Stress in Policemen" p. 151.

²⁷R. Gavney, J. Calderwood, and L. Knowles, "Attitude of Patrol Officers and Wives Toward a Four-Day Workweek," The Police Chief, (Feb. 1979) pp. 33-35.

²⁸Question 45, Police Work Scheduling Survey, Appendix D.

CHAPTER 3: POLICE WORK SCHEDULE REPRESENTATIONS AND PROPERTIES

Every schedule consists of many elements and possesses features and properties that can be used to compare one schedule with another. Often, however, police administrators find it difficult to make such comparisons. This occurs, in part, because they are not familiar with schedule properties that can be used for comparisons. Difficulties also arise because of the lack of a common vocabulary to describe police schedules.¹ Terms such as "work week," "shift," "platoon," "watch," and "day" are used in a variety of ways by police administrators.²

This chapter examines how police work schedules are represented and how they can be defined in terms of their properties. Each property is discussed in terms of its contribution to various scheduling objectives. Essential to the comparison of scheduling alternatives, this information should assist police administrators in (1) assessing current schedules, (2) searching for new schedules, and (3) evaluating alternatives.

Schedule Representation

Police administrators use an almost endless variety of ways to represent work schedules. Often displaying considerable imagination, most schemes are easy to understand after a brief orientation. For the uninitiated, however, deciphering some schedule representations can be difficult. Virtually all representations can be classified into one of three types. These are:

- duty cycle representations which show each officer's on- and off-duty assignments (and shift assignments if appropriate)

¹This problem was evident in some responses to the mail survey for this project. As an example, several departments, in response to a survey question about their "average work week," gave answers based on the "week" defined by their on- and off-duty pattern of assignments (e.g., in some agencies, the "week" is eight days long based on a 6 on - 2 off duty cycle).

²The reader is referred to Appendix A: A Glossary of Work Scheduling Terms.

without specifying either the day of the week or calendar date associated with each assignment;

- bracket representations which show an officer's shift and daily assignments for each day of the week; and
- calendar representations which show each employee's shift and daily assignments by date usually over an extended period of time.

Within each type of representation, numerous formats and notational schemes are used to indicate shift and on- and off-duty assignments. Shifts, for example, may be denoted by D (day); N (night); A (afternoon); G (graveyard); M (midnight); E (evening); S (swing); A, B, and C for shifts A, B, and C; or 1, 2, and 3 for shifts 1, 2, and 3. On-duty assignments, unless identified by a shift indicator, may be denoted by W (work), X, *, ON, or a blank. Off-duty assignments may be represented by R (rest or recreation day), O (off-duty), X, or OFF.

Duty Cycle Representations

Most police work schedules are based on a repeating pattern of on- and off-duty assignments. These repeating patterns, called "duty cycles," provide a simple way of representing schedules--especially if the length of the duty cycle (i.e., the number of days in the pattern) is not too long. Police schedules based on a 4 on - 2 off or 6 on - 3 off assignment are two examples of duty cycle patterns. The first cycle is six days long and the second is nine days long.

Duty cycle representations for police schedules usually illustrate the schedules of groups of officers sharing the same pattern of on- and off-duty assignments. One common representation shows assignments for a single group and it is implicitly understood that all other groups use the same duty cycle as the first, with the starting day shifted a certain number of days earlier or later in the pattern. Such a schedule is illustrated in Figure 3-1 for a duty cycle consisting of six on-duty assignments (denoted by D) followed by three off-duty days (denoted by R). In this format, the duty assignment for the group is shown on each day of the duty cycle. The pattern can be represented in a more compact form as

6D - 3R

which specifies the number of consecutive days for which the duty assignment is unchanged and the sequence of shift assignments and off-duty days. A duty cycle representation for a schedule with rotating shift assignments is illustrated in Figure 3-2. In this example, the duty

Day of the Duty Cycle

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>
D	D	D	D	D	D	R	R	R

FIGURE 3-1

6 ON - 3 OFF DUTY CYCLE REPRESENTATION FOR ONE GROUP

Day of the Duty Cycle

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>	<u>10</u>	<u>11</u>	<u>12</u>	<u>13</u>	<u>14</u>	<u>15</u>	<u>16</u>	<u>17</u>	<u>18</u>	<u>19</u>	<u>20</u>	<u>21</u>	<u>22</u>	<u>23</u>	<u>24</u>	<u>25</u>	<u>26</u>	<u>27</u>
D	D	D	D	D	D	R	R	R	A	A	A	A	A	A	R	R	R	N	N	N	N	N	N	R	R	R

FIGURE 3-2

THREE-SHIFT DUTY CYCLE REPRESENTATION FOR ONE GROUP

cycle is 27 days long and consists of on-duty periods (each six days long) on the day (D), afternoon (A), and night (N) shifts each followed by a three-day off-duty period. This duty cycle can also be represented as

6D - 3R - 6A - 3R - 6N - 3R.

As a final example, a duty cycle representation for a 22-day duty cycle schedule obtained from the Montclair (New Jersey) Police Department is shown in Figure 3-3. The duty cycle consists of five consecutive assignments on the day shift (M), two days off (O), five assignments on the afternoon shift (A), three days off, five assignments on the night shift (N), and two days off. In compact notation, this can be shown as

5M - 2O - 5A - 3O - 5N - 2O.

Notice that the representation shows the 22-day cycle for 22 different groups identified as squads in Figure 3-3.³

Bracket Representations

Bracket representations of police work schedules show on- and off-duty assignments displayed in segments, termed brackets, which are usually one week in length. In such a representation, the day of week corresponding to each duty assignment is indicated, but specific dates are not. A single officer or a group of officers may be assigned to each bracket. Also, officers may be permanently assigned to brackets, or they may rotate weekly or at some other fixed interval, from one bracket to the next.

Figures 3-4 and 3-5 illustrate alternative bracket representations for a work schedule in which six officers work 5 on - 2 off; two officers are off duty on Thursday and Friday, three are off duty on Friday and Saturday, and one is off duty on Saturday and Sunday. In Figure 3-4, the brackets defined by the three pairs of off-duty days are shown along with the numbers of officers assigned to each. Because only one shift is involved, on-duty days are denoted by a blank. Off-duty days are indicated with an R. If bracket assignments remain fixed from week to week, the format illustrated in Figure 3-5 can be interpreted either as showing the permanent bracket assignment for each officer, or if bracket assignments are rotated periodically (e.g., weekly), as showing the sequence of brackets which each officer will work in succeeding weeks. Thus, an officer might begin by working bracket 1 for a week, then

³Additional examples of duty cycle representations are shown in figures C-1 through C-3 in Appendix C.

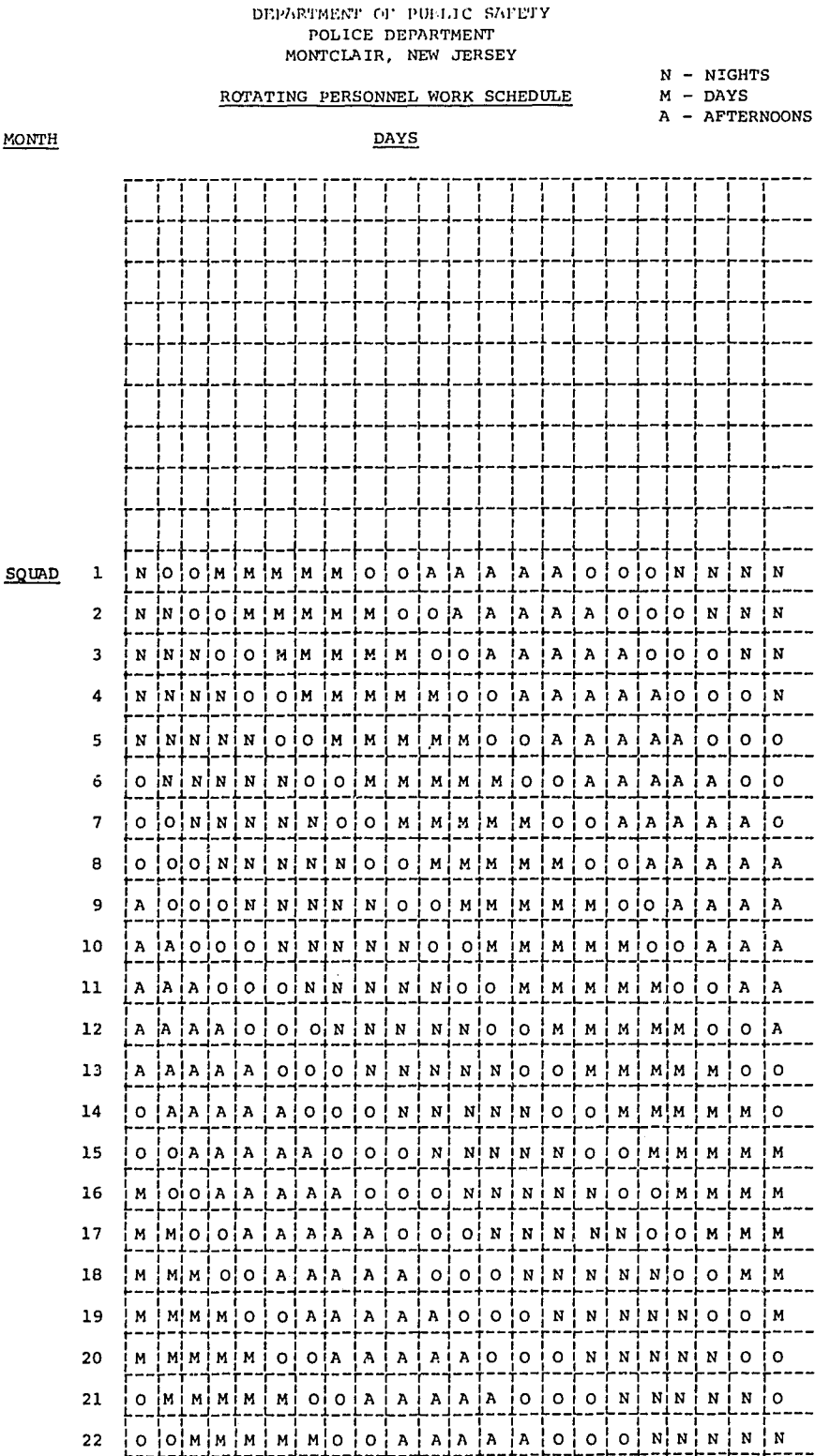


FIGURE 3-3
DUTY CYCLE REPRESENTATION OF A 22-DAY DUTY CYCLE SCHEDULE,
MONTCLAIR (NEW JERSEY) POLICE DEPARTMENT

Number of Officers	M	T	W	T	F	S	S
2				R	R		
3					R	R	
1						R	R

FIGURE 3-4
BRACKET REPRESENTATION SHOWING THE NUMBER OF OFFICERS
ASSIGNED TO EACH BRACKET

Bracket or Week	M	T	W	T	F	S	S
1				R	R		
2				R	R		
3					R	R	
4					R	R	
5					R	R	
6						R	R

FIGURE 3-5
BRACKET REPRESENTATION SHOWING THE BRACKET ASSIGNED TO EACH OFFICER
OR THE BRACKET ASSIGNED TO A SINGLE OFFICER IN SUCCESSIVE WEEKS

rotate to bracket 2 for a week, then bracket 3 for a week, etc. After working bracket 6 for a week, the officer would rotate back to bracket 1.

An example of a bracket representation obtained from the mail survey is shown in Figure 3-6. The schedule uses the notation "ON" and "OFF" to specify a 5 on - 2 off schedule for each officer.⁴ This schedule was obtained from the Bernalillo County (New Mexico) Sheriff's Department.⁵

Calendar Representations

Calendar representations of police work schedules show officers' daily assignments for specific dates up to a full year ahead. Some show the assignments of individual groups of identically-scheduled officers, while others show the groups which are assigned to each shift and those which are off duty for each day of the period covered. Two formats obtained from departments surveyed for this report are illustrated in figures 3-7 and 3-8.

The representation in Figure 3-7, obtained from the Chesapeake (Virginia) Police Department, illustrates a four-group schedule in which each group rotates to a new shift each time it begins a new on-duty period. The schedule covers the first six months of 1981. Figure 3-8 illustrates the calendar representation for the 1981 schedule used by the Hempstead (New York) Police Department. The schedule uses 22 squads to staff a 5 on - 2 off - 5 on - 3 off - 5 on - 2 off duty cycle with rotating shift assignments.⁶ To determine squad shift assignments for May 26th, for example, the row corresponding to this date is located in the chart. Reading across the row, the last three columns indicate that squads 5, 6, 7, 8, and 9 will be on-duty on the 12 (midnight) to 8 a.m. shift; squads 1, 2, 20, 21, and 22 will be on the 8 a.m. - 4 p.m. shift; and squads 13, 14, 15, 16, and 17 will be on the 4 p.m. - 12 (midnight) shift. The seven squads not identified: 3, 4, 10, 11, 12, 18, and 19 will be off duty.

⁴The reader may note that the summary of the number of on- and off-duty officers presented at the bottom of Figure 3-6 is not consistent with the schedule shown above. The schedule shows that three officers' will be off duty on both Wednesday and Friday while the summary indicates that four will be off on Wednesday and only two will be off duty on Friday.

⁵Additional examples of bracket representations are shown in figures B-1 through B-11 in Appendix B and in figures C-4 and C-5 in Appendix C.

⁶Additional calendar representations obtained from the mail survey are shown in figures C-6 through C-11 in Appendix C.

	<u>G R A V E Y A R D</u>		<u>S H I F T</u>		<u>P A T R O L</u>		
	<u>R E G U L A R</u>		<u>D A Y ' S</u>		<u>O F F</u>		
	<u>SATURDAY</u>	<u>SUNDAY</u>	<u>MONDAY</u>	<u>TUESDAY</u>	<u>WEDNESDAY</u>	<u>THURSDAY</u>	<u>FRIDAY</u>
Lt. E. Montoya	ON	OFF	OFF	ON	ON	ON	ON
Sgt. Candelaria	ON	OFF	OFF	ON	ON	ON	ON
Sgt. Lundy	OFF	ON	ON	ON	ON	ON	ON
Ptln. A. Brads	OFF	OFF	ON	ON	ON	ON	OFF
Ptln. P. Bustamante	OFF	ON	ON	ON	ON	ON	ON
Ptln. B. Ford	ON	ON	ON	OFF	OFF	ON	OFF
Ptln. A. Herrera	OFF	OFF	ON	ON	ON	ON	ON
Ptln. J. Landavazo	ON	OFF	OFF	ON	ON	ON	ON
Ptln. E. Nestor	OFF	ON	ON	ON	ON	ON	ON
Ptln. J. Phalen	ON	ON	OFF	OFF	ON	ON	OFF
Ptln. E. Rosales	ON	OFF	OFF	ON	ON	ON	ON
Ptln. W. Sadler	ON	ON	ON	OFF	OFF	ON	ON
Ptln. R. Scott	ON	ON	OFF	OFF	ON	ON	ON
Ptln. M. Wiggins	ON	ON	ON	OFF	OFF	ON	ON
Saturday (9 ON/5 OFF)	Sunday (8 ON/6 OFF)		Monday (8 ON/6 OFF)		(Tuesday 9 ON/5 OFF)		
Wednesday (10 ON/4 OFF)	Thursday (14 ON/0 OFF)		Friday (12 ON/2 OFF)				

FIGURE 3-6
BRACKET REPRESENTATION FOR A 5 ON - 2 OFF SCHEDULE, ONE OFFICER PER BRACKET,
BERNALILLO COUNTY (NEW MEXICO) SHERIFF'S DEPARTMENT

1981	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
JAN.																															
A	O	E	E	E	E	E	E	E	O	O	O	D	D	D	D	D	D	D	O	O	N	N	N	N	N	N	N	O	O	E	E
B	E	O	O	O	D	D	D	D	D	D	D	O	O	N	N	N	N	N	N	N	O	O	E	E	E	E	E	E	E	O	O
C	D	D	D	D	O	O	N	N	N	N	N	N	N	O	O	E	E	E	E	E	E	E	O	O	O	D	D	D	D	D	D
D	N	N	N	N	N	N	O	O	E	E	E	E	E	E	E	O	O	O	D	D	D	D	D	D	D	O	O	N	N	N	N
FEB.																															
A	E	E	E	E	E	O	O	O	D	D	D	D	D	D	D	O	O	N	N	N	N	N	N	N	N	O	O	E	E		
B	O	D	D	D	D	D	D	D	O	O	N	N	N	N	N	N	N	O	O	E	E	E	E	E	E	E	O	O			
C	D	O	O	N	N	N	N	N	N	N	O	O	E	E	E	E	E	E	E	O	O	O	D	D	D	D	D	D	D	D	D
D	N	N	N	O	O	E	E	E	E	E	E	E	O	O	O	D	D	D	D	D	D	D	O	O	N	N	N	N			
MARCH																															
A	E	E	E	E	E	O	O	O	D	D	D	D	D	D	D	O	O	N	N	N	N	N	N	N	N	O	O	E	E	E	E
B	O	D	D	D	D	D	D	D	O	O	N	N	N	N	N	N	N	O	O	E	E	E	E	E	E	E	E	O	O	O	D
C	D	O	O	N	N	N	N	N	N	N	O	O	E	E	E	E	E	E	E	O	O	O	D	D	D	D	D	D	D	D	O
D	N	N	N	O	O	E	E	E	E	E	E	E	O	O	O	D	D	D	D	D	D	D	O	O	N	N	N	N	N	N	N
APRIL																															
A	E	E	O	O	O	D	D	D	D	D	D	D	O	O	N	N	N	N	N	N	N	N	N	O	O	E	E	E	E	E	E
B	D	D	D	D	D	O	O	N	N	N	N	N	N	N	N	O	O	E	E	E	E	E	E	E	O	O	O	D	D	D	D
C	N	N	N	N	N	N	N	O	O	N	E	E	E	E	E	E	O	O	O	D	D	D	D	D	D	D	D	D	O	O	N
D	O	O	E	E	E	E	E	E	E	O	O	O	D	D	D	D	D	D	D	O	O	N	N	N	N	N	N	N	N	O	O
MAY																															
A	O	O	O	D	D	D	D	D	D	D	O	O	N	N	N	N	N	N	N	O	O	E	E	E	E	E	E	E	O	O	O
B	D	D	D	O	O	N	N	N	N	N	N	N	O	O	E	E	E	E	E	E	E	E	O	O	O	D	D	D	D	D	D
C	N	N	N	N	N	O	O	E	E	E	E	E	E	E	O	O	O	D	D	D	D	D	D	D	O	O	N	N	N	N	N
D	E	E	E	E	E	E	E	O	O	O	D	D	D	D	D	D	D	O	O	N	N	N	N	N	N	N	O	O	E	E	E
JUNE																															
A	D	D	D	D	D	D	D	O	O	N	N	N	N	N	N	N	O	O	E	E	E	E	E	E	E	E	O	O	O	D	D
B	O	O	N	N	N	N	N	N	N	O	O	E	E	E	E	E	E	E	O	O	O	D	D	D	D	D	D	D	O	O	O
C	N	N	O	O	E	E	E	E	E	E	E	O	O	O	D	D	D	D	D	D	O	O	N	N	N	N	N	N	N	N	N
D	E	E	E	E	O	O	O	D	D	D	D	D	D	D	O	O	N	N	N	N	N	N	N	N	O	O	E	E	E	E	E

FIGURE 3-7
CALENDAR REPRESENTATION FOR A FOUR-GROUP SCHEDULE (7D - 20 - 7N - 20 - 7E - 30),
CHESAPEAKE (VIRGINIA) POLICE DEPARTMENT

Personnel after June 1, 1977
249 DAY CHART

HEMPSTEAD POLICE DEPARTMENT
1981 SQUAD CHART FOR POLICE OFFICERS
22 SQUADS

JAN.	FEB.	MAR.	APRIL	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	12 - 8	8 - 4	4 - 12
1-23	14	8-30	21	13	4-26	18	9-31	22	14	5-27	19	14-15-16-17-18	7-8-9-10-11	22-1-2-3-4
2-24	15	9-31	22	14	5-27	19	10	1-23	15	6-28	20	15-16-17-18-19	8-9-10-11-12	1-2-3-4-5
3-25	16	10	1-23	15	6-28	20	11	2-24	16	7-29	21	16-17-18-19-20	9-10-11-12-13	2-3-4-5-6
4-26	17	11	2-24	16	7-29	21	12	3-25	17	8-30	22	17-18-19-20-21	10-11-12-13-14	3-4-5-6-7
5-27	18	12	3-25	17	8-30	22	13	4-26	18	9	1-23	18-19-20-21-22	11-12-13-14-15	4-5-6-7-8
6-28	19	13	4-26	18	9	1-23	14	5-27	19	10	2-24	19-20-21-22-1	12-13-14-15-16	5-6-7-8-9
7-29	20	14	5-27	19	10	2-24	15	6-28	20	11	3-25	20-21-22-1-2	13-14-15-16-17	6-7-8-9-10
8-30	21	15	6-28	20	11	3-25	16	7-29	21	12	4-26	21-22-1-2-3	14-15-16-17-18	7-8-9-10-11
9-31	22	16	7-29	21	12	4-26	17	8-30	22	13	5-27	22-1-2-3-4	15-16-17-18-19	8-9-10-11-12
10	1-23	17	8-30	22	13	5-27	18	9	1-23	14	6-28	1-2-3-4-5	16-17-18-19-20	9-10-11-12-13
11	2-24	18	9	1-23	14	6-28	19	10	2-24	15	7-29	2-3-4-5-6	17-18-19-20-21	10-11-12-13-14
12	3-25	19	10	2-24	15	7-29	20	11	3-25	16	8-30	3-4-5-6-7	18-19-20-21-22	11-12-13-14-15
13	4-26	20	11	3-25	16	8-30	21	12	4-26	17	9-31	4-5-6-7-8	19-20-21-22-1	12-13-14-15-16
14	5-27	21	12	4-26	17	9-31	22	13	5-27	18	10	5-6-7-8-9	20-21-22-1-2	13-14-15-16-17
15	6-28	22	13	5-27	18	10	1-23	14	6-28	19	11	6-7-8-9-10	21-22-1-2-3	14-15-16-17-18
16	7	1-23	14	6-28	19	11	2-24	15	7-29	20	12	7-8-9-10-11	22-1-2-3-4	15-16-17-18-19
17	8	2-24	15	7-29	20	12	3-25	16	8-30	21	13	8-9-10-11-12	1-2-3-4-5	16-17-18-19-20
18	9	3-25	16	8-30	21	13	4-26	17	9-31	22	14	9-10-11-12-13	2-3-4-5-6	17-18-19-20-21
19	10	4-26	17	9-31	22	14	5-27	18	10	1-23	15	10-11-12-13-14	3-4-5-6-7	18-19-20-21-22
20	11	5-27	18	10	1-23	15	6-28	19	11	2-24	16	11-12-13-14-15	4-5-6-7-8	19-20-21-22-1
21	12	6-28	19	11	2-24	16	7-29	20	12	3-25	17	12-13-14-15-16	5-6-7-8-9	20-21-22-1-2
22	13	7-29	20	12	3-25	17	8-30	21	13	4-26	18	13-14-15-16-17	6-7-8-9-10	21-22-1-2-3

BY ORDER OF: Thomas H. Smith CHIEF OF POLICE
1. Vincent Neefus Jr. 4. Peter Mc Namara 7. John O'Leary 10. Thomas J. Durnan
2. Stephen Oreszczyn 5. Stephen Johnston 8. William E. Demarest 11. Douglas Quednau
3. Michael T. Mc Gowan 6. Frank K. Edwards 9. John D'Aurio

FIGURE 3-8

CALENDAR REPRESENTATION FOR A ROTATING SHIFT ASSIGNMENT SCHEDULE
(5(8-4) - 2R - 5(4-12) - 3R - 5(12-8) - 2R),
HEMPSTEAD (NEW YORK) POLICE DEPARTMENT

Schedule Properties

This section examines basic schedule properties which can be used to compare and assess the relative merits of different scheduling alternatives. The properties examined include duty cycle, on-duty periods, off-duty periods, shift characteristics, staffing properties, and average work week. In addition to defining and illustrating each property, this discussion draws extensively upon information about police scheduling practices collected during the preparation of this report.

Duty Cycle

As indicated above, the repeating pattern of on- and off-duty assignments in a schedule is called a duty cycle. A 4 on - 2 off duty cycle, for example, can be represented as WWWRRR where W represents an on-duty day and R represents an off-duty day. The same duty cycle can also be represented as RWWWR or RRWWW or any other way obtainable by rotating the assignments in the original pattern one or more positions to the right or left. Groups of officers following the same duty cycle may be at different points in the cycle. As an example, if one group is working the first assignment in the pattern WWWRRR (i.e., the first of four consecutive on-duty assignments), another group may be at the fifth assignment in the pattern (i.e., the first of two consecutive off-duty days).

The key properties of duty cycle patterns are (1) the length of the duty cycle, (2) the number and lengths of consecutive on- and off-duty periods within the cycle, (3) staffing levels by shift and day of the week, and (4) the average work week.

Duty cycle length. The length of a duty cycle equals the number of days required for the cycle to repeat itself on the same shift. As an example, a 4 on - 2 off duty cycle, used on one shift only, begins to repeat itself after six days. Thus, the duty cycle length is six days. If, however, the 4 on - 2 off pattern is used to rotate through three shifts (e.g., 4D - 2R - 4N - 2R - 4A - 2R), then the duty cycle length becomes 18 days since it takes that long for the pattern to repeat itself on the same shift. The number of groups or squads that can be assigned to a duty cycle pattern can never exceed the number of days in the duty cycle length. (The number of groups, however, may be less than this maximum.) Hence, in the two examples given above, no more than six groups can be assigned to a one-shift, 4 on - 2 off duty cycle schedule, and no more than 18 to the three-shift pattern.

Week cycle. The week cycle answers the question: How many weeks must the

duty cycle pattern be repeated before it comes out to a whole number of weeks? Obviously, if the duty cycle length is a multiple of seven (i.e., 7, 14, 21, etc.), every pass through the pattern will take a whole number of weeks. For that special case, the week cycle in weeks, equals one-seventh of the duty cycle length in days. For example, a 5D - 2R pattern has a duty cycle length of 7 days and a week cycle of 1 week.

If the duty cycle is not a multiple of seven, however, the week cycle in weeks, equals the duty cycle length in days. As an example, for the pattern WWWRRR, the week cycle is six weeks long since the duty cycle is six days long (and not a multiple of 7). Figure 3-9 shows the 4W - 2R duty cycle pattern repeated over six weeks.

Schedules that have duty cycle lengths that are not multiples of seven are called unlocked schedules. Every unlocked duty cycle schedule possesses the following properties:

- The duty cycle repeats itself exactly seven times during the week cycle.

	M	T	W	T	F	S	S
1	W	W	W	W	R	R	W
2	W	W	W	R	R	W	W
3	W	W	R	R	W	W	W
4	W	R	R	W	W	W	W
5	R	R	W	W	W	W	R
6	R	W	W	W	W	R	R

FIGURE 3-9
WEEK CYCLE FOR THE DUTY CYCLE WWWRRR

- During each week cycle, each officer (or group of officers) is on- and off-duty exactly the same number of times as every other officer (or group) using the same schedule.
- During each week cycle, each officer (or group of officers) is on- and off-duty exactly the same number of times on each day of the week.

These properties are illustrated in Figure 3-9. The six-day pattern repeats itself exactly seven times, every officer following the schedule will be on- and off-duty exactly the same number of times as every other officer, and every officer will be on-duty four times and off-duty two times on each day of the week over the six-week period.

The term "unlocked" is used to denote the fact that when the duty cycle length is not a multiple of seven, the on- and off-duty periods in the duty cycle are not fixed or "locked" to specific days of the week. In fact, in unlocked duty cycle schedules, each on- and off-duty period begins on a different day of the week each time it appears in the week cycle. This property is also illustrated in Figure 3-9. The six-day pattern WWWRRR contains one four-day on-duty period and one two-day off-duty period. Over the six-week cycle, each of these periods appear seven times, each time on a different set of days.

When the duty cycle length is a multiple of seven, the schedule is said to be locked and the on- and off-duty assignments for individual officers may not distribute themselves equally over all days of the week or in the same way for all officers. Each on- and off-duty period is "locked" to specific days of the week. Consider the locked 5W - 2R schedule in Figure 3-10. The five-day on-duty period is locked on Monday through Friday and the two-day off-duty period is locked on Saturday and Sunday. Repeating the seven-day duty cycle over several weeks does not change the distribution of on- and off-duty assignments over the days of the week. Several additional examples of locked and unlocked duty cycle schedules are presented in figures B-5 through B-11 (pages 153-159).

Duty cycle schedules are extensively used for police work scheduling in the United States. Based on data obtained from the mail survey conducted for this report, over 96% of all police work schedules are based on duty cycle patterns, and among these, approximately 70% are locked and 30% are unlocked (see Table 3-1). The ranges of duty cycle lengths for both locked and unlocked schedules obtained from the survey are summarized in tables 3-2 and 3-3. Among locked schedules, almost three-fourths have 7-day brackets and most of these are 5 on - 2 off patterns.⁷

⁷"5 on - 2 off" duty cycle schedules represented 42.4% of all patrol division work schedules obtained from the mail survey.

	M	T	W	T	F	S	S
1	W	W	W	W	W	R	R
2	W	W	W	W	W	R	R
3	W	W	W	W	W	R	R
4	.	.	.				

FIGURE 3-10
LOCKED SCHEDULE WITH THE DUTY CYCLE 5W - 2R

TABLE 3-1
FREQUENCY OF DUTY CYCLE POLICE WORK SCHEDULES,
LOCKED AND UNLOCKED

	Number of Schedules	Percentage
Duty Cycle, Locked	87	69.6
Duty Cycle, Unlocked	34	27.2
Duty Cycle, Total	121	96.8
No Set Pattern	4	3.2
Totals	125 ^a	100.0

^aResponses from 119 police departments for Police Work Scheduling Survey. Six departments submitted two schedules for patrol operations.

TABLE 3-2
DUTY CYCLE LENGTHS FOR LOCKED WORK SCHEDULES

Duty Cycle Lengths, Days	Number of Departments	Percentage
7	65 ^a	74.7
14	1	1.1
21	1	1.1
28	6	6.9
35	2	2.3
42	2	2.3
49	8	9.2
56	1	1.1
63	1	1.1
Totals	87	99.8 ^b

^aThe 65 responses consisted of 53 (5 on - 2 off) and 12 (4 on - 3 off) schedules.

^bTotal percentage does not equal 100.0 due to roundoff of individual elements.

On-Duty Periods

On-duty periods are defined as consecutive on-duty days. The lengths of on-duty periods in a duty cycle (i.e., number of days) may be uniform or may vary. Period lengths can be identified by examining the duty cycle pattern. For example, the pattern 4D - 2R contains only one 4-day on-duty period. The duty cycle schedule represented by 7D - 2R - 8D - 4R, however, contains two on-duty periods; one is seven days long and the second is eight days long. Since on-duty period lengths may affect officer performance or morale, consideration of a work schedule should include identification of the following features:

- maximum and minimum lengths of on-duty periods experienced by each group of officers;
- frequency with which each group experiences on-duty periods of various lengths; and

TABLE 3-3

DUTY CYCLE LENGTHS FOR UNLOCKED WORK SCHEDULES

Duty Cycle Lengths, Days	Departments	Percentage
4	1	2.9
6	10	29.4
8	3	8.8
9	5	14.7
13	3	8.8
15	3	8.8
22	4	11.8
23	1	2.9
24	2	5.9
45	1	2.9
48	1	2.9
Totals	34	99.8 ^a

^aTotal percentage does not equal 100.0 due to roundoff of individual elements.

- distribution of maximum and minimum length on-duty periods throughout the week cycle.

Police agencies included in the mail survey for this project were asked about the maximum and minimum length on-duty periods in their schedules and how frequently these occur. Their responses are summarized in tables 3-4 and 3-5. The most common maximum on-duty period length is 5 days which reflects the fact that a large number of police departments use 5 on - 2 off schedules.

Off-Duty Periods

Off-duty periods consist of consecutive off-duty days. The length of off-duty periods in a duty cycle (i.e., number of days) may be uniform or may vary, and can be identified by examining the duty cycle pattern. As examples, consider the duty cycles 4D - 2R and 7D - 2R - 8D - 3R.

TABLE 3-4

FREQUENCY OF MAXIMUM LENGTH ON-DUTY PERIODS^a

On-Duty Period Length, Days	Frequency					Total	(%)
	Weekly	Bi-Weekly	Monthly	Quarterly	Less Than Quarterly		
3	2	0	0	0	0	2	(1.9)
4	9	1	0	0	1	11	(10.6)
5	39	3	4	1	5	52	(50.0)
6	12	1	3	1	0	17	(16.3)
7	5	0	4	1	3	13	(12.5)
8	0	0	1	3	2	6	(5.8)
10	0	0	0	0	2	2	(1.9)
20	0	0	0	1	0	1	(1.0)
Total (%)	67 (64.4)	5 (4.8)	12 (11.5)	7 (6.7)	13 (12.5)	104 ^b (99.9) ^c	(100.0)

^aResponses to questions 7 and 9, Police Work Scheduling Survey, Appendix D.

^bDoes include 15 incomplete responses.

^cTotal percentage does not equal 100.0 due to roundoff of individual elements.

TABLE 3-5

FREQUENCY OF MINIMUM LENGTH ON-DUTY PERIODS^a

On-Duty Period Length, Days	Frequency					Total	(%)
	Weekly	Bi-Weekly	Monthly	Quarterly	Less Than Quarterly		
1	0	0	0	0	5	5	(4.7)
2	1	1	0	1	1	4	(3.7)
3	2	1	0	2	0	5	(4.7)
4	19	2	2	3	2	28	(26.2)
5	36	0	10	3	3	52	(48.6)
6	6	1	1	0	0	8	(7.5)
7	3	0	0	0	2	5	(4.7)
Total (%)	67 (62.6)	5 (4.7)	13 (12.1)	9 (8.4)	13 (12.1)	107 ^b (99.9) ^c	(100.1)

^aResponses to questions 10 and 12, Police Work Scheduling Survey, Appendix D.

^bDoes include 12 incomplete responses.

^cTotal percentage does not equal 100.0 due to roundoff of individual elements.

The first contains only one 2-day off-duty period while the second contains two periods; the first is two days long and the second is three days long.

The properties of off-duty periods are among the most important characteristics to consider in assessing a schedule. Key features to examine include:

- maximum and minimum lengths of off-duty periods experienced by each group of officers;
- frequency with which each group experiences off-duty periods of various lengths;
- distribution of maximum and minimum length off-duty periods throughout the week cycle;
- whether long on-duty periods (e.g., six or seven days) are followed by long off-duty periods (e.g., three or four days); and
- frequency within the week cycle with which combinations of the days of the week are included in off-duty periods (e.g., the number of times officers are off duty on Friday through Sunday, Tuesday and Wednesday, etc.).

Police agencies responding to the mail survey were asked about the maximum length of the off-duty periods in their schedules and the frequency with which these occur. Their responses are summarized in Table 3-6.

Fixed and rotating days off. An important property of work schedules is whether off-duty assignments for individual officers fall on the same days each week or whether they change periodically. Schedules that give the same days off each week are said to be "fixed days-off schedules." Schedules that provide periodic changes in off-duty assignments are termed "rotating days-off schedules." The relationship between fixed and rotating days-off schedules and locked and unlocked duty cycle schedules is summarized in Table 3-7. Fixed days-off schedules can only be obtained by using locked duty cycle schedules with seven-day duty cycles (e.g., 5 on - 2 off or 4 on - 3 off). Rotating days-off schedules can be obtained in two ways: either with a locked schedule with a duty cycle length that is greater than 7 days or with any unlocked duty cycle schedule. Examples of both kinds of schedules are illustrated using bracket representations in Appendix B. The first four schedules, shown in figures B-1 through B-4 (pages 149-152), are fixed days-off schedules. All are locked with 7-day duty cycles. The seven schedules in figures B-5 through B-11 (pages 153-159) are rotating days-off schedules; those in figures B-5, B-7, and B-11 are locked and those in figures B-6, B-8, B-9, and B-10 are unlocked.

TABLE 3-6
FREQUENCY OF MAXIMUM LENGTH OFF-DUTY PERIODS^a

Off-Duty Period Length, Days	Frequency					Total (%)	
	Every Work Period	Bi-weekly	Monthly	Quarterly	Less Than Quarterly		
2	42	1	2	1	2	48	(43.2)
3	15	6	11	1	0	33	(29.7)
4	4	0	8	5	5	22	(19.8)
5	0	0	0	2	1	3	(2.7)
More than 5	1	0	2	1	1	5	(4.5)
Total (%)	62 (55.9)	7 (6.3)	23 (20.7)	10 (9.0)	9 (8.1)	111 ^b (100.0)	(99.9) ^c

^aResponses to questions 17 and 18, Police Work Scheduling Survey, Appendix C.

^bDoes include 8 incomplete responses.

^cTotal percentage does not equal 100.0 due to roundoff of individual elements.

TABLE 3-7
RELATIONSHIP BETWEEN FIXED AND ROTATING DAYS-OFF SCHEDULES AND LOCKED AND UNLOCKED SCHEDULES

	Fixed Days-Off Schedule	Rotating Days-Off Schedule
Locked Schedule, 7-Day Duty Cycle Length	Yes	No
Locked Schedule, Duty Cycle Length Greater Than 7	No	Yes ^a
Unlocked Schedule, Any Duty Cycle Length	No	Yes ^a

^aPattern of days off is completed once in every week cycle.

Weekend off-duty periods. Off-duty periods that include both Saturday and Sunday are of particular interest to most police officers. The frequency of such weekend off-duty periods can be determined by drawing out the schedule over the week cycle and simply counting the number of off-duty weekends. For unlocked schedules, the number of weekend off-duty periods can also be determined by counting the total number of off-duty days and the total number of off-duty periods in the duty cycle pattern and subtracting the latter from the former. The result is the number of off-duty weekends per week cycle. For example, a schedule with the 15-day duty cycle

WWWWRRWWWWRRR or 5W - 2R - 5W - 3R

has five off-duty days and two off-duty periods per duty cycle, and will provide

$5 - 2 = 3$ weekend off-duty periods

per week cycle (15 weeks). This can be verified by drawing out the schedule's week cycle (see Figure B-10 in Appendix B, page 158).

As important as weekend time off would appear to be for family life, it is not a benefit that is uniformly enjoyed by all police officers. In response to the mail survey, more than 34% of all responding departments indicated that some officers do not receive any weekends off, and 48% responded that all officers do not receive the same number of weekends off.⁸

Shift Characteristics

A shift is one of the sets of hours into which a day is divided for scheduling purposes.⁹ Important schedule properties related to shifts are (1) the shift length, (2) the number of shifts used per day, (3) shift starting times, and (4) whether officer shift assignments are fixed or rotating.

Shift length is the total number of hours included in each shift. Thus, a shift that begins at 7:00 a.m. and ends at 3:00 p.m., is eight hours in length. This is the most commonly used shift length, although 10, 11,

⁸Responses to questions 19 and 20, Police Work Scheduling Survey, Appendix D.

⁹The terms "shift" and "watch" can be used interchangeably. "Shift" is sometimes used to identify on-duty assignments as in "each officer works five shifts per week." See definition of "shift" in Appendix A.

and even 12-hour shifts are also used for police work. Schedules in which employees report at different times during the day are termed multishift schedules. The latter can be further classified as two-shift schedules, three-shift schedules, etc., according to the number of shifts used per day.¹⁰

When multiple shifts are used, shift starting times, as well as their lengths, must be known to determine whether the shifts are overlapping or non-overlapping. Shifts overlap when the starting time of one shift occurs between the starting and ending times of another shift. Overlapping shifts are used to provide additional officers at certain times of the day. The two most frequent ways of using overlapping shifts in police scheduling are (1) three 10-hour shifts per day or (2) a fourth shift, usually 6 or 8-hours long, in addition to three 8-hour shifts.¹¹

The number of hours of overlapping coverage per day can be determined by summing the lengths of all shifts and subtracting 24 hours. Hence, three 10-hour shifts will provide six hours of overlap per day (i.e., $3 \times 10 = 30$, $30 - 24 = 6$ hours), and a fourth shift, 8-hours long, used with three regular 8-hour shifts will provide eight hours of overlap per day (i.e., $4 \times 8 = 32$ hours, $32 - 24 = 8$ hours). The number of on-duty officers during hours of overlap can be determined by summing the number of officers that are on duty on each of the overlapping shifts.

Police agencies responding to the mail survey revealed that a large number (33.5%) use more than three shifts (see Table 3-8), and approximately 25% use shift lengths other than eight hours (see Table 3-9). Over 62% indicated that they use staggered starting hours with 15, 30, and 60 minutes being the most popular overlaps.¹²

Another important property of multishift schedules is whether an officer's shift assignments are fixed or rotating. When rotating shift assignments are used, key properties are (1) the shift rotation sequence, (2) the frequency of rotation, and (3) the amount of time off between shift changes. Rotation sequence is the order in which officers are assigned

¹⁰Officer reporting times are sometimes staggered at a shift change to minimize service disruptions. For example, officers assigned to the day shift (e.g., 7:00 a.m. to 3:00 p.m.) may actually report for duty at various times between 6:00 a.m. and 8:00 a.m.

¹¹A variety of labels are used to identify overlapping shifts including "power shifts," "swing shifts," etc.

¹²Responses to Question 6, Police Work Scheduling Survey, Appendix D.

TABLE 3-8
NUMBER OF SHIFTS^a

Number of Shifts	Number of Departments	Percentage
2	3	2.6
3	74	63.8
4	28	24.1
5	7	6.0
6	4	3.4
Totals	116 ^b	99.9 ^c

^aResponses to Question 4, Police Work Scheduling Survey, Appendix D.

^bDoes not include three non-responses.

^cTotal percentage does not equal 100.0 because of roundoff of individual elements.

to each shift. Thus, a schedule that requires each officer to rotate from the day (D) shift to the night (N) shift to the afternoon (A) shift before returning to the day shift is said to follow a D-N-A shift rotation sequence. Off-duty periods which occur between on-duty assignments on different shifts determine how many hours off are given at each shift change. Ideally the number of off-duty hours should be sufficient to allow adjustment to new hours and to provide adequate rest before returning to duty. Off-duty periods of less than 16 hours at a shift change are termed short changeovers which can be avoided with some schedules. The number of off-duty hours at changeover depends, not only on the number of days in the off-duty period, but also on shift lengths and the shift rotation sequence.

Among departments responding to the mail survey, 65% indicated that they use rotating shift assignments.¹³ Rotation frequencies for these departments are presented in Table 2-1 (page 11). Among the 35% of departments

¹³Responses to Question 13, Police Work Scheduling Survey, Appendix D.

TABLE 3-9
SHIFT LENGTH FOR THE FIRST SHIFT, HOURS^a

Shift Length, Hours ^b	Number of Departments	Percentage
7	3	2.5
8	87	73.7
9	11	9.3
10	13	11.0
11	1	0.9
12	3	2.5
	118 ^c	99.9 ^d

^aResponses to Question 5a, Police Work Scheduling Survey, Appendix D.

^bShift lengths are rounded to the nearest hour.

^cDoes not include one non-response.

^dTotal percentage does not equal 100.0 because of roundoff of individual elements.

that reported using permanent shift assignments, many have regularly-scheduled periods (e.g., every six months or annually) when changes in shift assignments can be requested. This is a widely-used procedure in conjunction with 5 on -2 off schedules where both shift and schedule bracket assignments are periodically opened for change upon request.¹⁴

Staffing Level Characteristics

A schedule group is one or more officers sharing identical on-duty shift assignments and off-duty days. The number of groups into which the patrol force is divided can have a significant impact on the distribution of on-duty officers by day of week and shift. The number of officers assigned to each group also affects the distribution of on-duty

¹⁴The request for change is often called "bidding" since approval may depend upon requests received from other officers.

officers by day of week and shift, as well as whether this distribution remains constant from week to week. The number of officers assigned to each group may be the same for all groups or it may vary among the groups. Officers assigned to a group may have equivalent skills and rank or they may represent a variety of experiences and ranks. Assignment of officers with different seniority levels to each group may be done to insure that officers with different experience levels are on duty at all times.

Within each schedule group, complete team integrity is achieved (i.e., all officers within a group have the same on- and off-duty assignments). A special type of police work schedule that produces perfect team integrity is a platoon schedule. A platoon is a group of officers whose duty assignments are such that whenever the group is on duty, all other groups are off duty. A schedule is termed a platoon schedule if all schedule groups are platoons. A four-platoon schedule is illustrated in Figure 3-7 (page 39). Notice that four groups are used and that only one group is on duty on each shift per day. (Alternative representations of this same schedule are presented in Figure B-5 on page 153 and in Figure C-7 on page 173.)

The degree to which unity of command can be achieved also depends on the number of groups and the type of schedules used by supervisory personnel. Complete unity of command is obtained when a supervisor and all subordinates are assigned to the same schedule group (i.e., each officer has the same supervisor on every on-duty day). If supervision is extended over several groups or supervisors work different schedules, unity of command is weakened.

On-duty staffing is specified in terms of the number of groups or officers that are on duty by day of week and shift. If shifts overlap, on-duty staffing will also vary by time of day within shifts. Staffing levels can be determined for any date and time of day by identifying which groups are scheduled to be on duty, and summing the number of officers assigned to these groups.

If the number of on-duty officers is the same whenever service is offered, staffing is said to be uniform. Otherwise, the staffing is said to be variable by time of day, day of week, or both. Staffing levels are said to be proportional if they match cyclical variations in the demand for service. Minor but unwanted cyclical variations in on-duty staffing by day of week and shift sometimes result when the numbers of officers assigned to each group in a duty cycle schedule are not equal. Proportional staffing by time of day is achieved by assigning different numbers of officers to each shift according to shift workloads or by using overlapping shifts. Proportional staffing by day of week is achieved by

assigning different numbers of officers to be on duty on each day according to daily workloads or by scheduling Kelly Days or payback days on particular days of the week. (Kelly Days and payback days are discussed below and in Chapter 6.)

Among departments responding to the mail survey, the use of proportional staffing by shift was reported more frequently (78.4%) than was proportional staffing by day of the week (58.8%).¹⁵ Similarly, uniform staffing by day of the week was more frequently reported (45.7%) than was uniform staffing by shift (29.9%).¹⁶

Average Work Week

The average work week is the average number of scheduled working hours per week where paid time off for vacations, holidays, and sick leave are considered working hours. Regularly scheduled hours treated as overtime are not included. If lunch periods and other breaks are considered working hours, they are included in determining the average work week.

To calculate the average work week for any duty cycle schedule, it is necessary to know the duty cycle length, the number of on-duty shifts per duty cycle, and the shift length. The formula for the average work week is:

$$\text{average work week} = \frac{\begin{array}{c} \text{working} \\ \text{hours} \\ \text{per shift} \end{array} \times \begin{array}{c} \text{on-duty} \\ \text{shifts per} \\ \text{duty cycle} \end{array} \times 7}{\begin{array}{c} \text{duty cycle} \\ \text{length in days} \end{array}} \quad (3-1)$$

As an example, consider a 4 on - 2 off duty cycle schedule with eight-hour shifts. Using formula (3-1), the average work week is calculated as follows:

¹⁵Responses to questions 22 and 25, Police Work Scheduling Survey, Appendix D.

¹⁶Responses to questions 21 and 24, Police Work Scheduling Survey, Appendix D.

$$\text{average work week} = \frac{8 \times 4 \times 7}{6} = 37.33 \text{ hours}$$

Formula (3-1) can be used with any duty cycle pattern regardless of its complexity or length. Consider the duty cycle 7W - 2R - 7W - 2R - 7W - 3R which describes a four-platoon schedule. Assuming eight-hour shifts, the average work week is:

$$\text{average work week} = \frac{8 \times 21 \times 7}{28} = 42 \text{ hours}$$

Despite the obvious importance of knowing the average work week, some departments and employee associations have negotiated new work schedules without determining the net impact of changing both shift length and duty cycle pattern at the same time. As an example, assume that a department is currently using the 22-day duty cycle: 5D - 2R - 5D - 2R - 5D - 3R with eight-hour shifts. To improve shift change communications, the department is considering use of an 8 1/2 hour shift and a 23-day duty cycle: 5D - 2R - 5D - 3R - 5D - 3R. One criteria for assessing the proposed change is the length of the average work week (AWW). For the current schedule:

$$\text{AWW} = \frac{8 \times 15 \times 7}{22} = 38.18 \text{ hours}$$

For the proposed schedule:

$$\text{AWW} = \frac{8.5 \times 15 \times 7}{23} = 38.80 \text{ hours}$$

Hence, for the proposed schedule, the AWW is 0.62 hours higher than it is for the current schedule. Although this may appear small, it accumulates to over 32 hours of additional on-duty time per officer annually.

When asked about the average work week in their departments, respondents to the mail survey exhibited a surprising range of answers (see Table

3-10). Over 9% indicated an AWW less than 40 hours and almost 16% indicated an AWW greater than 40 hours. Over 6% have average work weeks exceeding 45 hours.

Schedule Simplicity and Equity

Schedule simplicity refers to the ease with which individual officers and supervisors can determine duty assignments, and scheduling procedures

TABLE 3-10
AVERAGE WORK WEEK^a

Average Work Week, Hours	Number of Departments	Percentage
35.00 - 35.99	1	0.8
36.00 - 36.99	0	0.0
37.00 - 37.99	5	4.2
38.00 - 38.99	2	1.7
39.00 - 39.99	3	2.5
40.00 - 40.99	88	74.6
41.00 - 41.99	3	2.5
42.00 - 42.99	7	5.9
43.00 - 43.99	1	0.8
44.00 - 44.99	0	0.0
45.00 - 45.99	0	0.0
46.00 - 46.99	2	1.7
47.00 - 47.99	0	0.0
48.00 - 48.99	5	4.2
49.00 - 49.99	0	0.0
50.00 - 50.99	0	0.0
51.00 - 51.99	1	0.8
Totals	118 ^b	99.7 ^c

^aResponses to Question 34, Police Work Scheduling Survey, Appendix D.

^bDoes not include one non-response.

^cTotal percentage does not equal 100.0 because of roundoff of individual elements.

can be administered. Equity refers to the degree to which officers view a schedule as providing a fair distribution of desirable and undesirable schedule features. Both are subjective criteria that do not lend themselves to rigorous analysis. Yet each may represent important factors in adopting or rejecting scheduling alternatives.

Summary of Work Schedule Properties

All of the properties discussed above represent criteria to be examined when assessing the "quality" of any schedule. The following list summarizes a step-by-step review process:¹⁷

1. Identify shifts used in the schedule.
 - How many shifts are used?
 - At what times does each shift start and end?
 - What are the shift lengths?
 - Do the shifts overlap?
 - Are officers permanently assigned to a shift, or do they periodically rotate shift assignments? If they rotate, what is the shift rotation sequence?
2. Identify the duty cycle used in the schedule.
 - What are the lengths of the duty cycle and the week cycle?
 - Is the schedule locked? If so, the on- and off-duty periods of each group of officers must be analyzed separately.
3. Identify the schedule's on- and off-duty periods.
 - What are the maximum and minimum lengths of on- and off-duty periods?
 - How frequently do officers have on- and off-duty periods of various lengths?
 - Are long (short) on- and off-duty periods grouped together or are they distributed throughout the week cycle?

¹⁷Review process adapted from Work Schedule Design Handbook: Methods for Assigning Employees' Work Shifts and Days Off, U. S. Department of Housing and Urban Development, August 1979, pp. 75-77.

- Are long on-duty periods followed by long off-duty periods?
 - Are short off-duty periods preceded by short on-duty periods?
 - With what frequency are combinations of days of the week included in off-duty periods?
 - How many weekend off-duty periods are provided by the schedule?
 - How many off-duty hours are provided at each shift change?
4. Identify the groups of identically-scheduled officers using the schedule.
 - How many groups are used?
 - How many officers are assigned to each group?
 - What is the composition of each group in terms of rank and experience?
 - To what extent does the schedule provide team integrity and unity of command?
 - Do the groups of officers constitute platoons?
 5. Determine on-duty staffing provided by the schedule by time of day and day of week.
 6. Determine whether Kelly Days or payback days are used and how often they are given.
 7. Determine the average work week.
 8. How difficult is the schedule to understand and administer?
 9. To what extent does the schedule provide equity?

A summary of key schedule properties for duty cycle schedules is presented in Table 3-11.

TABLE 3-11
SUMMARY OF DUTY CYCLE SCHEDULE PROPERTIES

Duty Cycle Property	Definition or Formula
• Duty cycle	Repeating pattern of shift and days off assignments.
• Duty cycle length	Number of days in the duty cycle pattern.
• Locked schedule	Duty cycle length that is a multiple of seven (i.e., 7, 14, 21, 28, ...).
• Unlocked schedule	Duty cycle length that is not a multiple of seven.
• Week cycle	Number of weeks in which the duty cycle repeats itself a whole number of times. Locked schedules: $\text{week cycle (weeks)} \div \text{duty cycle length (days)} = 7$ Unlocked schedules: $\text{week cycle (weeks)} \div \text{duty cycle length (days)}$
• Average work week (AWW)	Average number of paid on-duty hours per week: $\text{AWW} = \frac{\left(\frac{\text{shift length, hours}}{\text{duty cycle length, days}} \right) \times \left(\frac{\text{Number of on-duty assignments per duty cycle}}{\text{duty cycle length, days}} \right) \times 7}$
• Weekend off-duty periods	Off-duty period that includes both Saturday and Sunday; ^a $\left[\frac{\text{Number of weekend off-duty periods}}{\text{week cycle}} \right] = \left[\frac{\text{Number of off-duty assignments}}{\text{duty cycle}} \right] - \left[\frac{\text{Number of off-duty periods}}{\text{duty cycle}} \right]$
• Group	One or more officers assigned to the same duty cycle pattern and starting day. Number of groups cannot exceed the number of days in the duty cycle length.
• Staffing levels	If the number of groups equals the duty cycle length: Day of the week: staffing will be uniform by day of the week; the number of groups on-duty each day will equal the number of on-duty days in the duty cycle. Shift: number of groups on-duty on each shift will equal the number on-duty assignments on each shift in the duty cycle.
• Simplicity	May require use of Kelly Days or pay-back days to adjust average work week.
• Equity	Provides identical pattern of on- and off-duty assignments for all officers.

^aApplicable to unlocked duty cycle schedules only.

CHAPTER 4: POLICE WORK SCHEDULE TYPES

This chapter examines work schedules used by police agencies in the United States. Particular attention is given to duty cycle schedules since virtually all police agencies (over 96%) use them (see Table 3-1, page 44). All duty cycle schedules can be classified into one of three schedule types: fixed days-off, unlocked rotating days-off, or locked rotating days-off. Many examples of each schedule type were found among the patrol division schedules obtained from the mail survey (see Table 4-1).

The value of this classification is that all schedules within each schedule type exhibit similar kinds of properties. The ability to identify which schedule type a duty cycle pattern represents allows one to quickly

TABLE 4-1
NUMBER OF FIXED AND ROTATING DAYS-OFF DUTY CYCLE SCHEDULES
OBTAINED FROM THE POLICE WORK SCHEDULING SURVEY^a

Type of Schedule	Locked	Unlocked	Totals (%)
Fixed days-off	65	0 ^b	65 (53.7)
Rotating days-off	22	34	56 (46.3)
Totals	87	34	121 (100.0)

^aResponses from 119 police departments. Six departments submitted two schedules for patrol operations. Four schedules were not duty cycle schedules.

^bFixed days-off schedules are, by definition, locked duty cycle schedules.

determine the key properties of that schedule. Each schedule type is discussed below in terms of major properties, advantages and disadvantages, and implementation features.

Fixed Days-Off Schedule Type

Fixed days-off (FDO) schedules are duty cycle schedules with a duty cycle length of seven days.¹ Of the 125 patrol division work schedules obtained from the mail survey, over half (65) were FDO schedules. Of these, 53 were 5 on - 2 off, usually with 8-hour shifts, and 12 were 4 on - 3 off, usually with 10-hour shifts. Illustrations of both patterns can be found in figures 3-4 and 3-5 (page 36), Figure 3-6 (page 38), figures B-1 through B-4 (pages 149-152), and figures C-4 and C-5 (pages 168 and 169).

Advantages of FDO Schedules

The popularity of FDO schedules is related to the following characteristics:

- Fixed days off. Fixed days off are often viewed with favor by police officers who find it easier to schedule educational and recreational activities. Closely related to this feature is the stability provided by uniformity in the lengths of both on- and off-duty periods.
- Proportional staffing levels. FDO schedules can be designed to provide staffing levels that are proportional to workload demands by day of the week (see figures B-2 and B-4 on pages 150 and 152). Since permanent shift assignments are frequently used with this type of schedule, staffing levels by day of the week can be tailored to individual shift differences. In addition, with permanent shift assignments, staffing levels can also be adjusted to match shift workload variations.
- Schedule simplicity. FDO schedules are relatively easy to design, understand, and administer. All FDO schedules, for example, require no more than seven scheduling groups. FDO schedules are also less sensitive to small variations in staff level changes.
- Weekly cycles. With a seven-day duty cycle, FDO schedules are usually compatible with municipal work rules (e.g., pay procedures based on weekly cycles).

¹Fixed days-off schedules are sometimes also called fixed-bracket schedules.

Disadvantages of FDO Schedules

FDO schedules also exhibit a number of disadvantages including the following:

- Permanent shift assignments. Few police agencies use FDO schedules with rotating shift assignments because of the poor changeover properties that are usually encountered when rotating from one shift to another. Also discouraging the use of FDO schedules with rotating shift assignments is the fact that, unless special adjustments are made, an equal number of officers must be used on each shift thereby eliminating proportional staffing levels by shift.
- Lack of schedule equity. FDO schedules do not provide equity among all officers. Some officers receive desirable off-duty periods (e.g., Saturday-Sunday) while others do not. Permanent shift assignments may also be viewed as undesirable and unfair. Many departments try to alleviate these problems by periodically providing all officers with an opportunity to request new days off and/or new shift assignments. Requests (frequently called "bids") are usually permitted every 6 or 12 months and most often are decided on the basis of seniority.²
- Diminished team integrity and unity of command. Complete team integrity and unity of command cannot be obtained unless all team members and their supervisor work the same schedule bracket.
- Fixed days off. Some officers do not like the monotony of having the same days off each week. Some police supervisors also believe that FDO schedules do not expose officers to varying service conditions that may exist on different days of the week.

Implementation of FDO Schedules

Implementation of a three-shift, eight hours per shift, FDO schedule consists of the following steps:

- analysis of agency workload to determine service demands by shift and day of the week;

²Departments that use this method indicate that actual personnel changes at each request period usually amount to between 10 and 20% of the patrol force.

- allocation of available staff in proportion to workload by shift;³ and
- design of a FDO schedule for each shift based on workload demand by day of the week;⁴ each schedule will indicate what fraction of the personnel allocated to a shift should be assigned to each schedule bracket to produce a daily staffing level proportional to agency workload.

Unlocked Rotating Days-Off Schedule Type

Rotating days-off (RDO) schedules are duty cycle schedules that are either unlocked, or locked with duty cycle lengths greater than 7 days. Unlocked RDO schedules are discussed in this section and locked RDO schedules are discussed in the following section.

Examples of unlocked RDO schedules are illustrated in Figure 3-3 (page 35), Figure 3-8 (page 40), Figure B-6 (page 154), figures B-8 through B-10 (pages 156-158), figures C-1 through C-3 (pages 165-166), and figures C-7 through C-9 (pages 173-175). As indicated in Table 4-1 (page 61), a total of 34 unlocked RDO schedules were received from departments responding to the mail survey. The 26 different duty cycle patterns and average work weeks represented by these schedules are summarized in Table 4-2.

Advantages of Unlocked RDO Schedules

Unlocked RDO schedules are widely used because of the following advantages:

- Schedule equity. All officers working the same unlocked RDO schedule have exactly the same pattern of on- and off-duty assignments, the same number and distribution of weekend off-duty periods, and the same distribution of time on each shift.
- Shift rotation. If shift rotation is built into the schedule, an off-duty period always separates on-duty assignments on different shifts.

³Methodology for the allocation of personnel is described in Work Schedule Design Handbook: Methods for Assigning Employees' Work Shifts and Days Off, U. S. Department of Housing and Urban Development, August 1979, pp. 82-121.

⁴Work Schedule Design Handbook, pp. 137-166.

TABLE 4-2
PROPERTIES OF UNLOCKED ROTATING DAYS-OFF SCHEDULES^a

Duty Cycle Pattern ^b	Duty Cycle Length (Days)	Shift Length (Hours)	Average Work Week (Hours)	Figure Number
1. 3W - 1R	4	8	42.00	B-6 C-10
2. 3W - 3R	6	12	40.00 ^c	
3. 4W - 2R	6	8 8.25 8.50 10	37.33 38.50 39.67 46.67	
4. 5W - 3R	8	9.25	40.47	3-1 B-8 C-1
5. 6W - 2R	8	8	42.00	
6. 6W - 3R	9	8 8.50 8	37.33 39.67 40.00 ^d	
7. 5W - 2R - 4W - 2R	13	8 8.25	38.77 39.98	B-9
8. 5W - 2R - 5W - 3R	15	8	37.33	B-10 C-8
9. 5A - 2R - 5N - 3R	15	8.58 ^e	40.06	C-9
10. 5D - 2R - 5A - 3R - 4N - 3R	22	8.25	36.75	3-3 3-8
11. 5D - 2R - 5A - 2R - 5N - 3R	22	8 8.25	38.18 39.38	
12. 5D - 3R - 5A - 2R - 5N - 3R	23	8.75	39.95	
13. 6W - 2R - 6W - 2R - 5W - 3R	24	8	39.67	3-2 C-2 C-3
14. 6D - 2R - 6N - 2R - 6A - 2R	24	8	40.00 ^c 42.00	
15. 6D - 3R - 6A - 3R - 6N - 3R	27	8	37.33	
16. 5D - 3R - 5A - 2R - 5N - 3R - 5D - 2R - 5A - 3R - 5N - 2R	45	8.25 8.58 ^e	38.50 40.06	
17. 6W - 2R - 6W - 2R - 6W - 2R - 6W - 2R - 5W - 3R - 5W - 3R	48	8	39.67	

^aBased on 34 unlocked RDO schedules obtained from the Police Work Scheduling Survey.

^bSchedules in which shift rotation is independent of the duty cycle are marked with "W" for on-duty assignments and "R" for off-duty assignments. Schedules which use the duty cycle pattern for shift rotation are marked with "D" for day shift, "A" for afternoon shift, "N" for night shift, and "R" for off-duty days.

^cRequires use of Kelly Days to adjust average work week.

^dRequires use of payback days to adjust average work week.

^eShift length is 8 hours, 35 minutes.

- Proportional staffing by shift. The proportion of on-duty officers assigned to each shift can be determined from the duty cycle pattern as follows:

$$\text{Fraction (\%) of on-duty patrol force on shift} = \frac{\text{Number of on-duty assignments on shift in the duty cycle}}{\text{Total number of on-duty assignments in duty cycle}} \quad (4-1)$$

As an example, consider the duty cycle pattern 5D - 2R - 5A - 3R - 4N - 3R. Using formula (4-1), the fraction of the patrol force that is on duty on the night shift is:

$$\text{Fraction (\%) of patrol force on-duty on the night shift} = \frac{\text{Number of on-duty assignments on the night shift}}{\text{Number of on-duty assignments on all shifts}} = \frac{4}{5+5+4} = .286 \text{ (28.6\%)}$$

Use of formula (4-1) also indicates that 35.7% of the on-duty patrol force will be assigned to the day and afternoon shifts each.

- Uniform distribution of off-duty days. Over the period of the week cycle, every officer will be on- and off-duty the same number of times on every day of the week.

Disadvantages of Unlocked RDO Schedules

Disadvantages cited for unlocked RDO schedules include the following:

- Uniform staffing by day of the week. Except for slight variations created by vacations, holidays, comp-days, Kelly Days, payback days, etc., unlocked RDO schedules provide the same level of staffing on each day of the week.
- Schedule design. Design of unlocked RDO schedules can be difficult. The relationship between duty cycle length, group size, and average work week may require departments to divide the

patrol force into an undesirable number of schedule groups or to accept a schedule that uses Kelly Days or payback days to achieve the correct average work week.

- Limited team integrity and unity of command. Unless supervisors and subordinates are placed in the same schedule group, some loss of team integrity and unity of command occurs. This problem is heightened when unlocked RDO schedules are used with shift rotation.
- Frequent shift changes. Some departments use unlocked RDO schedules with rotating shift assignments that change every week or two. There is increasing evidence that shift assignments that are less than four weeks in duration may contribute to heightened levels of officer fatigue and stress.⁵
- Variable work hours. The actual number of hours worked during each calendar week usually varies. This may cause problems if pay procedures are tied to actual hours worked.⁶
- Off-duty days vary. In unlocked RDO schedules, off-duty assignments usually change each week. Officers working such schedules may find it difficult to participate in outside activities that are tied to calendar week patterns.
- Schedule administration. Unlocked RDO schedules may require more administrative effort if Kelly Days and payback days are used. Also, schedules with long duty cycle lengths have correspondingly long week cycles. This usually requires additional administrative effort to monitor the specific days earned or owed by each officer. Finally, depending on the number of officers assigned to each group and the number of groups in the schedule, unlocked RDO schedules may be difficult to administer if there are substantive changes in the size of the patrol force.

Implementation of Unlocked RDO Schedules

Implementation of unlocked RDO schedules consists of the following steps:

⁵Over 21% of the departments that use rotating shift assignments indicated a shift rotation frequency of two weeks or less. Responses to Question 14, Police Work Scheduling Survey, Appendix D.

⁶Over 27% of the departments responding to the mail survey indicated that officers were paid on the basis of actual hours worked in the pay period. Responses to Question 39, Police Work Scheduling Survey, Appendix D.

- analysis of agency workload to determine service demands by shift;
- allocation of available staff in proportion to the workload by shift;⁷ and
- design of an unlocked RDO schedule that is consistent with the number of groups desired, the allocation of personnel by shift, and the average work week if shift rotation is to be used; or design of separate unlocked RDO schedules for each shift if fixed shift assignments will be used.⁸

Locked Rotating Days-Off Schedule Type

Locked RDO schedules are duty cycle schedules that have duty cycle lengths that are a multiple of 7 and are greater than 7 (i.e., duty cycle lengths of 14, 21, 28, . . .). Examples of locked RDO schedules are presented in Figure 3-7 (page 39), Figure B-5 (page 153), Figure B-7 (page 155), Figure B-11 (page 159), Figure C-6 (page 172), and Figure C-10 (page 176). Among the 22 locked RDO schedules obtained with the mail survey, 14 distinct duty cycle patterns and average work weeks were identified (see Table 4-3).

Advantages of Locked RDO Schedules

Locked RDO schedules share all of the advantages cited above for unlocked RDO schedules (schedule equity, shift rotation, proportional staffing by shift, and varying off-duty days) plus the following:

- Proportional staffing by day of the week. In addition to providing proportional staffing by shift, locked RDO schedules can also be designed to accommodate workload variations by day of week. An example is presented in Figure B-11 (page 159). The locked RDO schedule is six weeks long and provides four on-duty groups on Sunday through Thursday and five on-duty groups on Friday and Saturday.
- Duty cycle length is a whole number of weeks. In some cases, this property facilitates schedule administration.

⁷See Footnote 3 above.

⁸Work Schedule Design Handbook, pp. 169-215.

TABLE 4-3
PROPERTIES OF LOCKED ROTATING DAYS-OFF SCHEDULES^a

Duty Cycle Pattern ^b	Duty Cycle Length (Days)	Shift Length (Hours)	Average Work Week (Hours)	Figure Number
1. 2W - 2R - 3W - 2R - 2W - 3R	14	12	42.00	B-5
2. 7W - 2R - 8W - 4R	21	8.25	41.25	
3. 7W - 2R - 7W - 2R - 7W - 3R	28	8	42.00	
4. 7D - 2R - 7A - 2R - 7N - 3R	28	8	42.00	
5. 7W - 2R - 8W - 4R - 5W - 2R	28	8	40.00	3-7 C-7
6. 4W - 7R - 4W - 3R - 4W - 1R - 3W - 3R	28	12	42.00	
7. 7W - 2R - 6W - 2R - 7W - 4R	28	8	40.00	
8. 7D - 4R - 7A - 1R - 4P - 1R - 7N - 4R	35	8	40.00	
9. 4D - 3R - 2A - 2R - 3D - 1R - 2N - 1R - 3A - 3R - 5N - 1R - 2A - 3R	35	8	35.00 ^c	B-11
10. 6W - 2R - 6W - 2R - 6W - 2R - 6W - 2R - 6W - 4R	42	8	40.00	
11. 6W - 2R - 6W - 2R - 6W - 2R - 6W - 2R - 6W - 3R - 5W - 3R	49	8	40.00	
12. 7W - 2R - 7W - 2R - 7W - 4R - 7W - 2R - 7W - 4R	49	8	40.00	
13. 5W - 4R - 4W - 4R - 4W - 4R - 5W - 3R - 5W - 3R - 5W - 3R	49	10	40.00	B-7 C-11
14. 5W - 3R - 5W - 3R - 5W - 3R - 5W - 3R - 4W - 4R - 4W - 4R	56	10	40.00	

^aBased on 22 locked RDO schedules obtained from the Police Work Scheduling Survey.

^bSchedules in which shift rotation is independent of the duty cycle are marked with "W" for on-duty days and "R" for off-duty days." Schedules which use the duty cycle for shift rotation are marked with "D" for day shift, "A" for afternoon shift, "N" for night shift, "P" for power (or overlay) shift, and "R" for off-duty days.

^cRequires use of payback days to adjust average work week.

Disadvantages of Locked RDO Schedules

Among the disadvantages listed above for unlocked RDO schedules, several also apply to locked RDO schedules. These include difficult schedule design, limited team integrity and unity of command, frequent shift changes, variable work hours, varying off-duty days, and schedule administration.

Implementation of Locked RDO Schedules

Implementation of a locked RDO schedule consists of the following steps:

- analysis of agency workload to determine service demands by shift and day of the week;
- allocation of available staff in proportion to the workload by shift and day of the week on each shift;⁹ and
- design of an locked RDO schedule that is consistent with the number of groups desired, the shift and day of week staff allocations, and the average work week if shift rotation is to be used; or design of separate schedules for each shift if fixed shift assignments will be used.¹⁰

Variations in Police Work Schedules

This section examines some variations that are used for scheduling police personnel. Two topics are addressed: shift lengths other than eight hours, and work schedules that do not follow a duty cycle pattern.

Variations in Shift Length

Using shift lengths that are not exactly eight hours long is not an uncommon police scheduling practice. Different shift lengths are used for a variety of reasons including:

- Overlap of personnel at shift change. This is usually achieved by extending shift lengths by 15, 30, or 60 minutes. Some

⁹See Footnote 3 above.

¹⁰Work Schedule Design Handbook, pp. 217-274.

departments use staggered starting times in place of extending the shift length.

- Adjust average work week. This is most commonly done with unlocked RDO schedules which rarely yield 40-hour average work weeks with 8-hour shifts. Adjustments are usually made by extending the shift length by 15 or 30 minutes (e.g., see the shift length column in Table 4-2, page 65).
- Overlay shifts. Some overlay or power shifts, used to provide additional personnel during high service demand periods, may be only six or seven hours long.
- Overlapping shifts. Extending the length of each shift by one or two hours can produce several hours of overlap per day. With proper adjustment of shift starting hours, the overlap period(s) can be scheduled for high workload times of the day. The most common example is the four-day, ten-hour schedule which provides six hours of overlap per day.
- Increase officer time off. Some agencies have gone to 9, 10, or even 12-hour shifts to provide longer periods of off-duty time for officers. The use of 12-hour shifts is discussed below.

Ten-Hour Shifts

Police agencies use ten-hour shifts in a variety of ways.¹¹ Although most extensively used in a FDO schedule with a 4 on - 3 off pattern, the mail survey uncovered a number of agencies that use 10-hour shifts with RDO schedules, both locked and unlocked. Specific examples include:

- a 4W - 2R unlocked RDO schedule for the Johnson County (Iowa) Sheriff's Department (Figure C-9, page 175);
- a seven-week locked RDO schedule with the duty cycle pattern 5W - 4R - 4W - 4R - 4W - 4R - 5W - 3R - 5W - 3R - 5W - 3R for the Kansas City (Missouri) Police Department (pattern 13 in Table 4-3, page 69); and
- an eight-week locked RDO schedule with the duty cycle pattern 5W - 3R - 5W - 3R - 5W - 3R - 5W - 3R - 4W - 4R - 4W - 4R - 4W - 4R for the Cass County (Michigan) Sheriff's Department (pattern 14 in Table 4-3, page 69).

¹¹Of the 46 citations included in the annotated bibliography in Appendix F, 17 are devoted entirely or in part to a discussion of 10-hour shifts.

Bracket representations of two 4 on - 3 off schedules are illustrated in figures B-3 and B-4 (pages 151 and 152). The FDO form of 10-hour schedules first attracted wide attention as a scheduling alternative for police work in the late 1960s and early 1970s, particularly among departments on the west coast.¹² Principal reasons usually cited for adopting four-day ten-hour schedules are:

- the ability to have increased patrol coverage during periods of overlapping shifts, and
- improved officer morale due to more time off.

Over the years, a number of potential problems with four-ten plans have also surfaced including:

- reduced patrol coverage during periods of non-overlapping shifts unless the patrol force is increased,
- patrol car shortages during overlap periods,
- officer fatigue resulting in more car accidents and greater risk in emergency situations requiring immediate decisions, and
- difficulties in schedule administration related to the definition of benefit days off (e.g., vacation, holidays, sick leave) formerly based on an 8-hour day.

The most extensive evaluation of four-ten plans appears in a 1981 publication of the California Commission on Peace Officers Standards and Training.¹³ The evaluation is based on a survey of 104 California departments that are using some form of the four-ten plan. A summary of comments from police department administrators is reproduced below:

- The 4-10 scheduling was considered to be an employee benefit;
- Many senior patrol officers decline special assignments in order to retain the three days off under 4-10 scheduling;
- There was mixed reaction as to whether 4-10 scheduling provided

¹²Excellent reviews of the use of 10-hour shifts during this period can be found in "Four-Ten Plan: Police Explore Potential of Four-Day Workweek," J. McEwen, National Criminal Justice Reference Service, Selected Topic Digest, April 1972; and "The 'Ten-Plan' in California Law Enforcement Agencies," California Commission on Peace Officer Standards and Training, 1973.

¹³The Four-Ten Plan - California Law Enforcement, California Commission on Peace Officer Standards and Training, 1981.

adequate coverage during peak workload periods;

- Overtime, sick leave and court time initially went down; however, they subsequently returned to or surpassed past levels;
- Unity of command and supervision were considered problems;
- Providing relevant training in ten-hour blocks of time became increasingly difficult;
- Several agencies instituted a combination 4-10 plan and 5-8 work schedule; or restricted the use of the 4-10 plan to the evening watch because of lack of personnel;
- High costs, inflexible scheduling, and lack of personnel were cited as problems;
- There was a mixed view of 4-10 plans by all sizes of agencies. Several agencies abandoned their 4-10 plan primarily because they found that additional personnel were needed to provide the same coverage provided with eight-hour shifts. Other agencies expressed strong support for their 4-10 plan. Lastly, several agencies would abandon their 4-10 plan if their collective bargaining agreement did not require it.

In addition, the authors of the report added the following observations:

- There are six hours of overlap when three successive shifts are scheduled on the 4-10 plan. Frequently, the overlap during the 24-hour day occurs at a time when calls for service are low;
- In most cases, a 4-10 plan was not necessarily implemented to increase the effectiveness of the patrol function;
- Smaller departments find it difficult to efficiently schedule manpower with three consecutive days-off, as opposed to other work schedules with two consecutive days-off;
- The "common training day" variant of the 4-10 concept is one of the least efficient plans;
- The 4-10 concept requires more equipment. Usually, during the overlap period there are more officers than available vehicles;
- The principles of unity of command and supervision may be more difficult to follow with 4-10 scheduling.

Twelve-Hour Shifts

Five departments that use 12-hour shifts were identified during the preparation of this report: three from the mail survey and two from published reports.¹⁴ The three schedules obtained from the survey were:

- an unlocked RDO schedule with the duty cycle pattern 3W - 3R for the Morgan County (Illinois) Sheriff's Department which produces a 40-hour average work week if each officer receives one Kelly Day every six weeks (pattern 2 in Table 4-2, page 65);
- a locked two-week RDO schedule with a duty cycle pattern 2W - 2R - 3W - 2R - 2W - 3R for the Stephenson County (Illinois) Sheriff's Department (pattern 1 in Table 4-3, page 69); and
- a locked four-week RDO schedule with a duty cycle pattern 4W - 7R - 4W - 3R - 3W - 1R - 3W - 3R for the Durham (North Carolina) Department of Public Safety (pattern 6 in Table 4-3, page 69).

The two published reports were issued by the Everett (Washington) Police Department and the Louisiana State Police.¹⁵ The Louisiana State Police report summarized the initial findings of a three-month experiment initiated in 1979 with a duty cycle pattern 2W - 3R - 2W - 2R - 3W - 2R (a two-week, locked RDO schedule). Reasons identified for trying the schedule included:

- anticipated cost reductions resulting from less overtime, less sick leave, and reduced vehicle costs; and
- enhanced officer morale based on more time off with a three-day weekend every other week.

Commenting on the first month of the experiment, the authors concluded that "the results were somewhat mixed." They reported that:

- unscheduled overtime had decreased 21%, and
- officer morale was at an all-time high.

¹⁴Independent of the project, the authors learned of a sixth agency, the Winnebago County (Illinois) Sheriff's Department, shortly before publication of this document.

¹⁵Citations in the Bibliography (Appendix F) are "Everett's 12-Hour Shift," G. Davis and J. Tracy, FBI Law Enforcement Bulletin, April 1980, 7-9; and An Interim Analysis of 12-hour Shifts, Louisiana State Police Research Unit, 1979.

Less encouraging, however, were the following results:

- vehicle costs decreased only slightly,
- sick leave remained almost the same, and
- fatigue was noted as a problem particularly when court appearances were required.

Other Schedules

Of the 125 patrol work schedules obtained from the mail survey, only 4 were not duty cycle schedules. One schedule, used by the Metropolitan Police Department, City of St. Louis (Missouri), is based on six year-long brackets (i.e., each bracket is 365 days long). Once assigned, an officer follows the same bracket for an entire year. Each bracket has holiday time off and special events built into it, and care is taken to distribute weekend time and major holidays equitably. On-duty periods are 4 to 8 days long and off-duty periods range from 2 to 5 days. There is, however, no underlying "pattern" to the schedule.¹⁶

Three schedules reviewed use no pre-assigned pattern at all. Each officer is entitled to a specific number of off-duty days per month which may be scheduled in any way that he/she wishes so long as it is consistent with department guidelines and has supervisory approval. Different methods of specifying how many days off are to be scheduled included:

- 8 days off in months with 30 days and 9 days off in all other months (Lansing [Michigan] Police Department),
- 12 days off in every four-week period (9.33 hour shift length) (Torrance [California] Police Department), and
- 13 days off every month for the 10-hour shift, and 9 days off for the 8-hour shift (Oklahoma City [Oklahoma] Police Department).

Some agencies place upper limits on the maximum number of consecutive on-duty days an officer can request. Advantages cited for this type of scheduling are:

- maximum flexibility for officers to schedule time-off to match personal activities,

¹⁶In discussions with the designer of the St. Louis schedule, he pointed out that although he begins with a basic pattern, when holidays, special events, and court dates are inserted, the pattern become "invisible" to the officers.

- ability of supervisors to obtain additional staffing levels on busier days of the week and for special events by limiting the number of officers that are off duty on those days, and
- ability of supervisors to use scheduling as a motivational tool to reward or discipline officers by granting or denying time off requests.

Disadvantages, however, include:

- administrative effort required to review, approve, record, and publish monthly schedules; and
- potential for abuses based on personality conflicts and cronyism.

CHAPTER 5: MANAGING THE SCHEDULE DESIGN PROCESS

Changes to police work schedules--at least in many departments--are not infrequent events. Among the police agencies surveyed for this report, over 38% indicated that the current schedule used for patrol operations was less than three years old.¹ In view of the relationship between department operations and the work schedules that are used, it is not surprising that many agencies find it necessary to routinely modify or change scheduling procedures.

What is surprising, however, is the haphazard manner in which new schedules are often developed and implemented. Many of the underlying reasons for the lack of management attention have been identified in earlier chapters. They include:

- a lack of awareness about the manageability of scheduling problems and the process of changing schedules;
- unrealistic expectations about the benefits of new schedules; and
- the absence of resource materials to provide guidelines based upon the experience of other departments.

All of these reasons contribute to the fact that fewer than 20% of the police agencies surveyed indicated that they had obtained their current schedule from another department.²

This chapter examines the management of schedule changes. The discussion that follows promotes the idea that schedule design is more than merely finding the correct pattern of on- and off-duty assignments to be used. Developing and implementing new schedules involves all of the management issues that are associated with successful organizational change. The sections that follow examine the reasons for schedule changes, identify

¹See responses to Question 41, Police Work Scheduling Survey, Appendix D.

²See responses to Question 43, Police Work Scheduling Survey, Appendix D.

key participants, and present a step-by-step outline of the process itself.

Reasons for Changing Work Schedules

Police agencies change work schedules for many reasons. Primary among these are:³

- Changes in agency workload. This may reflect changes both in the level of service that must be provided and the distribution of workload by shift and day of the week. Fifty percent of the departments surveyed identified workload problems as the reason for their most recent schedule change.
- Changes in officer benefits. Changes in the average work week, the amount of time off for holidays and vacations, or changes in the terms of a collective bargaining agreement may necessitate a schedule change. Twenty percent of the surveyed departments identified this as the primary reason for their most recent schedule revision.
- Changes in the size of the patrol force. Although small variations in the size of the patrol force can usually be accommodated within existing scheduling procedures, substantive reductions or increases often necessitate the design of new schedules. This reason was identified by 10.9% of the surveyed departments.

Participants in the Schedule Design Process

Participation in the planning, implementing, and monitoring of a schedule change may involve only the chief in some agencies or a large number of persons representing management, labor, and support services in other agencies. Agency size; management style; the nature of work rules, city ordinances, and collective bargaining agreements; and the extent of the proposed change all play a part in determining who the participants are. Management representatives, other than the chief, may include the commander of field operations as well as watch and district supervisors. Support services may be represented by budget analysts and planners, legal advisors, and representatives from the personnel or employee relations office.

³See responses to Question 42, Police Work Scheduling Survey, Appendix D.

Police officers may be represented by an employee association or by senior officers from the department.⁴ In some instances, representatives from the jurisdiction's personnel or Civil Service Commission may also be involved in the process.

The Schedule Design Process

Most police administrators have learned that few issues can arouse controversy and heated arguments quicker than proposals for new work schedules.⁵ Regardless of how small or insignificant a change may appear to be, schedule revisions affect every officer and, as a result, may become the visible rallying point for any number of unrelated sources of officer discontent. Not all changes are well planned and some departments, in their haste to solve an immediate problem, have learned how difficult it can be to remedy a scheduling problem after a new schedule has been implemented.

The primary lesson to be noted is that every schedule change should be treated as a major management issue that requires a methodical, well-thought-out plan of action. Key steps in such a plan are presented below.

Assessing the Current Schedule

Before a schedule change is considered, a careful review of the current schedule should be undertaken to answer the following questions:

- What are the problems with the current schedule? The answers to this question should point to key objectives for any proposed solution.

⁴Twenty-five percent of departments surveyed indicated that the "employee association influences the scheduling of officers in the patrol division." See responses to Question 40, Police Work Scheduling Survey, Appendix D.

⁵One author of this document worked on a computerized work scheduling project for the Metropolitan Police Department, City of St. Louis (Missouri). When a group of officers were asked to assess a new schedule, a small percentage responded by saying that they disliked all schedules they had worked!

- Are these problems caused by the current schedule? It is important to distinguish between problems caused by a poor schedule and those caused by other circumstances within the department. For example, the lack of adequate staffing levels is often cited as a schedule-related problem. When insufficient patrol strength is available on particular shifts or days of the week, it may be possible to affect a better distribution of personnel by modifying the scheduling pattern. If patrol levels are too low on all shifts, however, no redistribution of the officers will solve the problem.
- Can any of the problems cited be remedied without a schedule change? When possible, it is often desirable to look for solutions that do not require schedule changes. Occasionally, simple policy or procedural revisions can avoid or at least minimize a problem.

Some department have utilized task force committees containing personnel from all ranks to consider these questions. This approach has the potential advantage of uncovering scheduling problems that may not be apparent to supervisory-level people but are a source of discontent among patrol officers.

Defining the Proposed Change

Once the decision to institute a schedule change has been made, the scope of the change should be examined by determining both the objectives and constraints that will apply to the new schedule.

Schedule objectives. The material presented in earlier chapters has identified many schedule features sought both by management and individual officers; examples include proportional staffing by shift and day of week, unity of command, team integrity, and weekends off. Often, these objectives are at cross purposes with one another and cannot be fully accommodated within the same schedule. Sources for objectives to be considered in the new schedule may include:

- the scheduling-related problems to be corrected,
- key features in the current schedule to be retained,
- the desire for proportional staffing and supervisory control by command personnel, and
- the preference for additional time off or revised on-duty features by individual officers.

Since, in almost all instances, the list of objectives will exceed what

can be realistically obtained in any schedule, it will be necessary to prioritize (or at least group into two or three classes) the objectives identified. The importance of this step cannot be overemphasized. The effort put forth in identifying what the schedule is to do may help avoid confusion and wasted effort when it is time to select among different scheduling alternatives.

Schedule constraints. Constraints can arise from a number of sources including:

- Legal restrictions imposed by state and local laws. Although the federal Fair Labor Standards Act which sets standards for employees' wages and working hours does not apply to municipal and state employees,⁶ some states have passed laws containing similar or more restrictive provisions for public employees. Local ordinances and civil service regulations may also set standards for public employees' work schedules. One-third of the surveyed departments indicated that work rules do influence the schedule design process in their department.⁷
- Bargaining agreements or contracts reached with employee associations may impose scheduling limitations. Twenty-five percent of the departments surveyed indicated that an employee association does influence the kind of work schedule that is used.⁸
- Limitations in equipment may restrict the kinds of schedules that can be considered. This most commonly occurs when schedules with overlapping shifts are used which require additional patrol units.
- Pay procedures based on actual days worked may require the use of schedules that specify the same number of on-duty days for each officer during each pay period.
- Size and composition of the patrol force may impose limitations. Small departments or agencies that want to retain team integrity by subdividing the work force into a small number of scheduling

⁶In 1974, Congress passed a series of amendments to the Fair Labor Standards Act (FLSA), extending the Act's minimum wage and overtime provisions to previously exempted state and local government employees, including police officers. Acting on a suit filed by the National League of Cities and others, the Supreme Court ruled in June 1976, however, that the amendments were unconstitutional.

⁷See responses to Question 44, Police Work Scheduling Survey, Appendix D.

⁸See responses to Question 40, Police Work Scheduling Survey, Appendix D.

groups may find few alternatives. A requirement to maintain a strict level of unity of command may also prohibit the use of some alternatives.

Designing a Schedule

When the objectives and constraints which the new schedule must satisfy are known, the process of finding one or more scheduling alternatives can begin. This step consists of both seeking out and analyzing scheduling alternatives. Finding candidate schedules is usually accomplished in one of three ways. These are examined below in increasing order of difficulty.

Modifying the current schedule. This option frequently offers the easiest and quickest way to find a suitable solution. It has the advantage of minimizing the change that must be instituted, and the potential disadvantage of not really correcting the problems which were instrumental in initiating the search for a new schedule. Although this approach may come down to little more than "tinkering" with the current schedule and hoping for a patchwork fix, it may work and should be given serious consideration.

Finding a schedule in another department. If modification of the current schedule is not possible, alternative schedules can sometimes be found in other agencies. This approach has obvious advantages: it may require little staff work and schedules can be observed as they function in another department. Finding appropriate schedules, however, can be difficult. No national directory of police work schedules is known to exist and locating possible solutions to one's own problems can become a matter of trial and error. The annotated bibliography included in Appendix F may be helpful in initiating such a search. Finally, even after an attractive schedule is found, the environment in which the schedule is used must be thoroughly understood so that the impact of different operating procedures on schedule effectiveness can be assessed. The importance of this assessment is sometimes overlooked and may account for instances in which police departments have implemented work schedules, used successfully in neighboring jurisdictions, only to find that they are inappropriate for their environment.

Designing a new schedule. Despite the attractiveness of the first two options; most law enforcement agencies continue to find new schedules by designing them with department resources. This approach offers the opportunity to start with a "clean slate" and to create a schedule best suited to department needs. As promising as this may appear, designing a new schedule can be a difficult and frustrating process in which it is impossible to determine when, and with what effort, appropriate alternatives will be found.

Regardless of the method used to find scheduling alternatives, this process can often be facilitated by using the information presented in chapters 3 and 4 to identify what kinds of schedules and properties are needed to comply with department policies. Key schedule features and the issues associated with them, discussed in those chapters, are listed below.

- On-duty periods: period lengths (i.e., the number of consecutive on-duty days) and the uniformity of on-duty period lengths.
- Off-duty periods: period lengths, the uniformity of off-duty period lengths, the number and distribution of off-duty periods that include both Saturday and Sunday, and whether off-duty days change each week.
- Shift assignments: rotating or permanent shift assignments, length of assignments, and the amount of time off when shift assignments are changed.
- Proportional staffing: proportionality of staff levels to workload levels by day of week and/or by shift.
- Average work week: average number of hours worked per week and the use of Kelly Days or payback days.
- Personnel benefits: impact on the definition and administration of vacation time, holidays, and other forms of leave.
- Schedule equity: extent of equity and the time period needed to provide equity for all officers.
- Miscellaneous: schedule simplicity, unity of command, and team integrity.

A comparison of the two major classes of schedules: fixed days off and rotating days off is presented in terms of these features in Table 5-1.

Schedule design resources. Additional information about manual schedule design methods can be found in Work Schedule Design Handbook: Methods for Assigning Employees' Work Shifts and Days Off. This comprehensive report, published in 1978 by the U. S. Department of Housing and Urban Development, presents procedures for analyzing the properties of existing schedules, determining the number and allocation of employees by shift and day of the week, determining what type of work schedule is needed, and designing both fixed and rotating days-off schedules.⁹

⁹The Work Schedule Design Handbook can be obtained from the National Technical Information Service (NTIS) in Springfield, Virginia, Document Number PB-300-211.

TABLE 5-1
SCHEDULE FEATURES ASSOCIATED WITH FIXED
AND ROTATING DAYS OFF SCHEDULES

	Schedule Type	
	Fixed Days Off	Rotating Days Off
On-duty periods	Periods lengths are 4 or 5 days long and are always uniform within the same schedule.	Period lengths may vary and may or may not be uniform within the same schedule
Off-duty periods	Period lengths are 2 or 3 days long and are always uniform. The same off-duty days are given each week. Officer either receives no weekends or every week-end off.	Period lengths vary and may or may not be uniform. The off-duty days usually change each week and each officer receives some weekends off on a regular basis.
Shift assignments	Usually used with permanent or semi-permanent shift assignments. ^a	Can be used with either fixed or rotating shift assignments.
Proportional staffing	Can provide uniform or proportional staffing by day of week or shift.	Provides uniform staffing by day of the week. Can provide uniform or proportional staffing by shift.
Average work week	Usually used to provide a 40-hour work week. Provides same number of on-duty hours each week.	Average work week depends on pattern of on-and off-duty assignments. Rarely gives 40-hour work week unless Kelly Days or pay-back days are used.
Personnel benefits	Schedules with 8-hour shifts are usually easy to administer. Schedules with 10-hour shifts may require redefinition of some time-off benefits.	Schedule administration is usually more complicated and requires careful recordkeeping to monitor time off earned.
Schedule equity	Schedules do not provide equity with regard to which days of week are given as off-duty days unless off-duty assignments are periodically changed.	Good schedule equity for all schedule features over the week cycle of the schedule. ^b
Miscellaneous	Schedules are easily understood and easy to modify. Unity of command is usually quite good and team integrity can be achieved if team members are placed in the same schedule group.	Schedules are more complex, harder to understand, and more difficult to adjust. Unity of command may be more difficult to achieve. Team integrity can be achieved if team members are placed in the same schedule groups.

^aSemi-permanent shift assignments refer to shift assignments which are considered permanent for an extended period of time (e.g., 3, 6, or 12 months) and changes in assignment are based on officer request (bid).

^b"Week cycle" - total number of weeks required for a pattern of on-and off-duty assignments to repeat itself.

Few computerized work scheduling programs, suitable for police applications, also exist. Two have been used by a small number of departments. These are:

- COMPSCHED - Developed under a LEAA grant in 1972 at the St. Louis City Police Department, the COMPSCHED system can be used to design locked rotating days-off schedules.¹⁰
- SCHEDULE/PLAN - A collection of three programs created in 1978 and designed to operate on a microcomputer. The programs can be used to determine shift relief factors, allocate employees by shift and day of week, and design fixed and rotating days-off schedules.¹¹

Citations for a number of evaluation reports and case studies based on specific police work schedule applications can be found in Appendix F of this document.

A design example. The discussion presented thus far may convey the idea that schedule design is a process that, if properly planned and organized, can be accomplished in routine fashion. The experiences of many law enforcement agencies, however, indicate that finding a new work schedule is often a tedious process that requires considerable effort and almost always results in a product that only partially satisfies the requests of management and field personnel. The hypothetical example presented below (based on actual events from several agencies) will serve to illustrate these experiences.

A police planner in Metropolis has been directed to find a new work schedule for the patrol division. The department, which serves a community of approximately 100,000 population, currently has 100 officers assigned to the patrol division. The agency is using a locked, rotating days-off (RDO) schedule with a duty cycle pattern that is 28 days long. The schedule, illustrated in Figure 5-1, divides the patrol force into four equal-sized platoons. On each day, each shift (day, afternoon, and night) is covered by one platoon while the fourth platoon is off-duty. The duty cycle pattern:

7D - 2R - 7N - 2R - 7A - 3R

has three work periods, each seven days long, and one three-day off-duty

¹⁰See What Law Enforcement Can Gain from Computer Designed Work Schedules by N. B. Heller, U. S. Department of Justice, 1974.

¹¹Information about both the COMPSCHED and SCHEDULE/PLAN programs can be obtained from Richard A. Kolde, Computer Power Applied, 9227 Manchester Road, St. Louis, Missouri 63144.

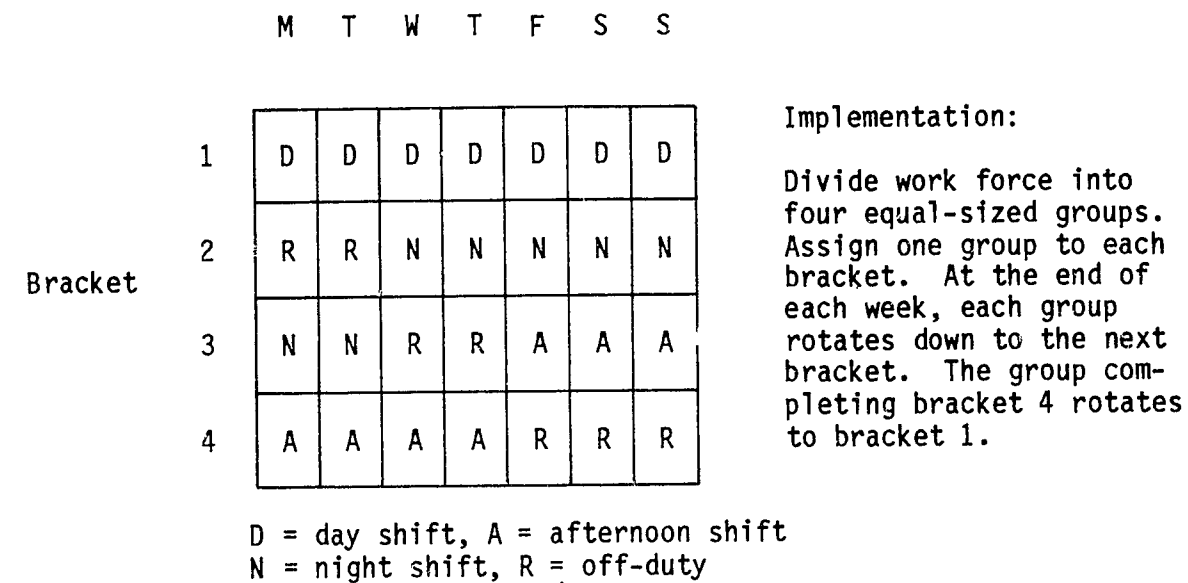


FIGURE 5-1

CURRENT FIXED DAYS-OFF SCHEDULE BASED ON
7D - 2R - 7N - 2R - 7A - 3R DUTY CYCLE

period that always begins on Friday. The current schedule provides rotation through all three shifts every four weeks and produces uniform staffing levels both by shift and day of the week (i.e., approximately 18 officers are scheduled to be on duty every day on each shift). Based on a shift length of eight hours, the schedule produces an average work week of 42 hours.

The instructions from the chief indicate that the primary reason for changing the schedule is to reduce the average work week to 40 hours. In discussions with supervisors and field officers, the planner also uncovers several other unofficial attributes and constraints that the new schedule should address. These include a reduction in work period lengths from seven to at most six days, provision for additional on-duty staffing on the afternoon shift, retention of the three-day off-duty period on the weekend, and elimination of frequent changes in shift assignments.

Based on this information, the planner concludes that the best solution would be elimination of rotating shift assignments with the use of fixed days-off (FDO) schedules designed to support staff allocations based on workload variations by shift and day of the week.

Analyzing workload statistics for the patrol division over the past year, the planner determines the ideal staffing allocations shown in Table 5-2. These results confirm that the present schedule does not provide sufficient numbers of officers on the afternoon shift. Based on this allocation, the planner produces a separate FDO schedule for each shift (figures 5-2, 5-3, and 5-4).

When these schedules are presented for review and approval, however, strong objections are raised. Several supervisors disagree with fixed shift assignments and there is considerable concern that the loss of the three-day off-duty weekend period and complete lack of equity will never be accepted by the troops. At this point, a lieutenant offers the suggestion that the department should look into adopting the "4 on - 2 off" schedule currently being used by the police department in a neighboring jurisdiction. The lieutenant has heard from a bowling buddy that it is a "terrific" schedule.

Upon investigation, the planner learns that the so-called "4 on - 2 off" schedule is, in fact, a locked RDO schedule with a duty cycle length of 126 days (Figure 5-5). The average work week is 42 hours, there are no three-day off-duty periods, and staffing levels are uniform by shift and day of the week. The planner quickly concludes that this schedule would represent a step backwards for his department.

TABLE 5-2

IDEAL STAFFING ALLOCATION BASED ON WORKLOAD
DISTRIBUTION BY SHIFT AND DAY OF THE WEEK

Shift	Number of Officers Assigned to Shift	Number of Officers On-Duty						
		Mon	Tue	Wed	Thu	Fri	Sat	Sun
Day	33	25	23	25	25	24	23	20
Afternoon	42	32	27	29	29	34	38	21
Night	25	18	17	17	18	21	21	13
Total	100							

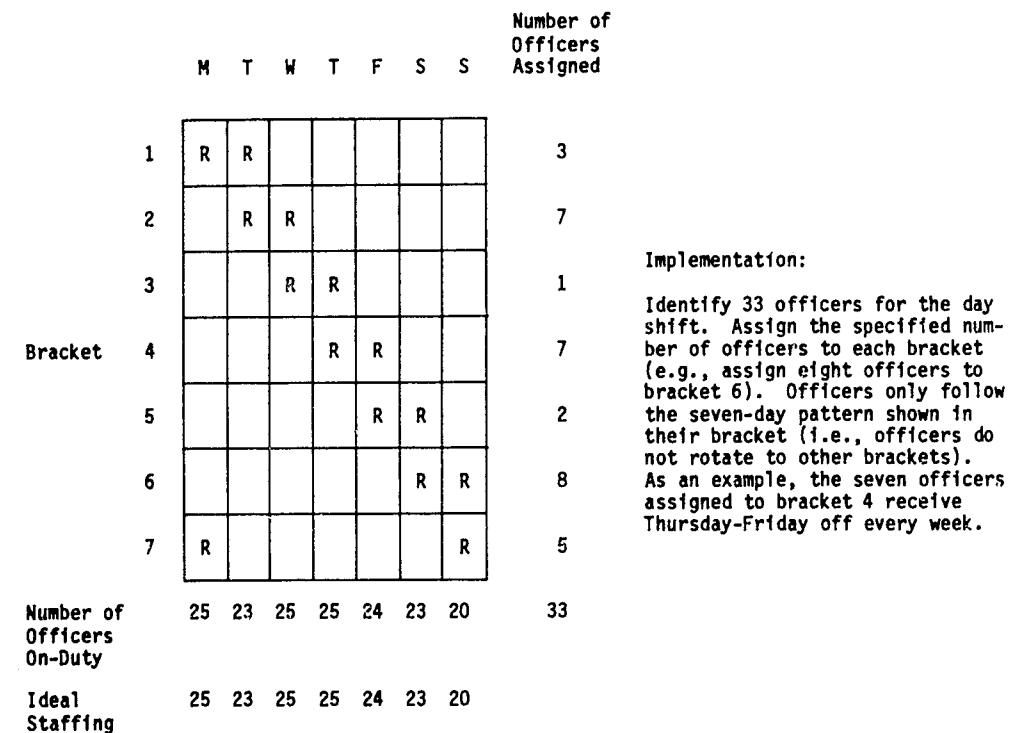


FIGURE 5-2

FIXED DAYS OFF (SEVEN-DAY DUTY CYCLE) SCHEDULE FOR THE DAY SHIFT

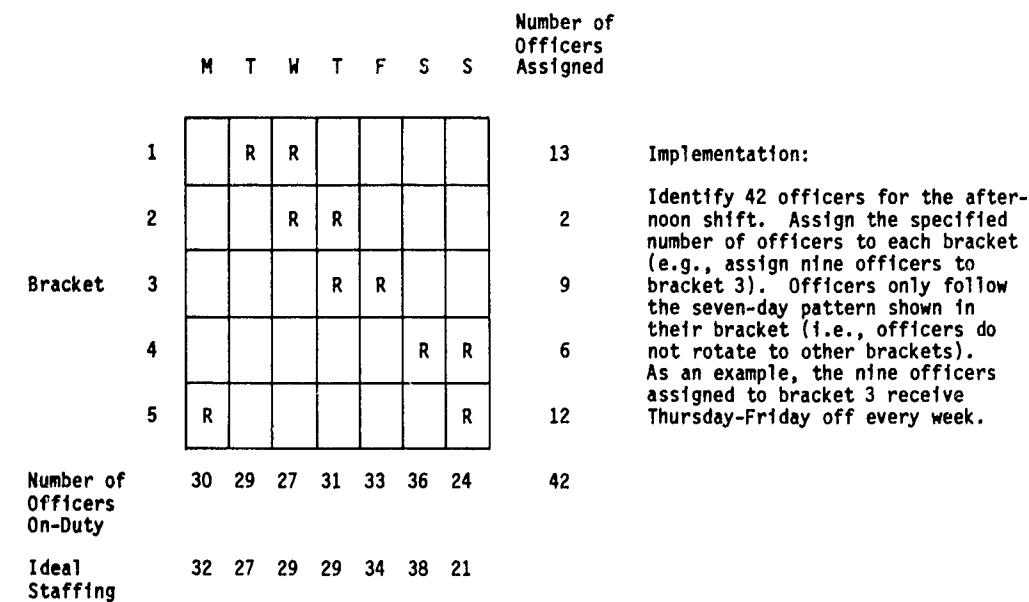


FIGURE 5-3

FIXED DAYS OFF (SEVEN-DAY DUTY CYCLE) FOR THE AFTERNOON SHIFT

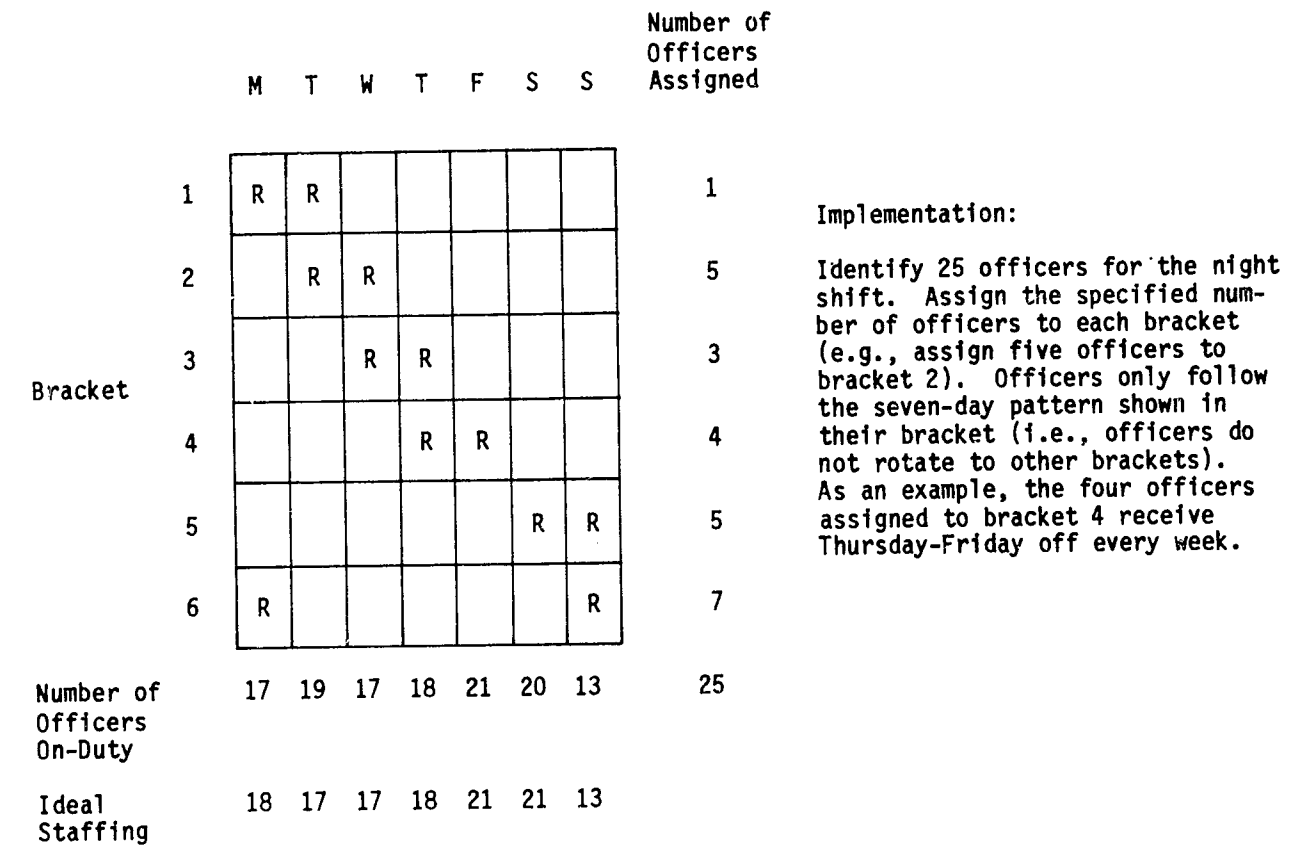


FIGURE 5-4

FIXED DAYS OFF (SEVEN-DAY DUTY CYCLE) FOR THE NIGHT SHIFT

In a final attempt to come up with an answer, the planner begins to tinker with the current duty cycle pattern: 7D - 2R - 7N - 2R - 7A - 3R. Recalling that there is a strong desire to eliminate the seven-day on-duty periods, he arbitrarily creates the pattern:

6D - 2R - 6N - 2R - 6A - 3R

by reducing each on-duty period from seven to six days. Computing the average work week, he is delighted to discover that the new pattern yields an average of 40.3 hours per week. Further examination indicates that a 40-hour work week can be obtained simply by giving each officer one additional day off (Kelly Day) every 25 weeks.

	M	T	W	T	F	S	S
1	D	D	D	D	R	R	D
2	D	D	D	R	R	D	D
3	D	D	R	R	D	D	D
4	D	R	R	D	D	D	D
5	R	R	D	D	D	D	R
6	R	D	D	D	D	R	R
7	N	N	N	N	R	R	N
8	N	N	N	R	R	N	N
9	N	N	R	R	N	N	N
10	N	R	R	N	N	N	N
11	R	R	N	N	N	N	R
12	R	N	N	N	N	R	R
13	A	A	A	A	R	R	A
14	A	A	A	R	R	A	A
15	A	A	R	R	A	A	A
16	A	R	R	A	A	A	A
17	R	R	A	A	A	A	R
18	R	A	A	A	A	R	R

Bracket

Implementation:
Divide work force into 18 equal-sized groups. Assign one group to each bracket. At the end of each week, each group rotates down to the next bracket. The group completing bracket 18 rotates to bracket 1.

D = day shift, A = afternoon shift
N = night shift, R = off-duty

FIGURE 5-5

"4 ON - 2 OFF" SCHEDULE USED BY NEIGHBORING JURISDICTION (18-WEEK FDO SCHEDULE)

Despite its attractive features (nearly a 40-hour work week, no seven-day work periods, and one three-day off-duty period), the revised pattern still provides uniform staffing levels by shift and day of the week. At this point, the planner makes another small change in the duty cycle pattern. He reduces the on-duty period on the night shift from six to five days and increases the on-duty period on the afternoon shift from six to seven days to produce the pattern:

6D - 2R - 5N - 2R - 7A - 3R.

The schedule represented by this pattern (shown in Figure 5-6) possesses several attractive features: it almost produces a 40-hour work week, it has a three-day off-duty period, and it provides additional staffing for the afternoon shift. Its drawbacks are that it still provides uniform staffing by day of the week and now includes one seven-day work period.

After review by the chief, supervisory staff, and some field personnel, this schedule is accepted as the best compromise that can be found. Although the schedule does not produce an exact 40-hour work week, the chief sees no problem with giving one Kelly Day every 25 weeks. Despite uniform staffing by day of the week, the afternoon shift commander is delighted with the additional officers available; and among field personnel, the feeling is that progress has been made by reducing the lengths of two of the three on-duty periods in the schedule pattern.

A careful reading of this detailed example will reveal that the planner used all three design methods described at the beginning of this section: he started by designing new schedules; then considered using a schedule from another department; and ended up finding an answer by modifying the current schedule.

Implementing a New Schedule

Administrative procedures for approval of a new schedule vary greatly among police agencies. In some, the chief may exercise complete discretion in determining what kind of schedule will be used. More often, many participants in the design process will be given an opportunity, either formally or informally, to review the proposed change. In larger departments, this process may involve supervisory personnel, senior officers, representatives of an employee association, staff persons from the budget and personnel offices, Civil Service Commission members, and, occasionally, members of the Police Board or the city council.

Once the review process is completed, implementation of the schedule can begin. Experience in many departments indicates that most implementation problems can be minimized through prior planning. It is essential to

	M	T	W	T	F	S	S
1	D	D	D	D	D	D	R
2	R	N	N	N	N	N	R
3	R	A	A	A	A	A	A
4	A	R	R	R	D	D	D
5	D	D	D	R	R	N	N
6	N	N	N	R	R	A	A
7	A	A	A	A	A	R	R
8	R	D	D	D	D	D	D
9	R	R	N	N	N	N	N
10	R	R	A	A	A	A	A
11	A	A	R	R	R	D	D
12	D	D	D	D	R	R	N
13	N	N	N	N	R	R	A
14	A	A	A	A	A	A	R
15	R	R	D	D	D	D	D
16	D	R	R	N	N	N	N
17	N	R	R	A	A	A	A
18	A	A	A	R	R	R	D
19	D	D	D	D	D	R	R
20	N	N	N	N	N	R	R
21	A	A	A	A	A	A	A
22	R	R	R	D	D	D	D
23	D	D	R	R	N	N	N
24	N	N	R	R	A	A	A
25	A	A	A	A	R	R	R

D = day shift, A = afternoon shift
N = night shift, R = off-duty

Implementation:

Divide work force into 25 equal-sized groups. Assign one group to each bracket. At the end of each week, each group rotates down to the next bracket. The group completing bracket 25 rotates to bracket 1.

Staffing by Shift:

Day	33%
Afternoon	39
Night	28

FIGURE 5-6

ADOPTED ROTATING DAYS-OFF SCHEDULE BASED ON
6D - 2R - 5N - 2R - 7A - 3R DUTY CYCLE

allow adequate time for each implementation task and to anticipate potential problems. Some departments have used implementation committees composed of officers of all ranks to plan and coordinate a schedule change.

Although efficient mechanisms for schedule change are dependent on the environment and traditions within each agency, successful implementation usually consists of the following activities:

Setting a changeover date. Consideration should be given to selecting a specific changeover date to minimize organizational and officer disruptions. Important issues to consider are:

- Agency workload cycles: changes should be made during light workload times, if possible.
- Agency pay periods: changes should be made compatible with department pay periods to avoid disrupting officer income.
- Agency bid procedures: changes may be required to accommodate a new or altered schedule to determine specific shift assignments and other schedule features.
- Current schedule cycle: it may be possible to eliminate some changeover problems by implementing the new schedule at a natural end point in the current schedule.
- Other department operations: review of the impact on other units within the department and other agencies (e.g., the courts) may indicate that some negative impacts can be avoided by selecting an appropriate change date.
- Other anticipated agency changes: if other significant changes are planned (e.g., increased staff, new beats, new benefits, etc.), the advantages and disadvantages of instituting a schedule change at the same time should also be reviewed.

Disseminating information. New duty rosters or calendars should be distributed or posted well in advance of the changeover date. Information meetings for supervisory personnel or for all officers may be useful. Key issues to be publicized are the reasons for the change, the advantages of the new schedule, and the efforts that are being taken to avoid unnecessary disruptions to agency operations and individual officers.

Reviewing individual and group schedules at changeover. Regardless of the precautions taken, most schedule changes involve temporary inconveniences for some officers. This may include long on-duty periods, disruption in

the level of income if an exact number of hours must be worked in each pay period, or insufficient time off when changing shift assignments. Although some disruptions are inevitable, care should be taken to insure that no officer or group is forced to work an unreasonable schedule during changeover (e.g., working two 6-day work periods back-to-back). To avoid such problems, it may be necessary to modify work schedules temporarily for some individuals or groups.

Reviewing impact upon personnel policies and administrative procedures. This important task should be done prior to schedule implementation. All personnel leave policies should be re-examined to assess whether the current definitions for earned time off for vacations, holidays, etc. are compatible with the characteristics of the new schedule. A notable example is the potential impact of changing the shift length from 8 to 10 hours. If vacation and holidays are defined in terms of "days," a department may find that it has inadvertently increased every officer's time off for vacations and holidays by 25% (see Footnote 2 in Chapter 6, page 95). Among administrative procedures, specification of how pay periods are defined is an important issue. Also critical is a review of record-keeping procedures to insure that methods, appropriate for the new schedule, are used to keep track of employee benefits.

Monitoring schedule implementation. No change occurs without some problems and temporary snags. These can be minimized, or at least controlled before they become important, by monitoring the reactions of supervisors and officers during the first weeks of implementation. Often such monitoring will discover problems related to individual changeover schedules, confusion in reading the new duty rosters, or using new recordkeeping procedures.

CHAPTER 6: SCHEDULE ADMINISTRATION

After the work schedule has been designed and put into effect, the scheduling process is not finished. There are day-to-day events and decisions that may involve a number of personnel issues. It is now time to consider use of the schedule on a daily basis.

To insure that use of personnel meets management goals, schedule administration must be accomplished through stated department policy or the discretionary judgment of those in command. The purpose here is to identify key administrative elements of the schedule and to discuss issues underlying them. These schedule elements include vacation time, holidays, compensatory time off, administrative and unplanned absences, prolonged shortage of personnel, relief factors, and pay procedures.

Vacation Time

Vacation leave is defined as "a series of on-duty assignments from which an employee is excused with pay as an annual fringe benefit."¹ The actual amount of vacation received by officers may be computed as a specified number of:

- on-duty shifts,
- on-duty hours (usually grouped and referred to as "days of vacation")², or

¹The following discussion draws upon issues presented in *Work Schedule Design Handbook: Methods for Assigning Employees' Work Shifts and Days Off*, U.S. Department of Housing and Urban Development, August 1978, pp. 322-323.

²Most police officers will refer to the "number of vacation days" earned or due annually when working eight-hour shifts. If that number is 15/year, it is more accurately $15 \times 8 = 120$ hours/year. If the police department expands its shift length, for example, to a four-day ten-hour work schedule, there are two vacation time possibilities: (a) vacation time remains 120 hours/year or 12 days ($120 \div 10$ -hour days), or

- calendar days (with no regard for the number of on-duty assignments during that time).

Vacation time generally increases with length of service based on the employee's anniversary date.

As noted in Chapter 2, police departments vary widely in their administration of vacation time as indicated by the following survey results:

- Days earned by an officer in the initial year of service range from 5 to 20 days, with 10 days (39%) and 12 days (25%) being the most common.
- Maximum annual vacation length ranges from 12 to 36 days with 20 days (23%) and 25 days (20%) as the most frequent.
- No increase of vacation time with length of service is used by 6% of departments.

Surveyed departments indicated, in their written directives, efforts to administer vacation time efficiently and fairly through policies, procedures and the exercise of supervisory judgment. At the same time, a number of problems were also reported:

- Staffing levels are difficult to maintain during popular vacation times.
- Loss of supervision occurs when too many senior officers are away at the same time.
- Excessive overtime is required when unforeseen demands or unexpected absences occur during popular vacation times.
- Only senior officers can get summer vacation time (seniority is usually used to determine the distribution of preferred times).
- Transfer of officers to another unit with its own vacation schedule may cause shortages.

(b) the officers will continue to receive 15 days vacation/year or 15 X 10-hour days = 150 hours/year, an increase of 25 percent in vacation time. In the first case, officers may be upset at what appears to be a loss of vacation; in the latter instance, management will be concerned at the reduction in patrol resources. To avoid either, vacation time should be expressed as a specified number of on-duty shifts or on-duty hours; the ambiguous term "days" should be avoided.

Major Vacation Scheduling Issues

It would seem surprising that this annual fringe benefit should so consistently cause problems. A careful analysis of the written vacation policies of surveyed departments suggests, however, that vacation scheduling is not as elementary as might be thought. Figure 6-1, developed from those written policies, identifies 13 issues, many with several sub-issues, that involve the administration of vacation time. Among many of the departments submitting copies of their vacation directives, only two or three issues were specifically addressed. Most often, these were the rate of vacation time accrual and the method of distributing preferred vacation times. Several of these issues are discussed with examples below.

Assurance of adequate staffing during vacation times. This management responsibility could at times be overlooked if it is not emphasized in policy with some indication of how adequate staffing will be maintained. An example from a large police department:

1. Distribution of Vacation Time
In order to assure that all beats are adequately manned according to beat plan specifications and to insure that all Bureaus are adequately staffed to provide continuous year-round service, the following guidelines shall be observed:
 - a. It shall be the responsibility of each Executive Director or Precinct Commander to assure that vacations are scheduled within their elements in such a manner that a continuous level of service is provided. During seasonal periods of high crime, a special emphasis shall be placed upon manning of all beats.
 - b. Each Executive Director shall be responsible for assuring that only one (1) Bureau Director within their Division is scheduled for vacation during each calendar week.
 - c. Only one (1) Executive Director shall be scheduled for vacation during each calendar week unless approved by the Superintendent.

Emergency procedures to maintain staffing levels. Closely associated with the issue above, emergency procedures may be necessary if a large number of non-vacationing officers become ill or injured and unable to report for duty or an emergency law enforcement need develops (natural disaster, rash of robberies, civil disturbance). Staffing levels in these situations must be maintained; the employee's right to vacation time as chosen is clearly secondary in importance to the attainment of agency mission and objectives. The following, from a municipality serving a

- Assurance of adequate staffing during vacation times
 - which personnel are covered by written policies
 - assurance statement (no officer shall suffer any loss of vacation time accrued because of department requirements/demands)
- Procedures to maintain staffing levels during vacation periods in the event of emergency/unforeseen conditions
- Periods of the year (dates) when vacation time may be taken
 - how total vacation time may be divided (if necessary/allowed)
 - maximum days allowed at one time
 - minimum days allowed
- Policy on combining vacation time with other forms of entitled or earned off-duty time
- Vacation credit accumulation
 - rate of annual vacation time allowed according to years of service
 - maximum vacation time accumulation allowed
- Vacation selection procedures
 - termination date for indicating preference(s)
 - method of determining the distribution of preferred times for primary vacation period
 - determination of distribution of secondary vacation periods
 - relationship of choice in primary period to that in secondary periods
 - method of accommodating employees wanting to change vacation dates
- Vacation time request and approval procedures
 - advance time for request
 - request procedure (to whom and in what form)
 - approval procedure (who approves and form of notification)
- Impact of vacation absence upon court scheduling, training time, and other duties
- Procedures when officer is transferred to another unit (with separate vacation list)
 - if transfer is officer-requested
 - if transfer is management-initiated
- Compensation procedure if sick time or emergency leave occur during designated vacation time
- Unused vacation time at separation
 - how much the officer is entitled to (maximum)
 - conditions under which the officer is not entitled
- Earned vacation time for part-time employees
- Borrowing unearned vacation time

FIGURE 6-1

VACATION TIME ISSUES

population of 100,000, establishes the principle and also refers to the first vacation time principle: assurance of adequate staffing.

1. Every reasonable attempt will be made to grant an employee's vacation request. However, management has the exclusive right to cancel or disapprove any and all vacations to meet emergency or unforeseen conditions which require department employees to be available for duty.
2. No more than 25% of the work force of a unit may be authorized vacation time simultaneously. Supervisory personnel are responsible for maintaining an adequate personnel level and may exceed the limitation if resources and workload permit.

Vacation selection procedures. Many departments have directives which specify the procedure for selecting vacations. Often such directives also indicate when vacations may be taken and frequently there is a termination date for indicating preference. The method for distributing preferred times is usually seniority. Some police departments attempt to insure that younger officers will get better vacation times by dividing the year into primary and secondary periods and limiting the amount of primary time any officer may use. An example:

Split Vacation Periods

- a. Employees may be allowed to split their vacation periods into calendar week blocks.
- b. Calendar week blocks shall be adhered to unless individual vacation days are in conjunction with another leave as authorized by this order.
- c. Only one (1) part of a split vacation period may be selected on a first choice basis. The other parts of such a split vacation period must be selected after all other personnel in the respective work element have made their first choice of vacation weeks.

Another example:

When an EMPLOYEE desires to take off five (5) or more consecutive accrued days, said period of consecutive days is designated as "semi-annual leave" and must be applied for in the following manner:
By the last Sunday in February and the 1st Sunday in August of each year, each Division Commander shall conspicuously post a notice and form upon which each EMPLOYEE may select his semi-annual leave on a seniority basis as provided for in Article 6.2. Said semi-annual

leave must be taken prior to the next shift change. The notice shall state that each employee requesting semi-annual leave must complete the posted form within ten (10) calendar days after its initial posting in order to prevail on the basis of seniority. An EMPLOYEE may complete the form after the expiration of ten (10) days, but, in such event, seniority does not apply. In this situation it shall be first come, first served. Computation of the five (5) or more day period designated as "semi-annual leave" shall not take into account any regular days off, so that a series of accrued days off will be considered consecutive, even if regular days off are interposed.

Combining vacation time with other forms of leave. Police departments differ in this matter. Some departments are quite liberal:

It is permissible for an employee to combine vacation days, regular days off, compensatory days, holidays, and any other approved time off, for the purpose of designating his semi-annual leave.

Others stipulate, to maintain adequate staffing levels, that "accumulated compensatory time may not be used in conjunction with vacation time."

Vacation credit accumulation. This issue appeared more often among written directives examined than any other; in some cases it was the only directive listed. The rate of accrual is often expressed in terms of days due, for example:

Section 1: All employees hereunder shall receive the following annual leave for vacation purposes, with pay in and for each calendar year, except as otherwise provided: Up to one (1) year of service, one (1) working day's vacation for each month of service; after one (1) year and up to five (5) years of service, fifteen (15) working days' vacation; after five (5) years and up to twelve (12) years of service, eighteen (18) working days' vacation; and after twelve (12) years of service, twenty-one (21) working days' vacation.

Such directives may create ambiguity as discussed in Footnote 2 (pages 95 and 96). Other departments express the accrual rate more precisely in terms of hours:

Earned vacation, based upon years of service, shall be accrued at the following rates:

<u>Years of Service</u>	<u>Bi-Weekly Accrual Rate</u>	<u>Annual Accrual Rate</u>
0 to 4 years	3.0770 hours	80 hours
5 to 9 years	4.6154 hours	120 hours
10 to 14 years	5.3846 hours	140 hours
15 to 19 years	6.1539 hours	160 hours
20 to 24 years	6.9231 hours	180 hours
25 years and over	7.6924 hours	200 hours

Usually a limit is set on the maximum vacation time that can be accumulated. Among surveyed departments it was, with one exception, double the annual earned vacation leave:

No employee shall be granted in any one year more vacation than the equivalent of two full annual vacations.

Impact of vacation absences. Absence from duty for extended vacation periods may affect the officer's responsibilities that continue in his absence. Court scheduling, designated training time, and special assignments requiring his presence often must be accommodated to his vacation leave. Such accommodations appear to be made informally in many departments, since few written directives were uncovered among surveyed departments. An example:

Once an employee's vacation request is granted, it is the employee's responsibility to notify the Court Liaison Coordinator of the time off by submitting the Schedule Change Form.

- The Court Liaison Coordinator will notify the appropriate courts of the employee's scheduled vacation.
- The Court Liaison Coordinator will therefore assist the employee in managing any court conflicts which may arise. However, the ultimate responsibility for managing court conflicts rests with the employee.

Miscellaneous Vacation Scheduling Issues

Police departments mentioned, when asked if scheduling of vacation periods causes problems, the difficulty of accommodating vacation choices when officers are transferred from one unit to another. One department handles the problem this way:

Employees transferred from one element to another after vacation dates for the calendar year have been selected and approved shall not have the right to

"bump" others in their new element during the calendar year. However, where applicable, the transferee may have the option of selecting the vacation date of the employee they are replacing or retaining their original selection.

Another department makes an interesting distinction in this matter:

In the event of a transfer of assignment to a new work unit, an employee's approved first choice for an annual vacation will be honored if the transfer was initiated by management. If the transfer was in response to an employee's request, the employee must initiate a new vacation time-off request and compete for that time off in the new work unit.

The issue of compensation for the officer in the event that sick time or emergency leave should occur during designated vacation leave is not usually specified in writing. Only one surveyed department addressed the issue:

In the event that a death in the family occurs while an employee is on vacation, the employee shall be entitled to Funeral Leave under that Section of this Article; provided the employee notifies the department of such death prior to the end of his vacation. Time charged to Funeral Leave shall not be charged against the employee's vacation time. In the event that the employee cannot notify the department of the death prior to the end of his vacation, due to circumstances beyond his control, the employee must notify the department of the death at his earliest opportunity. Where an illness of three (3) or more days occurs during a vacation, an employee may charge this time to sick leave and such time charged to sick leave shall not be charged against the employee's accrued vacation.

Many police departments stated in their vacation directives that employees, upon separation, are entitled to unused vacation time. The maximum amount allowed is not usually stated. If there are conditions under which the officer is not entitled to vacation leave, they will be stated; for example,

When leaving the City's employment, the employee will normally be paid for unused vacation leave. However, if the employee resigns and gives the department less than two weeks (10 working days) notice, he can lose payment for unused vacation leave. Employees discharged do not receive payment for leave.

Very few surveyed police departments included directives about earned vacation time for part-time employees. Examples of how two municipal departments state the issue:

Each year, each employee who is paid at a bi-weekly rate and has had continuous part-time active service throughout the year, shall be credited with annual vacation on the same basis as full-time employees provided, however, that such credit shall be in the proportion that their part-time employment bears to the full-time employment.

and

Permanent, part-time employees who work in year-round jobs shall earn and take vacation leave based upon the following:

10-20 hours worked per week	2 hours per month
21-39 hours worked per week	4 hours per month

Borrowing unearned vacation time is an unusual employee benefit that appeared in the directives of only one surveyed police department:

Borrowing: An employee may borrow up to forty hours of unearned vacation subject to the approval of his department head.

These vacation time issues vary in importance among individual law enforcement agencies. In setting forth the full range of issues, the purpose here is to assist police administrators in considering the effective day-to-day management of vacation time.

Holidays

Holidays (time off with pay from a regularly scheduled work shift) cannot be observed by closing the law enforcement agency for the day. It is commonly accepted that officers who work on designated holidays as well as those officers whose regular day off occurs on a holiday are entitled to some form of compensation.³

³Surveyed police departments, when asked if cash payment is allowed in place of taking time off for a due holiday, responded Yes (52%), No (48%).

Surveyed police departments exhibit considerable diversity in the methods used to provide holiday compensation. In terms of the actual number of holidays allowed, they ranged from none to 14 allowed per year, with 9 through 12 accounting for 73% of the departments.⁴ Examination of the written directives for the surveyed departments revealed few directives about scheduling and compensation for holidays. This directive from a small municipality is typical of many departments:

Each policeman covered by this agreement shall, in addition to his regular weekly wage, be paid 1/4 of his weekly wage for each of the following holidays:

- | | |
|--------------------------|------------------|
| 1. New Year's Day | 6. Labor Day |
| 2. Washington's Birthday | 7. Columbus Day |
| 3. Patriot's Day | 8. Veteran's Day |
| 4. Memorial Day | 9. Thanksgiving |
| 5. Independence Day | 10. Christmas |

In addition to (or in place of) these standard holidays, many departments allow what are called "discretionary holidays"⁵ or "floating holidays," usually with a directive about when these can be taken.⁶ Many departments list the employee's birthday as a holiday for the officer. Still other departments do not designate any holidays; they merely set aside eight hours per month. As one department explained:

Officers accrue 8 hours a month which goes into an account with earned compensatory time. Officers can accrue a maximum of 144 hours of personal time which can be taken off as staffing levels allow. Competition for a given day off is decided by seniority.

Holiday Issues Common to Vacation Time Issues

Some law enforcement agencies treat holidays exactly as vacation time; they are lumped together as "annual leave." In these circumstances, holidays lose their identity as a separate administrative element of the schedule. Where this is not done, however, there are several issues that are similar to the vacation issues discussed above.

⁴One department indicated its patrolmen's association gave up all holidays in return for an eight-hour work shift with a duty cycle of six on-duty days followed by three off-duty days.

⁵One large department allows four discretionary holidays annually, one taken each quarter.

⁶For example: "The first floating holiday can be used any time between January and June of the current year. The second floating holiday will be used between July and December of the current year."

Assurance of adequate staffing. Although departments rarely develop a separate directive establishing this principle, its presence is often referred to. As examples:

Each officer may take a duty-day off as a holiday with two provisions:

1. It will be taken on a seniority basis and
2. There must be sufficient manpower as determined by the Duty Captain.

and

Commanders will plan holiday scheduling for the entire year, requesting officers to make selections as far in advance as necessary to maintain the 10% limitation.

Selection procedures. Although used in varying ways, seniority is almost universally invoked whenever there is mention of determining the distribution of preferred times for taking holiday time due.

The question of holidays taken separately or in blocks. Some agencies settle this question in a simple manner:

Holidays may be taken separately or in blocks. For example, four, five or six holidays may be used at one time so that a number of consecutive days of vacation results.

For others, it is a complex matter:

Personnel not wishing to take the full twelve holidays together may take holiday time in increments of from one week to one day; however, all personnel must take a minimum of five consecutive holidays per year off. Personnel wishing to avail themselves of this optional holiday selection method will do so in the following manner:

1. Only holiday periods of one week or longer may be selected when the employee first becomes eligible. Failure to select the minimum holiday period will result in the loss of seniority to the next senior employee. Failure to select the second week will result in the loss of seniority to all employees.
2. Holiday time taken in increments of one or more days, but less than one week, will be permitted providing the following requirements are met:

- a. Watch Commanders must be notified in writing not less than two weeks prior to the day or days the employee wishes to take off. The granting of the request will be based upon considerations of department operations, and with the approval of the Division Commander.
- b. The first request submitted for holiday time on the optional method will be given preference.
- c. Holiday periods selected by members under provisions of III.B.1. (one week or longer) will not be disrupted by members exercising this option.

Request and approval procedures. Law enforcement agencies develop standard procedures for requesting holiday time off (to whom and in what form), as well as approval procedures (who approves and the form of notification). These often follow the same procedures used for vacation time.

Miscellaneous issues. Other holiday-related issues include:

- holidays occurring during vacation leave,⁷
- compensation for officers in the event of sick time or emergency leave occurring during holiday time-off,⁸
- unused holidays at separation,⁹ and
- holidays for part-time employees.¹⁰

These issues are not usually included in department directives.

⁷For example: "If a holiday occurs while an employee is on annual leave or sick leave, the employee will receive straight time pay for such holiday, and the day will not be charged against accrued annual leave or sick leave."

⁸For example: "If in the event of an emergency it is necessary to reschedule a holiday, the officer will take the alternate date designated." Also see Footnote 7 above.

⁹For example: "An EMPLOYEE whose employment terminates and the last day worked precedes a holiday shall not be paid for such holiday, except for EMPLOYEES whose retirement date coincides with a designated holiday."

¹⁰For example: "All permanent, part-time employees who work in year-round jobs shall be paid for holidays according to the number of hours each is normally scheduled to work. No other part-time, seasonal, or temporary employees are eligible for holiday pay."

Payment for Holidays

The manner in which patrol officers are reimbursed for working holidays or when holidays occur during off-duty days varies considerably. In written directives holiday payment appears to be discussed in one of two modes:

- Holidays considered as a totality; that is, as a total sum of "time off with pay from regularly scheduled work shifts."¹¹ Whether the officer is scheduled to work or not on a particular holiday is not at issue.
- Holidays considered as specific individual days when the officer must be on duty; this is usually viewed as a hardship for which the officer deserves extra compensation.

It is informative to examine the different ways that departments choose to reimburse their officers in each of these two modes.

Holidays considered as a totality. Four different possibilities emerged among departments submitting written directives.

1. Money Only. This is the simplest method of holiday reimbursement and is often accomplished through an incremental payment added to each paycheck. Some departments, however, choose a method of payment with more impact:

Each officer will receive one lump sum check for eleven holidays in the first week of December.

Another department reports:

Officers work holidays if the holiday falls on a regularly scheduled workday. All officers receive a lump sum payment for 10 days in December, regardless of whether the holiday is worked or not.

Hence, with the "money only" method, holidays can effectively be ignored as a work scheduling complication; they become instead a factor in the annual budget. If an officer wants time off on a holiday, he must use vacation or compensation time since there are no off-duty times specifically designated as "holiday time."

2. Compensatory Time Only. Other police departments remove holidays as a separate scheduling issue by converting them into compensatory time-off.

¹¹See Appendix A for a complete definition of "Holiday."

The county gives one holiday a month. You can take it off or accumulate them.

Another police department uses the following method:

Police officers and non-commissioned employees below the rank of Assistant Bureau Directors will receive one (1) holiday per month, excluding the months of June, July, and August. These restrictions shall not apply to employees assigned to elements that traditionally receive holiday leave on the authorized holiday.

- a. Watch Commander/Bureau Directors will publish a monthly list of the available dates and the number of persons that may take holiday leave on those dates.
- b. Employees shall choose holiday leave on the basis of seniority. If there is a conflict between employees in choosing their holiday leave, the procedures for holiday selection shall be the same as the procedures for vacation selection as outlined in Section VIII., Vacation Policy, B.4. of this Order.

3. Money or Compensatory Time. Some police departments provide the option of cash or time off as compensation for holidays. Some examples of directives (a bit legalistic) stating this:

Any employee entitled to receive holiday pay may elect to take compensatory time off in lieu of cash payment of his holidays, provided, however, that the employee shall request in writing such compensatory time off from the Director of Public Safety, who, in his discretion, which shall be reasonably exercised, may grant the employee said compensatory time off.

and

Employees shall be entitled to be paid cash for all holidays, except as provided elsewhere herein. Employees shall have the option to convert holidays to additional leave times set forth in Paragraph C.

4. Holidays Added to Vacation Time. Several police departments report that holidays are simply added to vacation time and are taken in the same manner as vacation leave.

Holidays considered as specific days that must be worked. Because most workers in America do not work on holidays, many police departments compensate officers who work holidays at a premium rate. One department's directive awards time-and-a-half for those working, but only "straight time" for those not on duty.

Officers who do not work on a holiday shall be paid for eight hours at their straight time rate. Work performed by an employee on a holiday will be compensated at the employee's straight time rate plus time and one-half that rate for the first eight hours. Thereafter work will be at straight time unless the employee qualifies for overtime under the overtime provisions of this agreement.

Another department does not make this distinction:

All law enforcement personnel are paid time and one-half for holidays and stay with their work schedule through the rank of Sergeant. Captains and above receive holidays off.

Other departments report that "officers work holidays if a regularly scheduled workday and are paid double time." The directive of one department awards double payment only if compensatory time is not given for working on a holiday:

If an employee is required to work on a holiday, and is not given compensating time off, the employee shall be paid at twice his normal rate for such holiday.

Still another police department singles out Christmas and Thanksgiving as special days to be compensated for with a factor of 2.5:

Employee's who work on Christmas day shall be paid at a rate of 2.5 times regular pay. In the fiscal year 1980/1981, employees who work on Christmas Day and/or Thanksgiving Day shall be paid at a rate of 2.5 times regular pay.

Other Holiday Issues

Calling in sick on holidays. Several police departments have directives to administer the situation of the officer who calls in sick when scheduled to work on a holiday:

If an employee is scheduled to work on an authorized holiday and sick leave is requested for that

day, the employee will not be eligible to receive holiday leave for the next authorized holiday, unless that employee provides the immediate supervisor with satisfactory evidence confirming the illness/injury (e.g., a written statement from a physician).

Another department is even more careful to administer sick leave on holidays for which officers are scheduled to work:

An EMPLOYEE who is absent on a holiday for which such EMPLOYEE is scheduled to work shall be placed on leave without pay during such absence unless the absence is verified by a medical statement as defined in Article 14.9. If the absence is so verified, the EMPLOYEE will receive his regular pay for the day and will not be charged a day of sick leave for the holiday.

For the purposes of this agreement, "medical statement" shall be defined as communication from a licensed medical doctor (M.D.) or Doctor of Osteopathy (D.O.) stating:

- a. The date or dates the EMPLOYEE was seen professionally by the doctor;
- b. The illness or ailment which was diagnosed or treated;
- c. The treatment and recommendations prescribed; and
- d. The date the EMPLOYEE was, or is expected to be, released to go back to work.

Other disciplinary matters. Some police departments find it necessary to include a directive insuring that officers report to work on the day before or the day following a holiday:

To receive holiday pay, officers must be in a work status or leave-with-pay status, or on their regular day off, the day preceding and the day following a holiday.

and

In order to receive pay for an observed holiday, an employee must not have been absent without authorized leave either on the work day before or after the holiday.

Special holidays. Certain holidays are administered in a special way. In some police departments, each officer must receive time off on at least one of the three major holidays: Thanksgiving, Christmas, and New Year's

Day. One department mentions running "short shifts" on these days; the entire patrol force works, but each officer for only a few hours. Finally, one department mentions that "veterans cannot be made to work on Memorial Day or Veterans Day; New York State Military law and the Public Officers law for New York State forbid it."

Other Administrative Elements of a Schedule

Although vacation and holiday time-off are major elements of schedule administration, there are a number of other administrative matters that often arise.

Compensatory Time-Off

Patrol officers frequently are at the scene of accidents and emergencies, processing arrests and other paper work, making court appearances, or serving arrest warrants when their regular duty time has run out. For extra time served beyond the official work week, most departments provide some form of compensation. Departments were requested to indicate the manner of reimbursement "when officers are required to put in unscheduled extra hours because of special events, emergencies, investigations, etc." Their responses are shown in Table 6-1. Almost all of the 34 departments designating "Other Reimbursement" did so to indicate that extra pay or compensatory time or both are used to reimburse for unscheduled time. When the "Compensatory Time" method is used, time is usually allowed to accrue until eight hours or more is earned, at which point an overtime day is taken at the request of the officer and discretion of his/her superior. If the number of "comp-time" days earned is not too great, overtime days can be taken as they accrue at the choice of the officer or on a day of the week when there is usually less workload.

In some police departments the process of scheduling "comp-time" becomes a regular procedure; a weekday with a lighter workload is designated a "Kelly Day"¹² on the schedule ahead of time. This is a day on which an officer is scheduled to work but may be taken off if he/she has accrued eight or more hours of "comp-time." An effort is usually made to schedule Kelly Days with other off-duty days. There can be procedures to ensure that staffing levels will not be violated if a Kelly Day is taken. When several officers request "comp-time" days off, the supervisor

¹²See Appendix A for definitions of "Kelly Day," and responses to questions 35 and 36, Police Work Scheduling Survey, Appendix D.

TABLE 6-1

METHODS OF REIMBURSEMENT FOR UNSCHEDULED WORK TIME^a

Manner of Reimbursement	Police Departments	
	Number	Percentage
Extra Pay	63	54.8
Compensatory Time	18	15.7
Other Reimbursement	34	29.6
No Response	4	--
Totals	119	100.1 ^b

^aQuestion 37, Police Work Scheduling Survey, Appendix D.

^bThe percentage total does not equal 100.0 due to roundoff of individual elements.

usually schedules these by distributing them over several Kelly Days.¹³

If officers are scheduled regularly to work more time per week than is called for in the average work week, the process of repaying them with time-off can be made routine by scheduling extra off-duty days (also called Kelly Days in some departments) into the unit's work schedule. In this way the schedule administrator can plan ahead of time for overtime if it is needed. Alternately, if officers are scheduled regularly to work less time per week than is called for in the average work week, make-up on-duty days may be inserted into the schedule by cutting short one or more off-duty periods. (These are called "payback days" in some departments.)¹⁴ Whichever method is used, the schedule administrator will find it a complication for regular scheduling.

¹³Among surveyed departments, only 11.2% indicated they use Kelly Days.

¹⁴Only 4.2% of surveyed departments stated that they utilized payback days.

Kelly Days may be either assigned under a pre-specified procedure or scheduled at the discretion of individual officers (e.g., by seniority or rotating order of choice). Pre-specified procedures usually involve assigning each officer an "off number," with all officers (usually from different groups) who have the same "off number" taking a Kelly Day on the same day. Although complicated to set up, these procedures enable managers to minimize staffing disruptions and avoid the problems associated with maintaining records when Kelly Days are scheduled in a less structured manner.

By using Kelly Days and "payback days," the average work week produced by a schedule can be modified without altering the basic duty cycle or number of groups required. In addition, Kelly Days can be used to interrupt long periods of consecutive work days and payback days can be used at management discretion to cover for absences. Kelly Days and payback days, however, can disrupt team integrity by causing individual team members to be on or off duty when other team members are not.

Administrative and Unplanned Absences

Administrative and unplanned absences contribute to personnel shortages and hence can impact negatively upon work schedules. Administrative absences include:

- in-service training time;¹⁵
- court time, either while on-duty or on the officer's time, but then compensated for by time-off taken later;
- military leave;
- planned special assignments;
- educational leave to attend school or for advanced training; and
- limited duty time (e.g., for an officer recuperating from an illness or injury).

Unplanned absences include:

- sick leave,
- personal emergency leave,

¹⁵Surveyed departments were asked if training time is designed into the schedule; 58.1% indicated yes.

- funeral leave (time taken in the event of death in the immediate family is often deducted from sick leave or personal emergency leave), and
- unexpected special assignment.

Whether planned or unplanned, such absences may add up to a significant percentage of the total time each officer is scheduled to be available for duty. The schedule administrator will want to keep careful records of these absences in order to predict their occurrence so that steps can be taken to lessen their impact upon staffing levels.

The Metropolitan Police Department, City of St. Louis, studied administrative and unplanned absences and found that, on the average, 27.5 on-duty days per year were used by each officer.¹⁶ This represented 12% of the 231 on-duty days scheduled for every patrol officer (365 minus the 134 days needed for regular off-duty days, vacation time, and holidays):

<u>Category of Absences</u>	<u>Average Days Absent Yearly Per Officer</u>
Sick Leave	9.1
Special Assignments (Details)	4.0
Sick Injured	3.6
In-Service Training	3.0
Court Overtime Taken	2.1
Limited Duty Status (i.e., officer not able to perform regular assignment)	1.8
Furloughs (Death and Other)	0.3
Military Leave	0.3
Other Absences	3.3
Total	27.5

Staffing levels on some watches can easily be affected by absences of this size. Where budget and staffing allocation make it possible, this problem can be remedied by raising staffing levels on the watches most affected, thus creating a buffer which allows for adequate patrol operations despite absences. For example, the figures for the St. Louis Police Department above indicate that the patrol administrator may

¹⁶Metropolitan Police Department, City of St. Louis, "Relief Factor for District Line Platoon Officers," February 6, 1981.

choose to raise staffing levels 12% on the watches most affected. An increase of this magnitude, however, will reduce the number of personnel available for other watches and thus lessen the schedule's ability to distribute staff to meet the workload.

Prolonged Shortage of Personnel

At times a patrol division unit may have to operate for long periods of time without a number of officers and thus be forced to go below authorized minimum staffing levels. This may happen for a variety of reasons: death, serious injury, assignment to other duties, or temporary detachment to another police division or law enforcement agency. There are a number of ways that prolonged shortages of personnel are dealt with when it presents a scheduling difficulty:

- Increase the minimum staffing level as a buffer for watches that are already low and thus are sensitive to further staffing reductions. This solution is preferred when it is not certain that the prolonged shortage will occur, or, if already in effect, a prolonged absence may terminate sooner than expected.
- Revise the schedule of some officers to cover shortages on some watches. This involves determining those watches which are seriously deficient and reassigning officers to cover the deficiency. Any extra on-duty days for an officer will be added to his/her accumulated overtime and compensated for in the usual way.
- Assign paraprofessionals (community service officers, police cadets, etc.) to duties that that can be performed by non-sworn employees. Although not a satisfactory solution, this effort may be the only possible action to be taken.
- Redesign the entire schedule on the basis of reduced manpower; this solution should be used only if serious deficiencies exist for a number of watches.

Using Personnel Data to Determine the Shift Relief Factor

The discussion of schedule administration thus far has focused on patrol officer unavailability for duty. Some officer absences are manageable by the patrol administrator (those designated above as administrative absences); other absences are not. All absences, however, even regular days off, impact upon the ability of the patrol division to meet desired staffing levels. All represent time lost to the operational needs of the division. Information about personnel absences can be used to

determine the "shift relief factor"¹⁷ which can be used to determine how many officers are needed to support a specific number of positions for each shift. Based on officer availability, the factor provides a quantitative link between all types of absences and actual staffing levels available for patrol.

The shift relief factor (SRF) for a law enforcement agency indicates the number of officers needed to fill one shift position seven days a week. SRFs typically have values between 1.6 and 1.9 and can be multiplied by the number of positions desired for the shift to determine the total number of officers required. Hence, through use of the SRF the administrator can anticipate all the ways that officers are absent from duty.

The first step in determining an agency's SRF is to calculate the average number of absences for a set period of time (usually one year) per officer. All kinds of absences are included. In addition to administrative and unplanned absences, vacation time, holidays and regular days off (per year) must also be considered. For example, a patrol commander may develop the average figures given below after gathering annual data on all officers:

Type of Absence	Total Annual Days Off
Regular Days Off	104
Vacation	15
Holidays	10
Inservice Training	2
Court Time	7
Military	1
Planned Special Assignments	2
Education/Advance Training	3
Limited Duty Time	2
Sick Leave	4
Personal Emergency	1
Unexpected Special Assignment	1
Total Average Annual Absences Per Officer (A)	152

¹⁷Police departments differ in the terms they use for the relief factor; "availability factor," "assignment factor," and "duty factor" are commonly used. A more detailed definition is provided in Appendix A under "Relief Factor."

Once the average annual number of absences per officer (A) is known or estimated, the SRF is calculated as follows:

$$\text{Shift Relief Factor (SRF)} = \frac{\text{Number of Agency Work Days per Year}}{\text{Average Number of Work Days per Year per Employee}} = \frac{365}{365-A}$$

In the example above, the shift relief factor is

$$\text{SRF} = \frac{365}{365-152} = \frac{365}{213} = 1.71 \text{ officers/position on one shift}$$

Given the average number of absences per officer on one shift,¹⁸ the shift commander can now use the SRF to determine how many officers are required to staff the authorized number of positions seven days per week. This is done as follows:

$$\text{Shift Relief Factor} \times \text{Number of Positions/Vehicles to be Filled} = \text{Number of Officers Required to Fill the Positions/Vehicles}$$

Using the sample SRF derived above and assuming the shift commander wants to have seven one-officer vehicles in the field, the equation yields the following:

$$1.71 \times 7 = 11.97 \text{ officers on one shift.}$$

Thus, the SRF indicates that twelve officers must be assigned to the shift in order to field seven vehicles on one shift every day of the week.

¹⁸The average may vary from shift to shift.

Pay Procedures

As discussed in Chapter 2, there is little doubt that the level of pay is an important aspect of the job to every sworn officer. It is also true that pay procedures can have an effect on how personnel are scheduled, and hence may be considered part of work schedule administration. Such procedures may limit the range of scheduling alternatives that can be considered. For example, if employees are paid for the actual number of hours worked in a pay period rather than a set base pay (e.g., 1/26 or 1/52 of annual salary), then schedules involving a variable number of workdays within the pay period may be considered unacceptable.

Pay procedures may also influence the amount of payment for overtime work and hence officers' willingness to work overtime. Overtime can be defined in a number of different ways; for example, as hours worked in excess of:

- 8 hours in any 24-hour period,
- 40 hours in a calendar week,
- 40 hours in any seven-day period,
- 80 hours in two consecutive calendar weeks, or
- 80 hours in any 14-day period.

Some of these alternatives will limit the kinds of schedules that can be used. A schedule that only averages 40 hours per calendar week (i.e., the actual number of hours worked from week to week may be less or greater than 40) will create imbalances, for example, if overtime is based on hours worked each calendar week. Surveyed departments were asked: "Excluding overtime or special pay, are patrol officers paid for the actual number of hours worked within a pay period or do they receive a set base pay each pay period?" Of the police departments that responded, 27.6% indicated that they pay for actual hours worked.¹⁹

Other Issues

Other administrative elements of the work schedule may require consideration by the police manager; for example, how much should he/she plan or allow for:

- use of seniority throughout the total scheduling process;
- trading among officers of shifts, vacation and holiday time, and compensatory time;
- use of administrative personnel to cover shortages; and
- use of part-time employees where possible.

¹⁹Question 39, Police Work Scheduling Survey, Appendix D.

CHAPTER 7: INDICATORS OF EFFECTIVE SCHEDULING

As explained in Chapter 1, work schedules used by law enforcement agencies reflect their individual workload patterns, local traditions, and specific management objectives. As a result, it is impossible to determine the most effective schedule for all police agencies, or even ideal types of schedules for agencies of varying responsibilities or size. As Tyler has stated:

No two organizations are exactly alike; nor their needs; nor their goals. Therefore it is no more logical to apply one scheduling technique to all work situations than it is to try to make everyone wear the same size of shoes. Some would be too cramped. Some would find the fit perfect, while others would find the fit entirely too loose.¹

There are indicators, however, that administrators of police agencies can use to assess the effectiveness of their schedules. Many are identified earlier in this report. These and other indicators are presented here to focus on the relationships between management objectives, field operations, and individual goals as they are operationalized in police work schedules.

What is meant by effective scheduling? Most would agree that an effective work schedule can produce:

- reduced sick leave,
- increased incentive to work,
- less wasted effort,
- more efficient use of equipment,
- reduced overtime,
- increased public service with consequent improved community relations,
- more leisure time,
- higher morale, and
- enhanced recruitment capabilities.

¹R. Tyler, An Analysis of Various Work-Time Scheduling Methods (Austin, Texas: Texas State Department of Highways and Public Transportation, 1977), p. 38.

In the context of this report, an effective schedule is one that in the judgement of the police manager adequately meets management scheduling objectives. As noted in Chapter 1, all police agencies use work schedules to provide adequate staffing levels, proper supervision, and an effective patrol force. Effective schedules also meet the scheduling objectives of individual officers. These include ability to do the job, compatibility with personal life, and schedule equity. Finally, an effective schedule is one that is sensitive to the environment in which the agency operates; that is, the governmental body, the community itself, and the criminal justice system at the local, state, and federal level.

Thus, in utilizing indicators of effective scheduling, a police department should consider at least three areas:

- management's ability to meet department goals,
- officer needs and morale, and
- agency operating environment.

Before identifying specific indicators for each of these areas, some preliminary comments are in order. A review of police management literature suggests that most departments have difficulty in objectively assessing the benefits of work schedules. Instead of carefully weighing pros and cons, law enforcement scheduling literature consists mostly of testimonials to the success of a recent schedule change.² A 1981 study of departments using the four-day ten-hour schedule by the California Commission on Peace Officer Standards and Training (CAL-POST) is an exception to this pattern.³ The CAL-POST report is an excellent example of objective analysis of a specific schedule type. California's experience with the four-day ten-hour schedule began in 1970; ten years later, CAL-POST surveyed 104 police departments that had used the schedule and found that 14 departments had subsequently dropped it.

Given the central role that work schedules play in several key agency objectives, periodic assessments of schedule effectiveness would appear

²See the articles referenced in Appendix F: Annotated Bibliography on Police Work Scheduling. In particular, note those by P. Brown, W. Cann, G. Davis and J. Tracy, and the Louisiana State Police Research Unit.

³California Commission on Peace Officer Standards and Training, The Four-Ten Plan: California Law Enforcement, 1981, 22 pp. The following discussion of indicators of effective scheduling draws upon several items discussed in Part III of this report.

to be appropriate management practice. CAL-POST, however, found that less than 10% of police departments converting to the four-day ten-hour schedule had conducted any thorough evaluation of the potential impact of the new schedules on their departments.⁴

The definition and acquisition of data relating agency performance to specific schedule properties is a difficult task. It is easier to monitor only the activities of a public service agency than it is to secure hard figures relating to its effectiveness. It may be necessary, in some cases, to rely only on the considered judgement of three or four key agency personnel.

Management's Ability to Meet Department Goals

The following indicators can be used to consider a schedule's effectiveness in meeting management's objectives. Each police agency may add indicators to this list based on its own department objectives. In several cases, "operational measures" are identified for specific indicators. These can be used to measure the degree of attainment of a specific management objective. Measures should be quantitative if possible, but since they are dependent upon the nature and accessibility of available data, qualitative or judgmental measures may be more appropriate in some cases.

Manpower availability to cover workload demands. This objective is central to the patrol function. An effective schedule will provide appropriate staff levels throughout the 168-hour week. CAL-POST amplifies this point well:

The question of manpower availability in relation to service demands of the community should, under normal workload circumstances, be considered in the context of the community's police service expectations and the (community's) ability or willingness to meet policing costs. Departmental policy regarding priority calls, use of specialized units, patrol strategies, etc. must also be deployed on the basis of calls-for-service and the capability to respond within an acceptable time period.⁵

Appropriate operational measures include average response times to routine, urgent, and emergency calls, and the number of officers scheduled

⁴CAL-POST, p. 4.

⁵CAL-POST, p. 12.

compared to the number of officers appearing for duty. Existing departmental records can be inspected for appropriate data (i.e., log sheets, computer printouts, or whatever summarization of patrol activity by shift is customarily used by the department). Written directives specifying procedures for stacking (holding calls unable to be answered at the time in some pre-determined order for later response) and answering calls for service can be rewritten, so that communications personnel are made responsible for recording how frequently stacking procedures are used on each shift.

Patrol commanders must be cautious in distinguishing between the number of units planned for a watch and those that in reality are operational. Analysis, for example, of the day watch in the first precinct of St. Louis County for the year 1975 indicated that although 11 units were scheduled to be in the field each day, for only 81 of the 365 days was this actually the case.⁶ A breakdown of the number of units fielded is shown below:

Number of Patrol Units Fielded	Number of Days During 1975
7	1
8	8
9	18
10	65
11	81
12	91
13	63
14	27
15	5
16	2
Unknown	4
TOTAL	365

One indicator of schedule effectiveness is a comparison of how closely actual patrol unit levels match scheduled levels under one work schedule as compared to another.

Patrol division output. Work schedules provide different levels of productivity in different organizational settings. Public service employees, for example, who have gone to the four-day ten-hour schedule report that they are more available for citizens who only work eight-hour shifts and

⁶The Institute for Public Program Analysis, Field Evaluation of the Hypercube System for the Analysis of Police Patrol Operations: Final Report, St. Louis, Missouri, 1977, p. 94.

that they are able to utilize the additional time to get necessary administrative work done. A highway department reports:

Signs and cones can be set before traffic becomes a problem. By the time traffic builds up the crew can be working safely. The extra two hours each day allows them to finish the work they are doing for a savings in gasoline, equipment wear and travel time; and ultimately, more money.⁷

In the police patrol context, effective schedules should enhance productive activities and minimize unproductive time. The standard "Patrol Daily Activity Form" for each officer can provide operational measures for this indicator. Total incidents after tallying are frequently weighted to produce cumulative points in each area (traffic, non-traffic violations, general patrol activities, vehicle accident assignments, criminal incidents-statute violation, ordinance violations, etc.). These figures for each officer can be averaged and studied for each shift.

Operational expenses. The cost input side of the productivity equation can be affected by the type of schedule used. Departments that have changed to new schedules sometimes report better deployment of manpower during peak workload times; that is, better use of patrol resources. The major costs for patrol operations involve total time required by officers assigned to the shift and vehicle costs. Operational measures for these are discussed in the following two paragraphs.

Overtime accrual. Although part of operational expenses, this item deserves special attention. Extra time earned will have to be reimbursed in money or time. CAL-POST affirms:

The amount of overtime should be analyzed detailing the circumstances under which it was authorized and at what time of day or shift it occurred. The issue of overtime should also be analyzed based on its relationship to court time, hold over periods for report writing and personnel deployment requirements. Court time analysis is particularly important to review. If officers have more days off, the chance of overtime due to court appearances increases proportionately.⁸

⁷D. Terry, "In Throckmorton They All Like the 4-Day Week," Transportation News, December, 1976, p. 2, as quoted in Tyler, p. 15.

⁸CAL-POST, p. 12. The Louisiana State Police, when going to a 12-hour shift schedule, projected a savings of 21% of unscheduled overtime for a total annual savings of \$32,050.

If not in use already, "Overtime Worked" forms can be developed that are filed by each officer at the occasion of necessary overtime. The form should identify the circumstances, time of day, shift, purpose (court, report writing, unforeseen deployment requirements, etc.), and total time worked. Periodically these forms can be tallied and analyzed for each shift.

Vehicle use and maintenance. Vehicle costs constitute a major element in every patrol division budget and should be examined in terms of their interaction with the work schedule. Specific issues to consider include:

- cost of vehicle operation,
- vehicle availability (unnecessary duplications),
- repair schedules, and
- turnover rate.

Maintaining a log for each patrol vehicle is a common procedure in many law enforcement agencies. If possible, an effort can be made to use these to obtain vehicle use and maintenance expenses by shift, so that a relationship to scheduling practices can be shown.

Operational communications. Information flow between shifts and with other units of the department is important. The impact of work schedules on the exchange and use of vital information about what is happening in the community should be reviewed. Developing operational measures of effectiveness for this indicator is not easy. The administrator will want to see that written directives specify procedures to be followed to insure that important information is transferred between shifts. Supervisors, for example, can be required to record items of information passed on to the next shift. The supervisor of the following shift would complete the form, showing items acted upon and the results; another form would be initiated at the end of this shift for the next supervisor. In this way a compilation of what was communicated and its effectiveness can be analyzed. Where inadequate or wasteful information procedures can be shown to be schedule-related, appropriate changes can be made.

Training time and costs. Training for patrol operations can be made more difficult or, conversely, overemphasized depending on the work schedule. Correspondingly, training needs can hamper work scheduling. CAL-POST affirms: "Each department should carefully review training requirements and needs and determine impact on available manpower for scheduling purposes."⁹ It is difficult to develop an adequate measure of effectiveness for this indicator. The administrator, nevertheless, can

⁹CAL-POST, p. 12.

examine the compatibility of work schedule and patrol division training, noting:

- if training involves overtime (how much and for what shifts),
- the impact of current training practices on maintaining minimum staffing levels (by shift), and
- imbalances among shifts in bearing the negative effects of taking officers away for training time.

Hidden costs for other units. There is often a need to assess schedule-related costs for sections or divisions that work closely with the patrol division. Are there periods of unusual workload (or slack) caused by the patrol division's work schedule that necessitate extra personnel or wasteful procedures in other units? Are there imbalances in the use of equipment? This may involve communications (dispatchers and/or complaint operators), records, youth section, criminal investigations, traffic, and crime prevention. To provide adequate measures of effectiveness, data should be separated by shift.

Equipment. Comments made above about vehicle use and maintenance also apply to other equipment used by the patrol division. An inventory of equipment can be made with information about repair schedules, maintenance and replacement costs, availability during periods of heavy workload, and unnecessary duplications.

These indicators of schedule effectiveness constitute a basis on which to begin assessing a schedule's role in meeting management goals. They and their accompanying measures are guidelines among a variety of possible ways of assessing the schedule. There are departments that will want to use indicators not mentioned here; and in some cases, simply interviewing key agency personnel about schedule-related matters may provide adequate information.

Although not as measureable as the indicators of schedule effectiveness cited above, police administrators may want to examine their current schedule in terms of its respect for and non-violation of the basic principles of police organization. These are:

- Similar or related tasks are grouped together under the control of one person.
- Specialized units are created only for the overall enhancement of department productivity.
- Demarcations between unit responsibilities are clearly drawn.

- Clear channels are established for information flow up and down, and for the delegation of authority.
- Structure and terminology of the department facilitate officers' understanding of the purposes and responsibilities of the organization.
- Each individual, unit, or situation is under the immediate control of only one person.
- A sphere of supervisory control large enough for economical supervision but not larger than can be managed effectively is used.
- There is reasonable delegation of responsibility and authority.
- Supervision is provided for every organization member.
- Each assignment given is commensurate with authority, while those with delegated authority are held accountable for the use and non-use of it.¹⁰

Officer Needs and Morale

A second area in which to consider the effectiveness of a police patrol work schedule is its ability to meet officers' needs. Management theory affirms that organizational characteristics which meet workers' needs will eventually improve morale and, hence, the quality and quantity of production. Nevertheless, caution must be observed at this point. As noted earlier, a work schedule can be viewed as a compromise between management objectives and personnel issues. Some schedule types may be immediately accepted because they satisfy worker desires,¹¹ but tension

¹⁰ Adapted from O. W. Wilson's standard treatise on police organization. See O. W. Wilson and R. McLaren, *Police Administration*, Fourth Edition (New York: McGraw-Hill, 1977), pp. 69-116.

¹¹ One example is the four-day ten-hour schedule because it provides the extra day off each week. Tyler says:

One of the foremost benefits is the extra day off. It is usually scheduled on either Friday or Monday, providing a three-day weekend every week. It affords the employee business interactions with organizations which are not usually open on Saturday or Sunday. It makes weekend trips more feasible and less rushed. It is a

later develops for management as it becomes evident that the attainment of management objectives has been impaired.¹² This tension between the achievement of department goals and the needs of personnel is perhaps an element of all schedules.

Several indicators to gauge a schedule's effectiveness in meeting officer needs are presented below. The concern is with agency personnel; hence, it is more difficult to identify specific performance measures.

Unnecessary stress and fatigue. Since police work, by its nature, is stressful, work schedules should avoid creating additional stress. Well-managed organizations minimize stress for the employees, whereas poorly-run organizations may place unnecessary burdens on already overworked troops. Although difficult to measure, "stress check-ups" on scheduling procedures may be revealing. Key issues to consider are:

- shift lengths,
- maximum number of consecutive on-duty days,
- rotation frequency, and
- time off between shift changes.¹³

Bullard presents and discusses the following police practices all avoidable, which produce stress for the troops:

- assigning jobs with ambiguous/overlapping responsibilities,
- conducting subjective performance evaluations,

day which can be spent leisurely, on hobbies, or moonlighting. For some it becomes the housecleaning day, freeing Saturday and Sunday to spend with the children; and according to Riva Poor, "The extra morning in bed may explain why people say the four-day is good for marriage, morale and so on. It certainly explains why not one four-day couple with children on a five-day schedule complains about the disparity," p. 10.

¹² Several California police departments dropped the four-day ten-hour schedule plan when it was discovered that additional personnel were needed to provide the same amount of service provided with eight-hour shifts. See CAL-POST, p. vi.

¹³ The "stress check-up" for an entire agency is discussed by H. Teten and J. Minderman in "Police Personal Problems - Practical Considerations for Administrators," *FBI Law Enforcement Bulletin*, January, 1977, pp. 8-15. The authors affirm that the administrator should "allow little or no rotating of duty shifts." See also P. Bullard, *Coping with Stress - A Psychological Survival Manual* (Portland, OR: Proseminar Press, 1980).

- allowing unexpressed grievances to affect morale,
- delegating responsibility without the necessary authority to do the complete job,
- making regrettable promotions or assignments,
- focusing on failures instead of successes,
- excluding the rank and file from the decision-making process,
- frequent shift rotations,
- rewarding inconsistently, and
- neglecting to provide opportunities for professional growth.¹⁴

More specific indicators of schedule-induced stress and fatigue follow.

Sick leave taken. Many departments periodically analyze the amount of sick leave taken by hour of day, day of week, day in the schedule cycle, shift, length of leave taken, circumstances of return, etc. Through analysis of this data, the administrator may find indications of schedule-related sick leave. An effective schedule is one that does not encourage unnecessary sick leave.

Injury on duty. Review of schedules that require long shift hours or long on-duty periods may reveal that on-duty injuries occur more frequently near the end of long shifts and after several consecutive on-duty assignments.

Vehicle accidents. Analysis of injuries and accidents is necessary to assess their relationship to a work schedule. Time of day, day of week, day in the schedule cycle, shift, location, staffing levels, cost to the department, and supervisory personnel involved are measures that should be considered.

Schedule impact on family and personal activities. Requiring overtime work or scheduling additional time off have added meaning for officers with families.¹⁵ An effective schedule is compatible with outside demands upon the employee, while meeting department objectives. Key issues are family schedules, family transportation, and the cost of living. These

¹⁴Ibid., pp. 159-174.

¹⁵See Chapter 2 for a discussion of these matters.

issues are particularly crucial to families with working spouses and children.

Management relationship with the employee association. A positive, cooperative relationship with the employee association and its representatives is an indicator of more than just effective scheduling. If management can retain the authority and responsibility proper to its office while at the same time meeting legitimate employee requests, it improves the chances of attaining organizational goals and enhances a sense of equity among employees. As mentioned earlier, schedule equity impacts officer morale and willingness to do the job. Proper consideration of this relationship is a continuing management practice in many departments.¹⁶

Participatory scheduling. Few areas are likely to concern employees more than the scheduling of duty time. Although final responsibility for scheduling is a management issue, some departments allow officers to participate in schedule changes or administrative decisions. Effective scheduling encourages officers to feel that they have some input into the decision process.¹⁷ The administrator, however, should not expect to gain consensus.

These indicators of schedule effectiveness in meeting officer needs and requests can constitute guidelines for assessing a work schedule.

¹⁶For a fuller consideration of these issues see D. Bell, "Collective Bargaining: Perspective for the 1980s," Journal of Police Science and Administration, Vol. 9 (1981), pp. 296-305.

¹⁷Research findings on the effects of participation indicate that the person who reports high participation in decisions which effect his work also shows:

- low psychological strain;
- favorable perception of the work environment;
- high utilization of skills and abilities;
- good working relations with immediate superior, peers, and subordinates;
- preference to take on more work;
- high level of productivity; and
- good health.

See W. Kroes, Society's Victim - The Policeman (Springfield, Illinois: Charles C. Thomas, 1976), pp. 98-119.

Agency Operating Environment

Police departments are law enforcement and public service organizations that must be compatible with the environment from which they receive resources and to which they provide service. If effective work scheduling contributes to the achievement of organizational goals, then it follows that schedules should also be considered in light of the larger system of which the police agency is a part. Elements to consider in that larger environment include:

- the municipal, county, or state government of which the police agency is a part;
- the community of citizens served by the governmental body;
- other agencies in the law enforcement system;
- other agencies in the public service system; and
- agencies with whom contractual or legal agreements have been made.

Larger governmental body. Assessment of a work schedule may include a review of the effects that the patrol division schedule has upon allied city, county, or state units. Municipal public works departments interact frequently with the police department. Vehicle maintenance crews, time accounting and payroll office workers, and local fire protection district employees are others whose working conditions may be influenced by the characteristics of the patrol division schedule.

Community expectations and needs. Level of service, type of problems resolved, and priorities addressed in the community are examples of operational aspects of police service that may be influenced by the kinds of schedules used. A periodic assessment of citizen complaints and commendations by time of day, day of week, day in the schedule cycle, shift, location, staffing levels, etc. may prove helpful in probing schedule effectiveness.

Law enforcement system. A police agency interacts continually with local courts, juvenile courts and allied agencies, local law enforcement training councils, and detention and penal institutions. The patrol division work schedule may be a factor in coordinating police operations with those of other criminal justice agencies. It is possible that a small modification in a schedule may significantly reduce overtime costs accrued because officers must use overtime to coordinate with these agencies. Occasionally, a work schedule may hamper coordination and cooperation with neighboring police departments. Periodic inspection of these factors may identify problems.

Public service system. Patrol officers on duty interact frequently with other public service agencies: hospitals, retirement homes, nursing facilities, crisis referral centers, mental health centers, etc. It is possible the patrol division work schedule influences the ease and effectiveness of interaction with these agencies.

Contractual or legal issues. Cited earlier in this document, contractual or legal requirements may limit the types of schedules that can be used to achieve department goals. Care must be taken to avoid labor agreements that are not consistent with scheduling requirements specified by local government policy or by ordinance or state statute.

In considering the possible impact of the patrol division work schedule upon organizations external to the law enforcement agency, it is difficult to develop specific operational measures of schedule effectiveness. In this case careful interviewing of those affected in other agencies may provide useful information.

All indicators of effective scheduling are summarized in Figure 7-1.

Management Ability to Meet Department Goals

- Manpower availability to cover workload demands
- Patrol division output
- Operational expenses
- Overtime accrual
- Vehicle use and maintenance
- Operational communications
- Training time and costs
- Hidden costs for other units
- Equipment use and maintenance

Officer Needs and Morale

- Unnecessary stress and fatigue
- Sick leave taken
- Injury on duty
- Vehicle accidents
- Impact on family and personal activities
- Management relationship with the employee association
- Participatory scheduling

Agency Operating Environment

- Larger government body
- Community expectations and needs
- Law enforcement system
- Public service system
- Contractual or legal issues

APPENDIX A: A GLOSSARY OF WORK SCHEDULING TERMS

FIGURE 7-1

INDICATORS OF EFFECTIVE SCHEDULING

APPENDIX A: A GLOSSARY OF WORK SCHEDULING TERMS

Average Work Week - The average number of scheduled work hours per calendar week, with paid time off for vacations, holidays, and sick leave included as scheduled work hours. Occasionally departments will specify the average work week as the number of scheduled work hours per "work week," where the length of the work week may not equal a calendar week. (See "Work Week.")

Bracket - See "Schedule Bracket."

Call-Back - Recall of off-duty groups or individuals to duty.

Compensatory Time (Compensatory Day) - Time off (day off) with pay from a regularly scheduled on-duty shift, granted to an officer as compensation for extra hours worked on a previous date.

Cyclic Schedule - A duty cycle schedule in which each group of officers works each schedule bracket in a specified sequence and returns to the initial bracket after completing the final bracket in the sequence.

Day - The 24-hour period used for scheduling purposes, not necessarily commencing at midnight.

Day Cycle - Same as "Duty Cycle."

Days-Off - Same as "Off-Duty Day."

Days-Off Scheduling - A staff allocation procedure which deals with the specification of on-duty and off-duty days for individual officers or groups of officers.

Day Shift - (1) A daytime work shift. (2) The group(s) of officers assigned to daytime duty.

Discretionary Holiday - Time off with pay from a regularly scheduled work shift. The time off is awarded in a lump sum per month or year and taken at the discretion of the officer.

Duty Cycle - The repeating pattern of shift assignments and days-off in a work schedule.

Duty Cycle Length - The number of days in the repeating pattern of a duty cycle.

Duty Day - Same as "Work Day."

Duty Schedule - Same as "Work Schedule."

Equity - The degree to which officers view a schedule as providing a fair distribution of both desirable and undesirable schedule features among all officers.

Fair Labor Standards Act (FLSA) - A federal law passed in 1938 setting conditions and standards concerning minimum wage rates, overtime pay rates, recordkeeping, equal pay, and child labor. In 1974 FLSA amendments attempted to extend the Act's overtime and minimum wage provisions to state and local government employees, but these were declared unconstitutional.

Fixed Bracket Schedule - Same as "Fixed Days-Off Schedule."

Fixed Days-Off Schedule - A schedule in which each officer or group of officers receive the same days off each week (i.e., work the same seven-day bracket each week). Fixed days-off schedules are duty cycle schedules with a duty cycle length of seven days.

Floating Holiday - Same as "Discretionary Holiday."

Four-Ten (4/10) Schedule - A 40-hour per week schedule consisting of an average of four 10-hour shifts per week for each officer. (Also called "4/10 Plan.")

Group - One or more officers sharing identical shift assignments and days off. (See "Platoon.")

Group Schedule - The pattern of shift assignments and days off followed by a group of officers. (See "Platoon Schedule.")

Holdover - Retention of officers on duty beyond the end of their normally scheduled work shift.

Holiday - Time off with pay from a regularly scheduled work shift.

Holiday Pay - Bonus pay to individual officers for working on designated legal holidays. In some schedules, both on-duty and off-duty officers receive bonus pay for certain holidays.

Job Factor - Same as "Staffing Factor."

Kelly Day - (1) An unpaid off-duty day, granted in place of a regularly scheduled work shift, for the purpose of reducing the average work

week. Kelly Days are generally scheduled as off-duty days for individual group members rather than entire groups. (2) A day on which an officer is scheduled to work but may be taken off if the officer has accrued sufficient compensatory time.

Locked Schedule - A duty cycle schedule is said to be "locked" if its duty cycle length is a multiple of seven days. In a locked duty cycle schedule, each on- and off-duty period is fixed or locked on specific days of the week.

Multishift Proportional Rotating Schedule - A rotating days-off schedule which provides rotation of shifts and days off, and staffing levels proportional to service demands by shift and day of the week.

Multishift Schedule - A work schedule in which officers report for work at different times of the day.

Night Shift - (1) A nighttime work shift. (2) The group(s) of officers assigned to nighttime duty.

Off-Duty Day - A day during which an officer has no scheduled on-duty shifts.

Off-Duty Period - A sequence of consecutive off-duty days.

On-Duty Shift - A shift during which an officer is scheduled to be on duty.

On-Duty Day - A day during which an officer is scheduled to work at least one shift.

Overlay Shift - A shift whose duty hours overlap the duty hours of other shifts; usually used to achieve an increase in staffing level during the hours covered. For example, a schedule using eight-hour shifts with reporting times of 7:00 a.m., 3:00 p.m., and 11:00 p.m. might also have an overlay shift from 6:00 p.m. to 2:00 a.m. in order to meet increased demand for services during those hours. Same as "Power Shift."

Overtime - Time worked by an officer in addition to the normally scheduled duty hours, sometimes compensated at 1.5 times the normal rate of pay or with compensatory time off.

Pay Period - A fixed and regularly recurring interval of time usually measured in days or weeks used for computing regular and overtime pay. (See "Work Period.")

Payback Day - Time worked by an officer in addition to the normally scheduled duty hours, due to the use of a duty schedule in which the average number of hours worked per week is less than the number required. For example, if an officer's schedule averages 38 hours

per week when 40 hours per week are required, the officer owes two on-duty hours each week.

Platoon - A group of officers whose schedule is such that whenever the group is on duty all other groups are off duty. (See "Group.")

Platoon Schedule - (1) A schedule in which all groups are platoons. The term may include a reference to the number of platoons into which the total work force is divided, as in "Two-Platoon Schedule," "Three-Platoon Schedule," and "Four-Platoon Schedule." (2) The pattern of shift assignments and days off followed by a given platoon.

Power Shift - Same as "Overlay Shift."

Position - A defined role and set of duties to which one on-duty officer must be assigned. A position may be filled by different officers at different times of the day and on different days of the week. A "shift position" is a position that is staffed during a specified shift on all days when service is offered.

PR Schedule - See "Proportional Rotating Schedule."

Proportional Rotating Schedule - A rotating days-off schedule which provides rotating days off and staffing levels proportional to service demands by day of the week. (Sometimes used synonymously with "Multishift Proportional Rotating Schedule.")

Proportional Staffing - A personnel allocation procedure in which the number of on-duty personnel changes by time of day or day of week in proportion to cyclic variations in agency workload.

Relief Factor - The number of officers required to staff one position, taking into account all employee absences, including vacations, holidays, and sick leave. A shift relief factor is the number of employees needed to staff one position during one shift on all days that agency's services are provided. A daily relief factor is the number of officers needed to staff one position during all shifts on each day that agency's services are provided.

Rotating Days-Off Schedule - A duty cycle schedule in which the days-off assigned to each officer or group of officers change from week to week, in a repeating pattern. Rotating days-off schedules are duty cycle schedules with duty cycle lengths not equal to seven days.

Rotation Period - See "Schedule Period."

Schedule Bracket - A sequence of on-duty and off-duty assignments for a specified number of days. Schedules may be represented as a set of equal-length brackets, usually seven days in length. (For example, 5 on-duty days, 2 off-duty days.)

Schedule Changeover - The point at which an existing schedule is replaced with a new schedule.

Schedule Changeover Properties - Work schedule properties resulting from joining the final on-duty or off-duty periods of an existing schedule (i.e., the periods immediately preceding the changeover) with the first on-duty or off-duty periods assigned as part of a new schedule (i.e., the periods immediately following the changeover).

Schedule Group - Same as "Group."

Schedule Period - The number of weeks required for one complete cycle through all of the brackets in a cyclic schedule.

Schedule Rotation Period - See "Schedule Period."

Schedule Simplicity - The ease with which officers and supervisors can determine duty assignments, and scheduling procedures can be administered.

Schedule Type - All duty cycle schedules can be classified into one of three schedule types based on the length of the duty cycle: (1) fixed days-off, (2) rotating days-off locked, and (3) rotating days-off unlocked.

Schedule Week - The seven-day period beginning on a specified day of the week, used for defining officer work hours and computing overtime compensation. Sometimes departments with six or eight-day duty cycle schedules refer to the duty cycle length as the "schedule week."

Shift - (1) One of the sets of hours into which the day is divided for scheduling purposes, constituting the time interval for on-duty services. Sometimes called a "tour" or "watch." (2) The set of officers assigned to work during a specified time of the day (e.g., the officers assigned to daytime duty may be collectively referred to as the "day shift"). (3) An on-duty assignment worked by an officer (e.g., an officer may be scheduled to work five eight-hour shifts per week).

Shift Changeover - Same as "Shift Rotation."

Shift Changeover Properties - Work schedule properties resulting from joining an officer's final work or off-duty period on one shift with the first work or off-duty period on a different shift.

Shift Rotation - The reassignment of officers from one shift to a different shift.

Shift Rotation Sequence - The order in which new shift assignments are made (e.g., day-afternoon-night or day-night-afternoon).

Shift Scheduling - A personnel allocation procedure in which service demands are determined for small units of time (usually one hour periods) and then are used to find the best shift starting times for each day of the week and the number of officers to be assigned to each shift on each day of the week.

Shift Tour - For a multishift rotating schedule, the interval for which an officer is assigned to a specified shift, including on-duty and off-duty days, before being reassigned to another shift (e.g., a three-week tour on the day shift).

Shift Trade - The exchange of scheduled work shifts between officers, usually restricted to individuals of equal rank and skill. See "Trading Time."

Sick Day - The unit of on-duty time used in computing the length of sick leave.

Sick Leave - A period of paid absence from on-duty assignments arising from illness or injury.

Split Shift - A shift comprised of non-consecutive hours which are interrupted by a period of off-duty hours.

Staff-Day - A unit of measure consisting of the on-duty services of one officer for one shift. Used for assessing the amount of staff resources available or needed.

Staffing Factor - The number of officers needed to maintain one on-duty position for all hours during which service is provided, not taking into account absences due to vacations, paid holidays, sick leave, etc. The staffing factor is computed by dividing the number of hours per week for which service is provided by the average work week (e.g., for around-the-clock service, a 40-hour work week results in a staffing factor of 4.2).

Standard 40-Hour Week - A schedule consisting of five eight-hour shifts, Monday through Friday, with Saturday and Sunday off.

Straight Time - Work hours for which the regular rate of pay is received.

Swing Shift - (1) The afternoon shift, or the employees assigned to the afternoon shift. (2) A longer than normal day worked to change an employee or group from day to night duty or from one platoon to another. (3) An overlay shift, or the employees working an overlay shift.

Team Integrity - A personnel management principle that is achieved when a group of officers have the same duty schedule and supervisor.

Tour of Duty - Same as "On-Duty Shift." (See "Shift Tour.")

Trading Time - The exchange of schedule work hours between officers, usually limited to individuals of equal rank and skill. See "Shift Trade."

Uniform Staffing - A personnel allocation procedure in which the number of scheduled on-duty personnel is the same at all times when service is offered. Sometimes called "Fixed Post Staffing."

Unity of Command - A personnel management principle that is achieved when each subordinate reports to the same supervisor at all times. When supervisors' schedules are not identical to those of their subordinates, it is not possible to achieve complete unity of command for all personnel.

Unlocked Schedule - Any duty cycle schedule that is not "locked" (i.e., it does not have a duty cycle length that is a multiple of seven). In an unlocked duty cycle schedule, each on- and off-duty period begins on a different day of the week each time it appears during the week cycle (i.e., the on- and off-duty periods are not locked to specific days of the week).

Vacation - An on-duty assignment or series of on-duty assignments from which an employee is excused with pay as an annual fringe benefit.

Vacation Day - The unit of on-duty time used in computing the length of a vacation.

Variable Staffing - A personnel allocation procedure in which the number of scheduled on-duty personnel changes cyclically by the time of day or day of the week. See "Proportional Staffing."

Watch - Same as "Shift."

Week Cycle - The smallest number of weeks in which the duty cycle repeats a whole number of times. The length of the week cycle, in weeks, is equal to the number of days in the duty cycle, if this number cannot be divided evenly by seven; if it can be so divided, the length of the week cycle is given by the result of this division.

Weekend Off-Duty Period - An off-duty period which includes both Saturday and Sunday.

Work Day - A day during which an officer is scheduled to be on duty. Same as "On-Duty Day."

Work Force - The set of officers that constitutes the organization, division, or unit for which a work schedule or work schedules must be designed.

Work Period - A sequence of consecutive work days.

Work Schedule - A specification of shift assignments and days off for individual officers or groups of officers.

Work Shift - Same as "On-Duty Shift."

Work Week - (1) A fixed and regularly recurring seven-day interval, used for computing regular and overtime work hours. Some departments with six or eight-day duty cycle schedules refer to the "work week" as the six or eight-day interval represented by the duty cycle pattern as the "work week." (2) Same as "Average Work Week."

APPENDIX B: EXAMPLES OF POLICE WORK SCHEDULES

APPENDIX B: EXAMPLES OF POLICE WORK SCHEDULES

This appendix presents a number of the more common work schedules that were encountered during the conduct of the Police Work Scheduling project. The schedules shown are included for their representativeness of the major schedule types that can be found in police agencies throughout the United States. In some cases, several schedules, differing only in minor details, were combined into a "generic" form for inclusion below.

The schedules shown are divided into two types: those with fixed days off (figures B-1 through B-4) and those with rotating days off (figures B-5 through B-11). Within each group, examples of both uniform and variable staffing by day of the week are shown. None of the schedules indicate shift rotation. Information provided for each schedule includes (as appropriate) the duty cycle pattern, the level of staffing by day of the week, implementation and use, average work week, and the number of Kelly or payback days required to achieve particular average work weeks.

It is assumed that the reader is already familiar with the material and vocabulary presented in chapters 3 and 4 (e.g., Kelly Day, payback day, schedule bracket, and group). The following conventions are used in each of the schedules shown below:

- A blank denotes an on-duty day.
- An "R" denotes an off-duty day.
- In several of the schedules, the implementation instructions direct that the work force should be divided into a specific number of "equal-sized" groups. When this can be accomplished, it is then possible to achieve the daily staffing levels indicated. When equal-sized groups cannot be achieved, the use of nearly equal-sized groups will produce small variations in daily staffing levels. Schedules which provide uniform staffing by day of the week when equal-sized groups are used, will produce "slightly unequal" daily staffing levels when "slightly unequal" group sizes are used. In many applications, small daily variations are quite permissible.

- All schedules use a Monday through Sunday bracket to facilitate the identification of weekend off-duty periods.
- The term "group," used in all of the schedules shown, may refer to one or several officers.

		Percentage of the Work Force Assigned to Each Bracket							
		M	T	W	T	F	S	S	
Bracket	1	R	R						14.3
	2		R	R					14.3
	3			R	R				14.3
	4				R	R			14.3
	5					R	R		14.3
	6						R	R	14.3
	7	R						R	14.3
Percentage of the Work Force On Duty		71	71	71	71	71	71	71	

- Implementation: Divide work force into seven equal-sized groups. Assign one group to each bracket of the schedule. Each group receives the same two days off each week (e.g., all officers in Bracket 4 receive Thursday and Friday off every week).
- Average Work Week: 40 hours if shift length is 8 hours.
- Daily Staffing: Uniform by day of the week; five groups are on duty each day (i.e., 71.4% of the work force).

FIGURE B-1
FIXED DAYS-OFF (5 ON - 2 OFF) SCHEDULE WITH
UNIFORM STAFFING BY DAY OF THE WEEK

		Percentage of the Work Force Assigned to Each Bracket							
		M	T	W	T	F	S	S	
Bracket	1		R	R					30
	2			R	R				5
	3				R	R			15
	4						R	R	15
	5	R						R	35
Percentage of the Work Force On Duty		65	70	65	80	85	85	50	

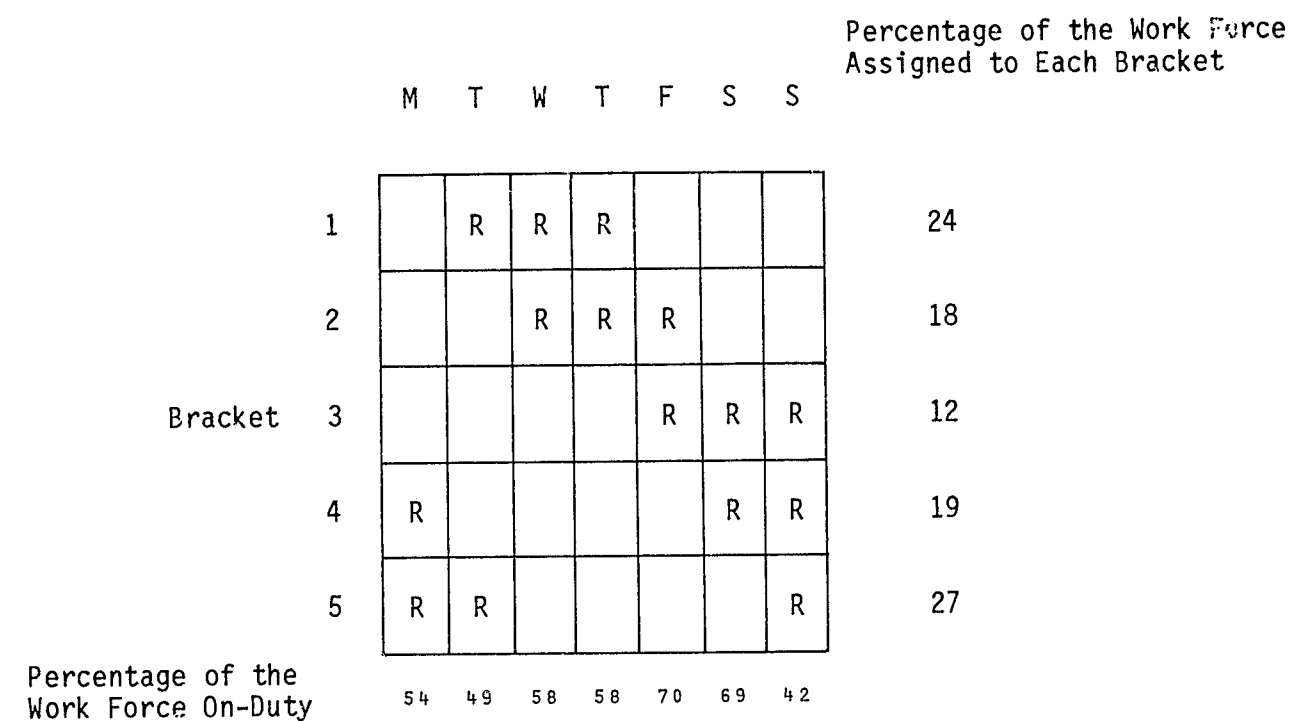
- Implementation: Divide officers into five groups representing 30, 5, 15, 15, and 35 percent of the work force. Assign groups to brackets 1 through 5 respectively. Each group receives the same two days off each week (e.g., all officers in Bracket 3 receive Thursday and Friday every week).
- Average Work Week: 40 hours if shift length is 8 hours.
- Daily Staffing: Provides increased coverage on Friday and Saturday and reduced coverage on Sunday.

FIGURE B-2
FIXED DAYS-OFF (5 ON - 2 OFF) SCHEDULE WITH
VARIABLE STAFFING BY DAY OF THE WEEK

		Percentage of the Work Force Assigned to Each Bracket								
		M	T	W	T	F	S	S		
Bracket	1	R	R	R					14.3	
	2		R	R	R				14.3	
	3				R	R	R		14.3	
	4					R	R	R	14.3	
	5						R	R	R	14.3
	6	R						R	R	14.3
	7	R	R						R	14.3
Percentage of the Force On Duty		57	57	57	57	57	57	57		

- Implementation: Divide work force into seven equal-sized groups. Assign one group to each bracket of the schedule. Each group receives the same three days off each week (e.g., all officers in Bracket 2 receive Tuesday, Wednesday, and Thursday every week).
- Average Work Week: 40 hours if shift length is 10 hours.
- Daily Staffing: Uniform by day of the week; four groups are on duty each day (i.e., 57.1% of the work force).

FIGURE B-3
FIXED DAYS-OFF (4 ON - 3 OFF) SCHEDULE WITH
UNIFORM STAFFING BY DAY OF THE WEEK

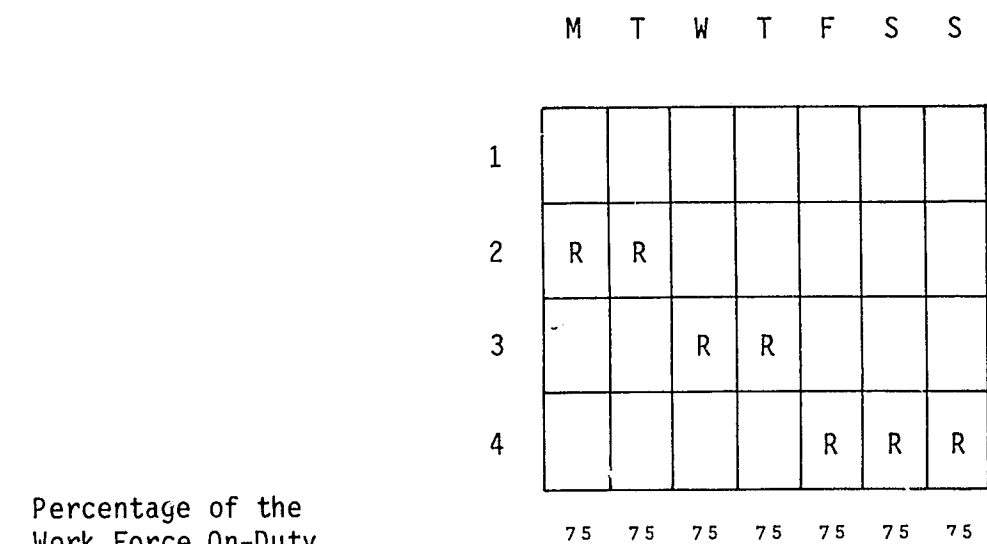


Implementation: Divide officers in five groups representing 24, 18, 12, 19, and 27 percent of the work force. Assign groups to brackets 1 through 5 respectively. Each group receives the same three days off each week (e.g., all officers in Bracket 5 receive Sunday, Monday and Tuesday off every week).

Average Work Week: 40 hours if shift length is 10 hours.

Daily Staffing: Provides increased coverage on Friday and Saturday with reduced coverage on Sunday.

FIGURE B-4
FIXED DAYS-OFF (4 ON - 3 OFF) SCHEDULE WITH
VARIABLE STAFFING BY DAY OF THE WEEK



Percentage of the Work Force On-Duty

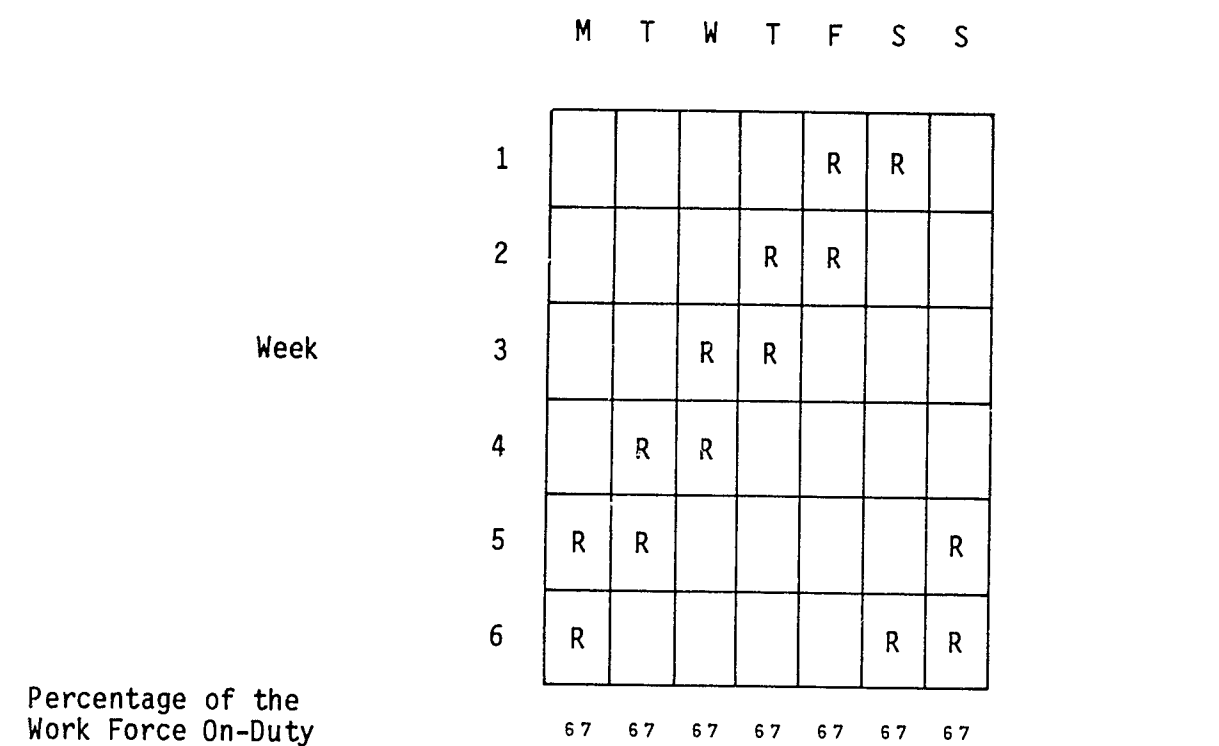
Schedule Duty Cycle: 7 on - 2 off - 7 on - 2 off - 7 on - 3 off.

Implementation: Divide officers into four equal-sized groups. At the beginning of week 1, assign one group to each bracket. At the end of each week, each group moves to the bracket below it (the group completing bracket 4 goes to bracket 1). All groups work same 4-week duty cycle.

Average Work Week: 42 hours if shift length is 8 hours. One Kelly Day per 4-week cycle per officer reduces the average work week to 40 hours.

Daily Staffing: Uniform by day of the week; three groups of officers are on duty each day (i.e., 75% of the work force).

FIGURE B-5
LOCKED ROTATING DAYS-OFF SCHEDULE WITH
UNIFORM STAFFING BY DAY OF THE WEEK



Percentage of the Work Force On-Duty

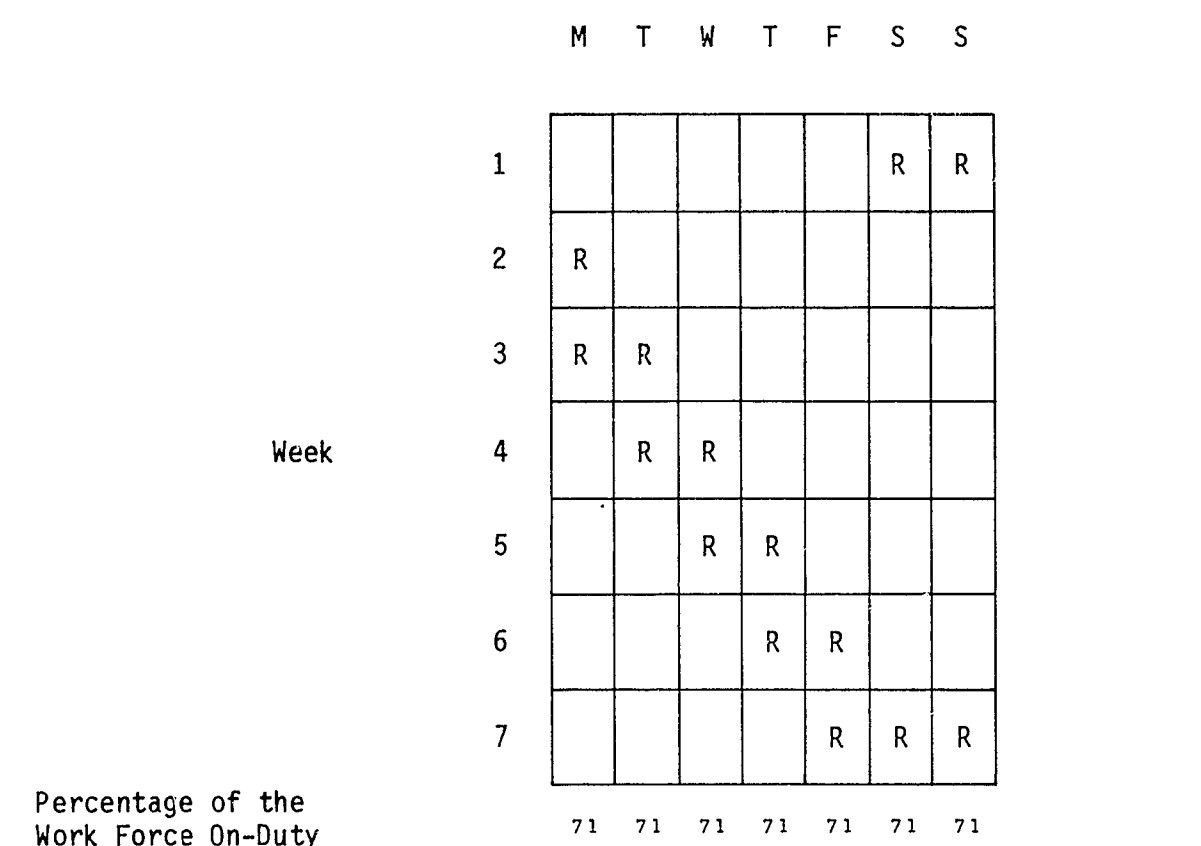
Schedule Duty Cycle: 4 on - 2 off repeated 7 times over a six-week period.

Implementation: Divide officers into six equal-sized groups. At the beginning of week 1, assign one group to each bracket. At the end of each week, each group moves to the bracket below it (the group completing bracket 6 goes to bracket 1). All groups work the same pattern over a six-week period.

Average Work Week: 37 1/3 hours if the shift length is 8 hours (2 payback days per officer every six weeks are required to achieve a 40-hour work week); 38 1/2 hours if the shift length is 8 1/4 hours (9 payback hours per officer every six weeks are required to achieve a 40-hour work week); and 39 2/3 hours if the shift length is 8 1/2 hours (2 payback hours per officer every six weeks are required to achieve a 40-hour work week).

Daily Staffing: Uniform by day of the week; four groups of officers are on duty each day (i.e., 66.7% of the work force).

FIGURE B-6
UNLOCKED ROTATING DAYS-OFF SCHEDULE WITH
UNIFORM STAFFING BY DAY OF THE WEEK



Percentage of the Work Force On-Duty

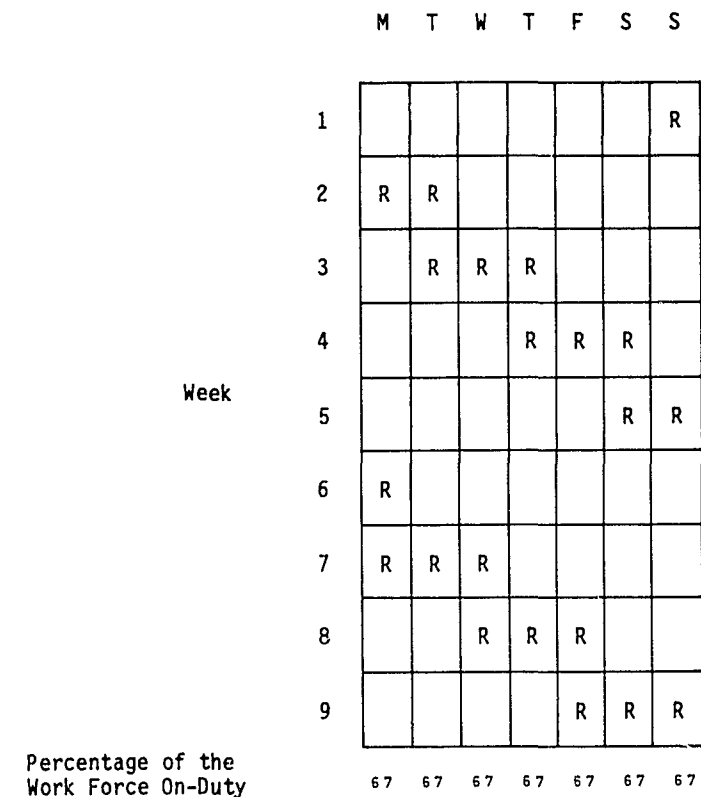
Schedule Duty Cycle: 5 on - 3 off - 6 on - 2 off - 6 on - 2 off - 6 on - 2 off - 6 on - 2 off - 6 on - 3 off.

Implementation: Divide officers into seven equal-sized groups. At the beginning of week 1, assign one group to each bracket. At the end of each week, each group moves to the bracket below it (the group completing bracket 7 goes to bracket 1). All groups work the same 7-week duty cycle.

Average Work Week: 40 hours if shift length is 8 hours.

Daily Staffing: Uniform by day of the week; five groups are on duty each day.

FIGURE B-7
LOCKED ROTATING DAYS-OFF SCHEDULE WITH
UNIFORM STAFFING BY DAY OF THE WEEK



Schedule Duty Cycle: 6 on - 3 off repeated 7 times over a nine-week period.

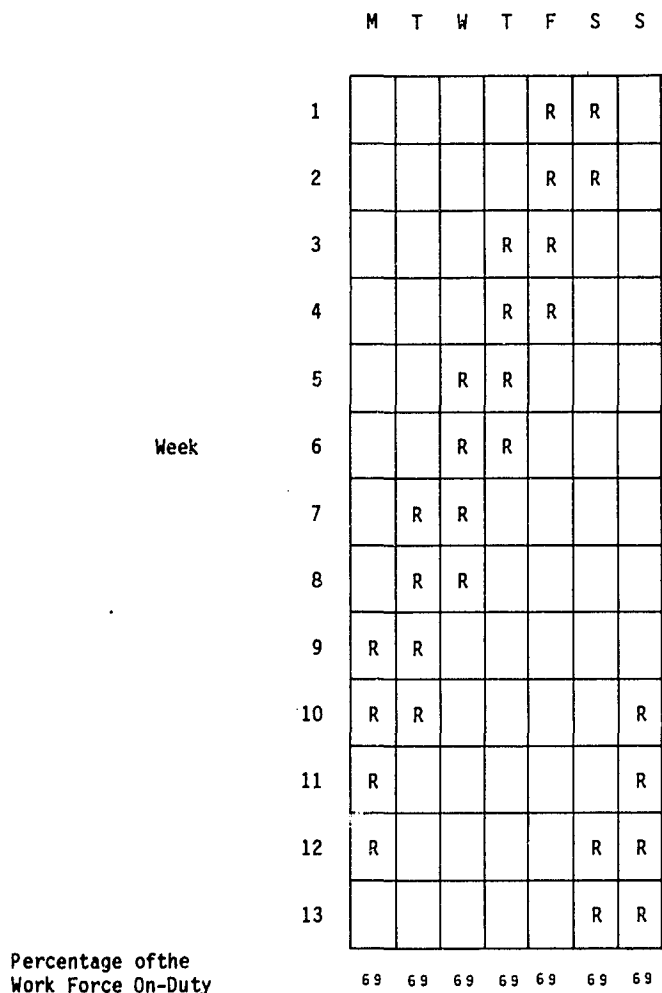
Implementation: Divide officers into nine equal-sized groups. At the beginning of week 1, assign one group to each bracket. At the end of each week, each group moves to the bracket below it (the group completing bracket 9 goes to bracket 1). All groups work the same pattern over a nine-week period.

Alternatively, divide the officers into three groups. At the beginning of week 1, assign the groups to brackets 1, 4, and 7 respectively.

Average Work Week: 37 1/3 hour if the shift length is 8 hours (2 payback days per officer every six weeks are required to achieve a 40-hour work week); 38 1/2 hours, if the shift length is 8 1/4 hours (9 payback hours per officer every six weeks are required to achieve a 40-hour work week); and 39 2/3 hours if the shift length is 8 1/2 hours (2 payback hours per officer every six weeks are required to achieve a 40-hour work week).

Daily Staffing: Uniform by day of the week; six groups of officers are on duty each day (i.e., 66.7% of the work force).

FIGURE B-8
UNLOCKED ROTATING DAYS-OFF SCHEDULE WITH
UNIFORM STAFFING BY DAY OF THE WEEK



Schedule Duty Cycle: 4 on - 2 off - 5 on - 2 off repeated 7 times over a 13-week period.

Implementation: Divide the officers into 13 equal-sized groups. At the beginning of week 1, assign one group to each bracket. At the end of each week, each group moves to the bracket below it (the group completing bracket 13 goes to bracket 1). All groups work the same pattern over a 13-week period.

Average Work Load: 38.77 hours if shift length is 8 hours (2 payback days per officer per 13 weeks are required to achieve a 40-hour work week); 39.98 hours if the shift length is 8 1/4 hours.

Daily Staffing: Uniform by day of the week; nine groups of officers are on duty each day (i.e., 69.2% of the work force).

FIGURE B-9
UNLOCKED ROTATING DAYS-OFF SCHEDULE WITH
UNIFORM STAFFING BY DAY OF THE WEEK

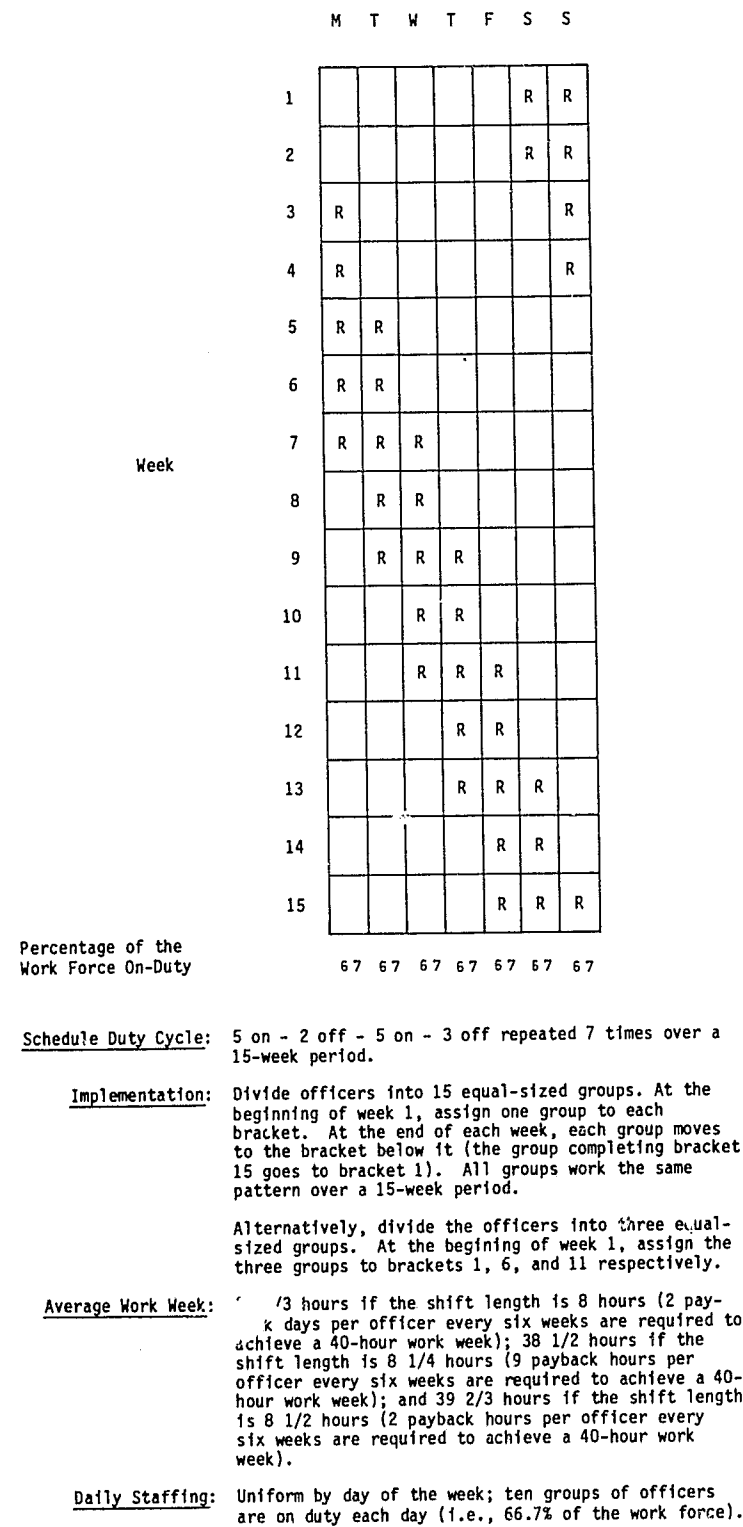


FIGURE B-10

UNLOCKED ROTATING DAYS-OFF SCHEDULE WITH
UNIFORM STAFFING BY DAY OF THE WEEK

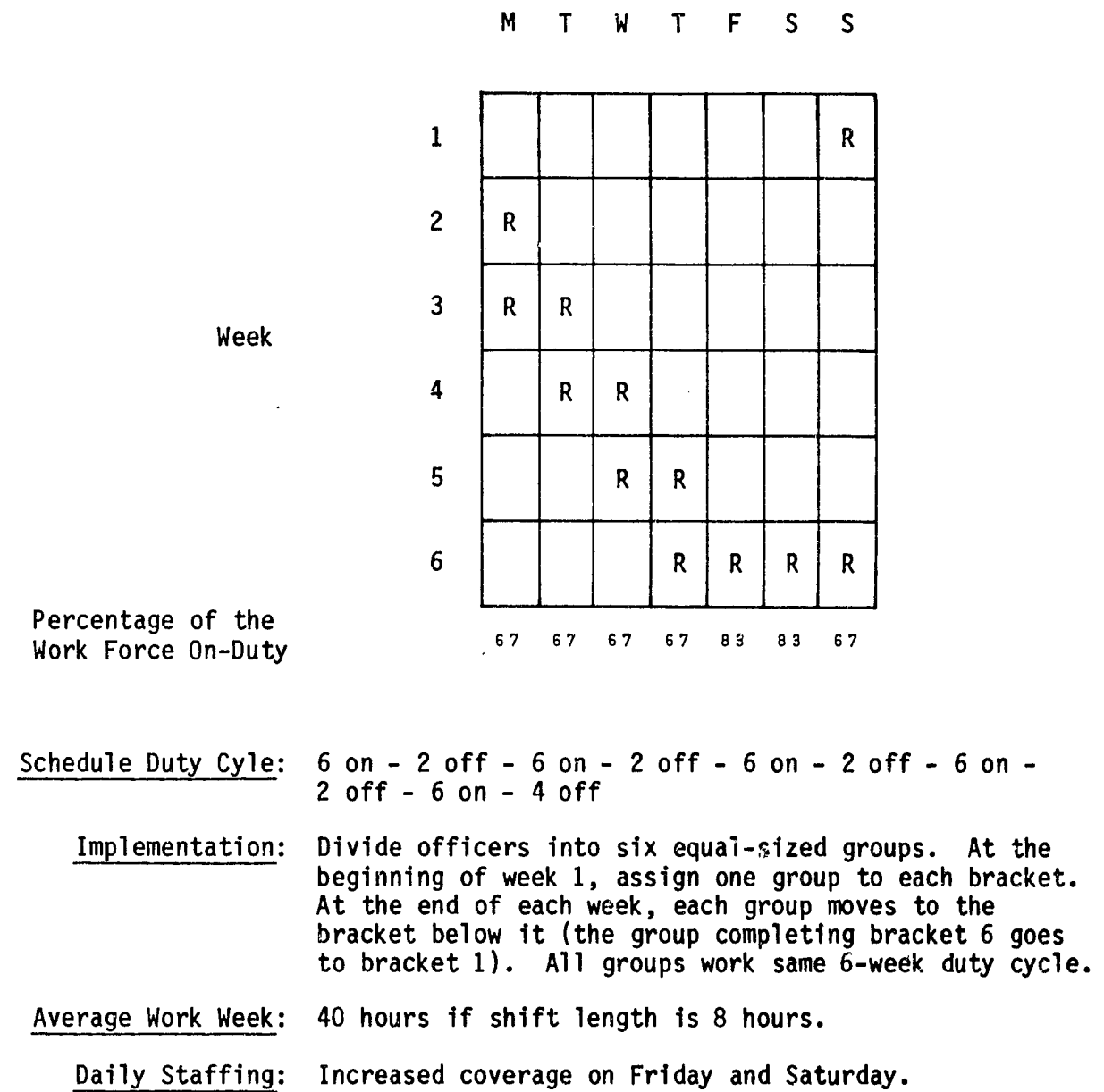


FIGURE B-11

LOCKED ROTATING DAYS-OFF SCHEDULE WITH
VARIABLE STAFFING BY DAY OF THE WEEK

APPENDIX C: EXAMPLES OF POLICE WORK SCHEDULE REPRESENTATIONS

APPENDIX C: EXAMPLES OF POLICE WORK SCHEDULE REPRESENTATIONS

This appendix presents several examples of schedule representations based on the three representation types introduced in Chapter 3. These are:

- duty cycle representations which show each officer's on- and off-duty assignments (and shift assignments if appropriate) without specifying either the day of the week or calendar date associated with each assignment;
- bracket representations which shown an officer's shift and daily assignments for each day of the week; and
- calendar representations which show each employee's shift and daily assignments by date usually over an extended period of time.

Within each type of representation, numerous formats and notational schemes are used to indicate shift and on- and off-duty assignments. Shifts, for example, may be denoted by D (day); N (night); A (afternoon); G (grave-yard); M (midnight); E (evening); S (swing); A, B, and C for shifts A, B, and C; or 1, 2, and 3 for shifts 1, 2, and 3. On-duty assignments, unless identified by a shift indicator, may be denoted by W (work), X, *, ON, or a blank. Off-duty assignments may be represented by R (rest or recreation day), O (off-duty), X, or OFF.

Eleven schedules are presented below: 3 duty cycle representations, 2 bracket representations, and 6 calendar representations.

Duty Cycle Representations

Duty cycle representations illustrate the schedules of groups of officers sharing the same pattern of on- and off-duty assignments. In the simplest form, a duty cycle representation shows the assignments for a single group. Examples are presented in figures 3-1 and 3-2 on page 33. More commonly used are representations which display the duty cycle for

all groups simultaneously. Examples are presented below in figures C-1 through C-3. In each figure, the duty assignment is specified for each group of officers on each day of the duty cycle.

In Figure C-1, the patrol force is divided into three groups and each group follows the same duty cycle pattern, 6D - 3R. The assignment for any group on any day of the cycle is found by finding the letter entry in the schedule that corresponds to the group (row) and day (column) of interest (e.g., the "D" entry for Group 2 on day 7 of the cycle indicates an on-duty assignment). The three groups in the schedule, however, are each at different points in the nine-day duty cycle pattern. For example, on day 1, Group 1 is beginning a six-day on-duty period, Group 2 is midway through a six-day on-duty period, and Group 3 is beginning a three-day off-duty period. Since the 6D - 3R pattern represents an unlocked RDO schedule, the on-duty staffing is uniform by day of the cycle. In this example, two groups are on duty and one group is off duty every day. (A bracket representation of a 6D - 3R schedule is shown in Figure B-8 on page 156).

Figure C-2 displays a duty cycle schedule representation for nine groups based on the 27-day pattern:

6D - 3R - 6A - 3R - 6N - 3R.

In this schedule, each group rotates to a new shift assignment each time it is on duty. Determining the daily assignment for any group is identical to the procedure used with the schedule in Figure C-1; the letter entry in the schedule corresponding to the group (row) and day (column) of interest indicates the assignment (e.g., the "R" entry in the 6th row and 10th column indicates that Group 6 is off duty on the 10th day of the cycle). Staffing with this schedule is uniform both by shift and day of the cycle; two groups are on duty on each shift every day.

Figure C-3 illustrates an alternate duty cycle representation for the nine-group schedule shown in Figure C-2. In Figure C-3, the first three rows corresponds to on-duty assignments on the day, afternoon, and night shifts while the fourth row represents an off-duty assignment. The entries within the display identify which groups have each assignment on each day of the duty cycle (e.g., groups 1 and 2 are on-duty on the afternoon shift on day 12 of the cycle).

	Day of Duty Cycle								
	1	2	3	4	5	6	7	8	9
Group 1	D	D	D	D	D	D	R	R	R
Group 2	D	D	D	R	R	R	D	D	D
Group 3	R	R	R	D	D	D	D	D	D

FIGURE C-1
6 ON - 3 OFF DUTY CYCLE REPRESENTATION FOR THREE GROUPS

Group	Day of Duty Cycle																										
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
1	D	D	D	D	D	D	R	R	R	A	A	A	A	A	A	R	R	R	N	N	N	N	N	N	R	R	R
2	D	D	D	R	R	R	A	A	A	A	A	A	R	R	R	N	N	N	N	N	N	R	R	R	D	D	D
3	R	R	R	A	A	A	A	A	A	R	R	R	N	N	N	N	N	N	R	R	R	D	D	D	D	D	D
4	A	A	A	A	A	A	R	R	R	N	N	N	N	N	N	R	R	R	D	D	D	D	D	D	R	R	R
5	A	A	A	R	R	R	N	N	N	N	N	N	R	R	R	D	D	D	D	D	D	R	R	R	A	A	A
6	R	R	R	N	N	N	N	N	N	R	R	R	D	D	D	D	D	D	R	R	R	A	A	A	A	A	A
7	N	N	N	N	N	N	R	R	R	D	D	D	D	D	D	R	R	R	A	A	A	A	A	A	R	R	R
8	N	N	N	R	R	R	D	D	D	D	D	D	R	R	R	A	A	A	A	A	A	R	R	R	N	N	N
9	R	R	R	D	D	D	D	D	D	R	R	R	A	A	A	A	A	A	R	R	R	N	N	N	N	N	N

FIGURE C-2
THREE-SHIFT DUTY CYCLE REPRESENTATION FOR NINE GROUPS

		<u>Day of Duty Cycle</u>																										
<u>Assignment</u>		<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>	<u>10</u>	<u>11</u>	<u>12</u>	<u>13</u>	<u>14</u>	<u>15</u>	<u>16</u>	<u>17</u>	<u>18</u>	<u>19</u>	<u>20</u>	<u>21</u>	<u>22</u>	<u>23</u>	<u>24</u>	<u>25</u>	<u>26</u>	<u>27</u>
168	Day Shift	1-2	1-2	1-2	1-9	1-9	1-9	8-9	8-9	8-9	7-8	7-8	7-8	6-7	6-7	6-7	5-6	5-6	5-6	4-5	4-5	4-5	3-4	3-4	3-4	2-3	2-3	2-3
	Afternoon Shift	4-5	4-5	4-5	3-4	3-4	3-4	2-3	2-3	2-3	1-2	1-2	1-2	1-9	1-9	1-9	8-9	8-9	8-9	7-8	7-8	7-8	6-7	6-7	6-7	5-6	5-6	5-6
	Night Shift	7-8	7-8	7-8	6-7	6-7	6-7	5-6	5-6	5-6	4-5	4-5	4-5	3-4	3-4	3-4	2-3	2-3	2-3	1-2	1-2	1-2	1-9	1-9	1-9	8-9	8-9	8-9
	Off-Duty	3-6-9			2-5-8			1-4-7			3-6-9			2-5-8			1-4-7			3-6-9			2-5-8			1-4-7		

FIGURE C-3
THREE-SHIFT DUTY CYCLE REPRESENTATION SHOWING WHICH GROUPS
ARE ON- AND OFF-DUTY BY SHIFT AND CYCLE DAY

Bracket Representations

Bracket representations of police work schedules show on- and off-duty assignments displayed in segments, termed brackets, which are usually one week in length. In such a representation, the day of week corresponding to each duty assignment is indicated, but specific dates are not. A single officer or a group of officers may be assigned to each bracket. Also, officers may be permanently assigned to brackets, or they may rotate weekly or at some other fixed interval, from one bracket to the next. A number of bracket representations are presented in Chapter 3 and Appendix B (see figures 3-4 and 3-5 on page 36, Figure 3-6 on page 38, and figures B-1 through B-11 on pages 149-159).

Figure C-4 illustrates a different notational format for a bracket representation of a 4 on - 3 off schedule. Rather than displaying a seven-day bracket for each group of officers (see figures B-3 and B-4 on pages 151 and 152), the representation in Figure C-4 identifies the seven possible brackets (i.e., off-duty periods) as columns and uses the rows to indicate patrol units for each pair of officers (e.g., three officers: Bauer, Storie, and Orr receive Saturday, Sunday, and Monday off each week, and on Tuesday through Friday, Storie and Orr are assigned to Unit 2C40). An alternate bracket representation of the schedule in Figure C-4 is displayed in Figure C-5.

P.O.D. ASSIGNMENT SHEET
AREA II SHIFT III

EFFECTIVE DATE: 11/29/80

	SAT-SUN-MON	SUN-MON-TUE	MON-TUE-WED	TUE-WED-THUR	WED-THUR-FRI	THUR-FRI-SAT	FRI-SAT-SUN
AREA CMDR.							CAPT. R. TALLEY 2430
LTS				H. JENKINS 2614			
SGTS	D. BAUER 2405	C. RILEY 2641		R. NELSON 2871	T. MUILENBURG 2924	F. ELLSWORTH 2446	
UNITS							
2C9		R. WILLIAMS 3284 N. TURLEY 3533			D. MCCULLOUGH 3179 R. STONE 3435		
2C10				D. CLARKE 3448 R. WOODALL 3447			D. GATH 2708 F. SIMS 2837
2C11		R. ZYLSTRA 2625 D. BARBER 3334	J. ROBERTSON 3224 S. CHRISMAN 3505		R. QUARN 3373 D. JOHNSON 3380		
2C12		B. LICHTYER 3438 V. PLATT 3451				S. HENSON 3407 M. THORNFELD 3120 J. STENART 3115 H. TORRES 3454	
2C13				S. MCCULLOUGH 3329 T. NICHOLSON 3330			E. CARTER 2609 E. ANDERSON 2977 E. DAVENPORT 2645 M. JENSEN 3508
2C14							
2C39							
2C40	R. STORIE 2961 P. ORR 3061			M. BRAY 3437 D. VANDUZER 3529			
2C59							
2CK9 "2C60"		S. POULSEN 3162 "CLAT"					
RELIEF			D. ROBBINS 3369				
IOD							R. BURGESS 2642
TASK				SGT. M. GALLWAS 2930 W. TURLEY 3268			
FORCE							

INSPECTIONS FOR:

VACATIONS:

OFFICERS	START	RTW
LT. JENKINS	12/19/80	01/02/81
SGT. RILEY	12/09/80	12/26/80
SGT. ELLSWORTH	12/28/80	01/05/81
J. ROBERTSON	12/13/80	01/04/81
D. MCCULLOUGH	12/06/80	12/13/80
H. TORRES	11/26/80	12/03/80
R. STONE	11/25/80	12/13/80

COMPILED BY: SGTS. RILEY & ELLSWORTH

APPROVED BY:

Lt. H. M. Jenkins

COMPLEMENT:

Lieutenants	1
Sergeants	6
POLICE OFFICERS	34
TOTAL	42

FIGURE C-4

BRACKET REPRESENTATION FOR A 4 ON - 3 OFF SCHEDULE,
LONG BEACH (CALIFORNIA) POLICE DEPARTMENT

		M	T	W	T	F	S	S	Number of Officers Assigned to Each Bracket	
Brackets	1	R					R	R	3	
	2	R	R					R	8	
	3	R	R	R					3	
	4		R	R	R				10	
	5			R	R	R			5	
	6				R	R	R		5	
	7					R	R	R	8	
Number of Officers On Duty									—	42

FIGURE C-5
 ALTERNATE BRACKET REPRESENTATION FOR
 THE 4 ON - 3 OFF SCHEDULE IN FIGURE C-4,
 LONG BEACH (CALIFORNIA) POLICE DEPARTMENT

Calendar Representations

Calendar representations of work schedules show officers' daily assignments for specific dates up to a full year ahead. Some show the duty assignment of individual groups of identically-scheduled officers, while others show the groups which are assigned to each shift and those which are off duty for each day of the period covered. Alternative formats obtained from departments surveyed for this document are illustrated in figures C-6 through C-11.

Figure C-6 shows a one-month calendar representation for a 5 on - 2 off schedule for 25 officers. On-duty assignments are indicated by blanks and off-duty assignments by "0". The schedule has 18 officers on duty on Friday through Wednesday and 17 officers on duty on Thursday.

Figure C-7 illustrates a calendar representation for a four-group platoon schedule that covers all of 1981. The schedule is based on a 28-day duty cycle pattern that contains three 7-day on-duty periods. The assignment for any platoon on a given date is found by determining what number entry corresponds to the platoon (row) and calendar date (column) of interest. The calendar dates begin in the upper left-hand corner on December 29, 1980, and proceed left to right, row by row down to December 31, 1981, in the last row. As an example, on March 25, 1981, the "A" platoon is assigned to the 2nd shift ("2" entry). An alternate representation of this same schedule is displayed in Figure 3-7 on page 39. A bracket representation of this duty cycle pattern used for a one-shift schedule is illustrated in Figure B-5 on page 153.

Figure C-8 displays a calendar representation for a three-group schedule based on the 15-day duty cycle pattern: 5 on - 2 off - 5 on - 3 off. This pattern provides uniform staffing by day of the week; 2 groups (called squads in the schedule) are on duty every day. The representation in Figure C-8 identifies which squad (A, B, or C) is off duty on each day. An alternate representation of this schedule is presented in Figure C-9 below and a bracket representation is presented in Figure B-10 on page 158.

The calendar representation in Figure C-9 is also based on a 5 on - 2 off - 5 on - 3 off duty cycle pattern and is used to identify the on- and off-duty assignments for three squads that rotate between two shifts (identified as "2" and "3" in the schedule). The staffing is the same on every day: one squad is assigned to shift 2, one is assigned to shift 3, and one squad is off-duty. Figure C-9 indicates the daily assignments for all three squads for every day in 1981. To determine a squad assignment for any date the following procedure is used:

- Find the date of interest in the lower portion of the table. (One row is used for each month.)
- The three rows at the top of the column containing the date of interest identify the assignments for each squad. (A blank designates an off-duty day.)

As an example, on August 23, 1981, the 1st squad was on the "3" shift, the 2nd squad was on the "2" shift, and the 3rd squad was off duty.

The calendar representation in Figure C-10 illustrates a 4 on - 2 off schedule that uses 10-hour shifts. The display shows the shift hours for each officer (columns) for each day (rows) in March 1981. A bracket representation of this schedule is also illustrated in Figure B-6 on page 154.

Figure C-11 illustrates a calendar representation for a locked rotating days-off schedule based on the 49-day duty cycle pattern: 6 on - 2 off - 6 on - 2 off - 6 on - 2 off - 6 on - 3 off - 5 on - 3 off. The two calendars shown in Figure C-11 identify the off-duty days (designated with circles) for groups 2 and 3 for all of 1981. (The patrol force is divided into seven groups.) A bracket representation of this schedule is presented in Figure B-7 on page 155.

PLATOON															
SCHEMATIC		Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Officer:															
Lieutenant							0 0							0 0	
Sergeant				0 0								0 0			
Sergeant		0 0						0 0					0 0		
Corporal				0 0							0 0				0 0
Patrolman						0 0						0 0			
Patrolman		0 0					0 0						0 0		
Patrolman				0 0							0 0				
Patrolman					0 0							0 0			
Patrolman		0				0 0					0 0			0 0	
Patrolman			0 0				0 0					0 0			
Patrolman				0 0				0 0					0 0		
Patrolman					0 0				0 0					0 0	
Patrolman						0 0				0 0					0 0
Patrolman		0 0					0 0				0 0				
Patrolman			0 0					0 0				0 0			
Patrolman				0 0					0 0				0 0		
Patrolman					0 0					0 0				0 0	
Patrolman		0				0 0				0 0				0 0	
Patrolman			0 0				0 0				0 0				0
Patrolman				0 0				0 0				0 0			
Patrolman		0 0					0 0			0 0			0 0		
Patrolman			0 0						0 0				0 0		
Patrolman				0 0						0 0				0 0	
Patrolman		0				0 0				0 0				0 0	
Patrolman			0 0				0 0				0 0				0
Patrolman				0 0				0 0				0 0			
Patrolman		0 0					0 0			0 0			0 0		
Patrolman			0 0						0 0					0 0	
Patrolman				0 0						0 0					0 0
Patrolman		0				0 0				0 0				0 0	
Patrolman			0 0				0 0				0 0				0
Patrolman				0 0				0 0				0 0			
Supervisors		3	3	3	2	3	3	3							
Patrols		15	15	15	15	15	15	15							

FIGURE C-6
CALENDAR REPRESENTATION FOR A 5 ON - 2 OFF SCHEDULE,
HAGERSTOWN (MARYLAND) POLICE DEPARTMENT

Patrol and Jail Rotating Work Schedule

1=1st shift
2=2nd shift
3=3rd shift
0=Off

Dec. 29, '80
thru
Dec. 31, '81

D	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S		
29	30	31	J	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	
26	27	28	29	30	31	F	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	
23	24	25	26	27	28	M	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	
23	24	25	26	27	28	29	30	31	A	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	
20	21	22	23	24	25	26	27	28	29	30	M	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	
18	19	20	21	22	23	24	25	26	27	28	29	30	31	J	1	2	3	4	5	6	7	8	9	10	11	12	13	14	
15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	J	1	2	3	4	5	6	7	8	9	10	11	12	
13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	A	1	2	3	4	5	6	7	8	9	
10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	S	1	2	3	4	5	6	
	2	2	2	2	0	0	0	1	1	1	1	1	1	1	0	0	3	3	3	3	3	3	3	3	0	0	2	2	2
	3	3	0	0	2	2	2	2	2	2	2	0	0	0	1	1	1	1	1	1	1	0	0	3	3	3	3		
	1	1	1	1	1	1	1	0	0	3	3	3	3	3	3	3	0	0	2	2	2	2	2	2	2	0	0		
	0	0	3	3	3	3	3	3	3	0	0	2	2	2	2	2	2	2	0	0	0	1	1	1	1	1	1		
S	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	O	1	2	3	
	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	1	
	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	
30	D	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	
28	29	30	31																										

FIGURE C-7
CALENDAR REPRESENTATION FOR A FOUR-GROUP PLATOON SCHEDULE,
WAKE COUNTY (NORTH CAROLINA) SHERIFF'S DEPARTMENT
(7(1) - 2(0) - 7(3) - 2(0) - 7(2) - 3(0))

NAME: _____ PLAN AHEAD FOR 1981
 DATE EMPL: _____ S.S. # _____

JANUARY							FEBRUARY							MARCH							APRIL						
				1 B	2 C	3 C	1 C	2 C	3 A	4 A	5 A	6 B	7 B	1 B	2 B	3 C	4 C	5 A	6 A	7 A				1 B	2 C	3 C	4 A
4 A	5 A	6 A	7 B	8 B	9 C	10 C	8 C	9 C	10 C	11 A	12 A	13 B	14 B	8 B	9 B	10 C	11 C	12 C	13 A	14 A	5 A	6 A	7 B	8 B	9 C	10 C	11 C
11 C	12 A	13 A	14 B	15 B	16 B	17 C	15 B	16 C	17 C	18 A	19 A	20 A	21 B	15 B	16 B	17 B	18 C	19 C	20 A	21 A	12 A	13 A	14 A	15 B	16 B	17 C	18 C
18 C	19 A	20 A	21 A	22 B	23 B	24 C	22 B	23 C	24 C	25 C	26 A	27 A	28 B	22 A	23 B	24 B	25 C	26 C	27 C	28 A	19 A	20 A	21 A	22 B	23 B	24 C	25 C
25 C	26 C	27 A	28 A	29 B	30 B	31 B								29 A	30 B	31 B					24 C	27 A	28 A	29 B	30 B		
MAY							JUNE							JULY							AUGUST						
				1 B	2 C			1 C	2 C	3 A	4 A	5 A	6 B			1 C	2 C	3 A	4 A								1 C
3 C	4 A	5 A	6 A	7 B	8 B	9 C	7 B	8 C	9 C	10 C	11 A	12 A	13 B	5 A	6 B	7 B	8 C	9 C	10 C	11 A	2 A	3 A	4 A	5 B	6 B	7 C	8 C
10 C	11 C	12 A	13 A	14 B	15 B	16 B	14 B	15 B	16 C	17 C	18 A	19 A	20 A	12 A	13 B	14 B	15 B	16 C	17 C	18 A	9 C	10 A	11 A	12 B	13 B	14 B	15 C
17 C	18 C	19 A	20 A	21 A	22 B	23 B	21 B	22 B	23 C	24 C	25 C	26 A	27 A	19 A	20 A	21 B	22 B	23 C	24 C	25 C	16 C	17 A	18 A	19 A	20 B	21 B	22 C
24 C	25 C	26 C	27 A	28 A	29 B	30 B	28 B	29 B	30 B					26 A	27 A	28 B	29 B	30 B	31 C		23 C	24 C	25 A	26 A	27 B	28 B	29 B
31 C																					30 C	31 C					
SEPTEMBER							OCTOBER							NOVEMBER							DECEMBER						
		1 A	2 A	3 A	4 B	5 B				1 A	2 A	3 A		1 A	2 A	3 B	4 B	5 C	6 C	7 C			1 A	2 A	3 B	4 B	5 C
6 C	7 C	8 C	9 A	10 A	11 B	12 B	4 B	5 B	6 C	7 C	8 C	9 A	10 A	8 A	9 A	10 B	11 B	12 B	13 C	14 C	6 C	7 C	8 A	9 A	10 B	11 B	12 B
13 B	14 C	15 C	16 A	17 A	18 A	19 B	11 B	12 B	13 B	14 C	15 C	16 A	17 A	15 A	16 A	17 A	18 B	19 B	20 C	21 C	13 C	14 C	15 A	16 A	17 A	18 B	19 B
20 B	21 C	22 C	23 C	24 A	25 A	26 B	18 A	19 B	20 B	21 C	22 C	23 C	24 A	22 C	23 A	24 A	25 B	26 B	27 B	28 C	20 C	21 C	22 C	23 A	24 A	25 B	26 B
27 B	28 B	29 C	30 C				25 A	26 B	27 B	28 B	29 C	30 C	31 A	29 C	30 A						27 B	28 C	29 C	30 A	31 A	A	B

FIGURE C-8

CALENDAR REPRESENTATION FOR A 5 ON - 2 OFF - 5 ON - 3 OFF SCHEDULE,
 NORWALK (CONNECTICUT) POLICE DEPARTMENT

1 9 8 1 ROTATING SECOND & THIRD PLATOONS DUTY SCHEDULE 1 9 8 1
243 APPEARANCES

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1st. SQUAD	2	2	2	2	2			3	3	3	3	3			
2nd. SQUAD	3	3				2	2	2	2	2			3	3	3
3rd. SQUAD			3	3	3	3	3				2	2	2	2	2

JANUARY	1-16-31	2-17	3-18	4-19	5-20	6-21	7-22	8-23	9-24	10-25	11-26	12-27	13-28	14-29	15-30
FEBRUARY	15	1-16	2-17	3-18	4-19	5-20	6-21	7-22	8-23	9-24	10-25	11-26	12-27	13-28	14
MARCH	2-17	3-18	4-19	5-20	6-21	7-22	8-23	9-24	10-25	11-26	12-27	13-28	14-29	15-30	1-16-31
APRIL	1-16	2-17	3-18	4-19	5-20	6-21	7-22	8-23	9-24	10-25	11-26	12-27	13-28	14-29	15-30
MAY	1-16-31	2-17	3-18	4-19	5-20	6-21	7-22	8-23	9-24	10-25	11-26	12-27	13-28	14-29	15-30
JUNE	15-30	1-16	2-17	3-18	4-19	5-20	6-21	7-22	8-23	9-24	10-25	11-26	12-27	13-28	14-29
JULY	15-30	1-16-31	2-17	3-18	4-19	5-20	6-21	7-22	8-23	9-24	10-25	11-26	12-27	13-28	14-29
AUGUST	14-29	15-30	1-16-31	2-17	3-18	4-19	5-20	6-21	7-22	8-23	9-24	10-25	11-26	12-27	13-28
SEPTEMBER	13-28	14-29	15-30	1-16	2-17	3-18	4-19	5-20	6-21	7-22	8-23	9-24	10-25	11-26	12-27
OCTOBER	13-28	14-29	15-30	1-16-31	2-17	3-18	4-19	5-20	6-21	7-22	8-23	9-24	10-25	11-26	12-27
NOVEMBER	12-27	13-28	14-29	15-30	1-16	2-17	3-18	4-19	5-20	6-21	7-22	8-23	9-24	10-25	11-26
DECEMBER	12-27	13-28	14-29	15-30	1-16-31	2-17	3-18	4-19	5-20	6-21	7-22	8-23	9-24	10-25	11-26

LEGEND
2 = 0800 hrs. to 1600 hrs. } EACH TOUR CONSISTS OF 8 HOURS AND 35 MINUTES
3 = 1600 hrs. to 2400 hrs. } AS DESCRIBED IN OPERATIONS ORDER: 105 S'78

FIGURE C-9
CALENDAR REPRESENTATION FOR A 5 ON - 2 OFF - 5 ON - 3 OFF SCHEDULE,
NEW YORK CITY POLICE DEPARTMENT

JOHNSON COUNTY SHERIFF

March 1981

PATROL SCHEDULE

Date	8	15	6	18	27	16	26	19	25	13	17	10
1	PM 4-2	PM -	PM Vac.	PM -	PM 4-2	PM -	PM Hol.	PM -	PM 9-7	PM 6-4	PM -	PM 9-7
2	4-2	2-11	Vac.	-	4-2	-	Hol.	-	9-7	6-4	-	9-7
3	-	2-11	-	Vac.	4-2	7-4	6-4	4-2	-	9-7	9-7	-
4	-	2-11	-	Vac.	4-2	7-4	6-4	4-2	-	9-7	9-7	-
5	4-2	2-11	6-4	Vac.	-	7-4	-	4-2	9-7	-	9-7	9-7
6	4-2	2-11	6-4	Vac.	-	7-4	-	4-2	9-7	-	9-7	9-7
7	Hol.	-	6-4	-	4-2	7-4	Hol.	-	9-7	9-7	-	9-7
8	Hol.	-	6-4	-	4-2	-	4-2	-	9-7	9-7	-	9-7
9	-	Hol.	-	Vac.	4-2	-	6-4	4-2	-	9-7	9-7	-
10	-	Hol.	-	Vac.	4-2	7-4	6-4	4-2	-	9-7	9-7	-
11	4-2	Hol.	6-4	Vac.	-	7-4	-	4-2	9-7	-	9-7	9-7
12	4-2	Hol.	6-4	Vac.	-	7-4	-	4-2	9-7	-	9-7	9-7
13	4-2	Hol.	6-4	-	4-2	7-4	6-4	-	9-7	9-7	-	9-7
14	4-2	-	Vac.	-	4-2	7-4	6-4	-	9-7	Hol.	-	9-7
15	-	-	-	4-2	4-2	-	6-4	6-4	-	9-7	9-7	-
16	-	2-11	-	4-2	4-2	-	6-4	6-4	-	9-7	9-7	-
17	4-2	2-11	6-4	4-2	-	7-4	-	6-4	9-7	-	9-7	9-7
18	4-2	2-11	6-4	4-2	-	7-4	-	6-4	9-7	-	9-7	9-7
19	4-2	2-11	6-4	-	4-2	7-4	6-4	-	9-7	9-7	-	9-7
20	4-2	2-11	6-4	-	4-2	7-4	6-4	-	9-7	9-7	-	9-7
21	-	-	-	4-2	4-2	7-4	8-6	6-4	-	9-7	G	-
22	-	-	-	4-2	4-2	-	8-6	6-4	-	9-7	U	-
23	4-2	2-11	Hol.	4-2	-	-	-	6-4	9-7	-	A	9-7
24	4-2	2-11	Hol.	4-2	-	7-4	-	6-4	9-7	-	R	9-7
25	4-2	2-11	Hol.	-	4-2	7-4	6-4	-	9-7	9-7	D	9-7
26	4-2	2-11	Hol.	-	4-2	7-4	6-4	-	9-7	9-7		9-7
27	-	2-11	-	4-2	4-2	7-4	6-4	8-6	-	9-7		-
28	-	-	-	4-2	4-2	7-4	6-4	8-6	-	9-7		-
29	4-2	-	Sch.	4-2	-	-	-	6-4	9-7	-		9-7
30	4-2	2-11	Sch.	4-2	-	-	-	6-4	9-7	-		9-7
31	4-2	2-11	Sch.	-	4-2	7-4	6-4	-	9-7	9-7		9-7

FIGURE C-10

CALENDAR REPRESENTATION FOR A 4 ON - 2 OFF SCHEDULE,
JOHNSON COUNTY (IOWA) SHERIFF'S DEPARTMENT

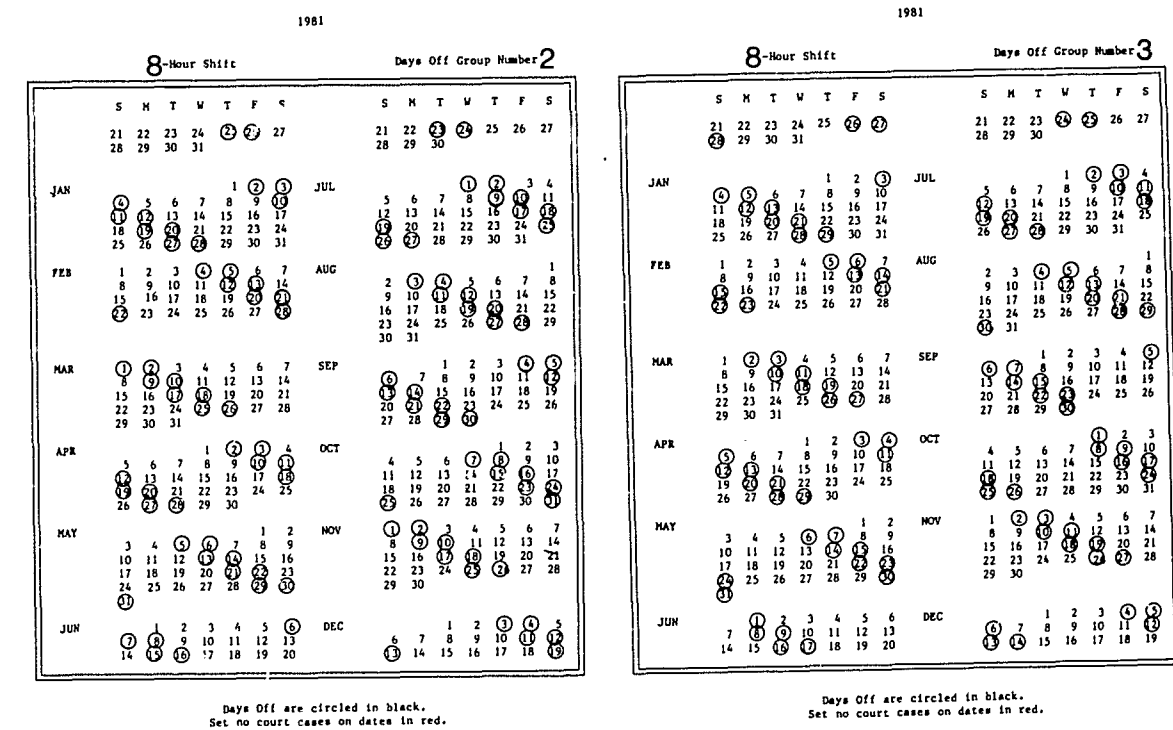


FIGURE C-11

CALENDAR REPRESENTATION FOR A ROTATING DAYS-OFF SCHEDULE,
KANSAS CITY (MISSOURI) POLICE DEPARTMENT

**APPENDIX D: SURVEY SAMPLE SELECTION PROCEDURE
AND SURVEY RESPONSES**

**APPENDIX D: SURVEY SAMPLE SELECTION PROCEDURE
AND SURVEY RESPONSES**

The Police Work Scheduling mail survey was distributed in March 1981 to a total of 220 police agencies throughout the United States. The sample population consisted of two groups. The first group of 196 departments was randomly selected to include all regions of the country and a variety of agency sizes. A discussion of the selection of these departments and the survey results obtained from them is presented below. The second group consisted of 24 police agencies identified through a review of the literature and personal contacts as having a scheduling environment which warranted further investigation. A list of the departments that returned the survey is presented in Appendix E.

The survey instrument, in slightly modified form, also served as the interview and data collection form for approximately 40 interviews of police officers conducted both at The Traffic Institute and at several police agencies during the course of the project.

Sample Population for the Mail Survey

The 1978 "Uniform Crime Reports (UCR) for the United States" served as the source listing of law enforcement agencies for the survey random sample. The UCR listing provided the advantages of ease of use, completeness, and relative currency. The listing was stratified by agency size and geographic region. Proportional sampling, either by agency size or by geographic location, was rejected because of the disproportional effects that would be introduced by a small number of very large departments and the large number of departments in the northeastern and southeastern regions of the United States.

Stratification of the listing into four regions and seven community sizes produced a matrix with 28 cells. Seven agencies were selected for each cell for a total sample size of 196 (see Table D-1). By surveying an equal number of departments for each population and regional grouping, it was believed that the survey had the best chance of obtaining descriptions of police scheduling practices across a variety of organizational settings.

The actual number of responses for each population and regional grouping are shown in Table D-2. The overall response rate was 60.7%. Equally important was the fact that the responding agencies reflected every combination of community size and region.

TABLE D-1
SURVEY SAMPLE BY COMMUNITY SIZE AND REGION

Community Size	Region ^a				Community Size Totals
	North East	North Central	South	West	
250,000 or more	7	7	7	7	28
100,000 - 249,999	7	7	7	7	28
50,000 - 99,999	7	7	7	7	28
25,000 - 49,999	7	7	7	7	28
10,000 - 24,999	7	7	7	7	28
Suburban County	7	7	7	7	28
Rural County	7	7	7	7	28
Region Totals	49	49	49	49	196

^aNortheast: Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, and Vermont.

North Central: Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin.

South: Alabama, Arkansas, Delaware, District of Columbia, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, West Virginia, and Virginia.

West: Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, New Mexico, Nevada, Oregon, Utah, Washington, and Wyoming.

TABLE D-2
NUMBER OF RESPONDING POLICE AGENCIES BY
COMMUNITY SIZE AND GEOGRAPHIC REGION^a

Community Size	Region				Total (%) ^b
	North East	North Central	South	West	
250,000 or more	2	5	5	5	17 (14.3)
100,000 - 249,999	4	5	7	6	22 (18.5)
50,000 - 99,999	5	3	3	4	15 (12.6)
25,000 - 49,999	4	3	4	6	17 (14.3)
10,000 - 24,999	6	5	2	4	17 (11.8)
Suburban County	3	5	1	5	14 (11.8)
Rural County	4	6	3	4	17 (14.3)
Total (%) ^b	28 (23.5)	32 (26.9)	25 (21.0)	34 (28.6)	119

^aSee footnote to Table D-1 for definition of region.

^bPercentage base is the total number of responses, N=119.

Frequency Distributions of Survey Responses

The remainder of this appendix presents the frequency counts of the survey responses to the 45 questions presented in the mail survey questionnaire.

DATA TABULATIONS FOR THE POLICE WORK SCHEDULING SURVEY^a

Survey Question Number^b

1a. "Does your department have a separate patrol division?"

	No.	%
No	5	4.2
Yes	114	95.8
Total	119	100.0

1b. "If 'Yes', is there a separate work schedule for the patrol division?"

	No.	%
No	4	3.5
Yes	110	96.5
Total	114	100.0

2. "Which of the following commonly used work schedules best describes how patrol personnel are assigned in your department?"

	No.	%
4 eight-hour days on, 2 off	7	5.9
5 eight-hour days on, 2 off	51	43.2
6 eight-hour days on, 2 off	8	6.8
4 ten-hour days on, 3 off	11	9.3
Other schedule	41	34.7
No response	1	-
Total	119	100.0

3. "Please attach a photocopy of a recent work schedule for the patrol division--or the full schedule if patrol is not separate."

	No.	%
Not attached	18	15.1
Attached	101	84.9
Total	119	100.0

^aIn the following tabulations, "No." refers to the number of departments responding as indicated and "%" refers to the percentage of responding departments. Non-responses are excluded from calculations. Percentages may not total 100.0 due to roundoff of individual elements.

^bSurvey question numbers correspond to questionnaire item numbers. Some questions and response categories have been abbreviated to conserve space.

4. "How many work shifts are scheduled per day?"

	No.	%
Two	3	2.6
Three	74	63.8
Four	28	24.1
Five	7	6.0
Six	4	3.4
No response	3	-
Total	119	100.0

5a. Length of 1st shift (to nearest hour):^c

	No.	%
Seven hours	3	2.5
Eight hours	87	73.7
Nine hours	11	9.3
Ten hours	13	11.0
Eleven hours	1	0.9
Twelve hours	3	2.5
No response	1	-
Total	119	100.0

5b. Length of 2nd shift (to nearest hour):

	No.	%
Eight hours	86	72.9
Nine hours	12	10.1
Ten hours	15	12.7
Eleven hours	2	1.7
Twelve hours	3	2.5
No response	1	-
Total	119	100.0

^cIn the mail survey, Question 5 was "What are the hours for each shift?" The respondents were asked to indicate the name, starting time, and length for each shift. In the tabulations above, "1st shift" refers to the first shift listed, the "2nd shift" to refers to the second shift listed, and so on.

5c. Length of 3rd shift (to nearest hour):

	No.	%
No third shift	3	2.5
Six hours	1	0.9
Seven hours	3	2.5
Eight hours	86	72.9
Nine hours	10	8.5
Ten hours	15	12.7
No response	1	-
Total	119	100.0

5d. Length of 4th shift (to nearest hour):

	No.	%
No fourth shift	79	66.4
Eight hours	32	26.9
Ten hours	8	6.7
Total	119	100.0

5e. Length of 5th shift (to nearest hour):

	No.	%
No fifth shift	107	89.9
Eight hours	7	5.9
Nine hours	2	1.7
Ten hours	3	2.5
Total	119	100.0

5f. Length of 6th shift (to nearest hour):

	No.	%
No sixth shift	114	95.8
Eight hours	3	2.5
Ten hours	2	1.7
Total	119	100.0

6a. "Are there early-arrivers or late-leavers to provide for continuous service at shift changes?"

	No.	%
No	43	37.4
Yes	72	62.6
No response	4	-
Total	119	100.0

6b. "If 'Yes,' how many?"

	No.	%
5 Minutes	1	1.5
15 Minutes	16	23.5
20 Minutes	2	2.9
30 Minutes	20	29.4
55 Minutes	1	1.5
60 Minutes	27	39.7
90 Minutes	1	1.5
No response	4	-
Total	72	100.0

7. "What is the maximum number of consecutive working days within your current schedule?"

	No.	%
3 Days	3	2.7
4 Days	13	11.6
5 Days	52	46.4
6 Days	19	17.0
7 Days	14	12.5
8 Days	7	6.3
10 Days	3	2.7
20 Days	1	0.9
No response	7	-
Total	119	100.0

8. "The maximum specified in Question 7 above has been established by (Check all that apply):"

	No.	%
State statute	7	6.1
Local government ordinance	3	2.6
Collective bargaining agreement	42	36.5
Department directive	70	60.9
Other requirement	9	7.8
No response	4	-
Total	**** ^d	**** ^d

^dNon-exclusive categories. Cases do not total 119 and percentages do not total 100.0 because of multiple responses.

9. "How often is a typical patrol officer routinely scheduled for the maximum allowable number of consecutive work days (identified in Question 7 above)?"

	No.	%
Weekly	67	62.6
Bi-weekly	5	4.7
Monthly	14	13.1
Quarterly	7	6.5
Less than quarterly	14	13.1
No response	12	-
Total	119	100.0

10. "What is the shortest work period, i.e., consecutive work days between days off?"

	No.	%
1 Day	5	4.5
2 Days	4	3.6
3 Days	6	5.5
4 Days	29	26.4
5 Days	53	48.2
6 Days	8	7.3
7 Days	5	4.5
No response	9	-
Total	119	100.0

11. "The minimum work period specified in Question 10 above has been established by (Check all that apply):"

	No.	%
State statute	3	2.7
Local government ordinance	5	4.5
Collective bargaining agreement	37	33.0
Department directive	70	62.5
Other requirement	11	9.8
No response	7	-
Total	****e	****e

^eNon-exclusive categories. Cases do not total 119 and percentages do not total 100.0 because of multiple responses.

12. "How often is a typical patrol officer routinely scheduled to work the minimum work period?"

	No.	%
Every work period	67	60.4
Bi-weekly	5	4.5
Monthly	13	11.7
Quarterly	9	8.1
Less than quarterly	17	15.3
No response	8	-
Total	119	100.0

13. "Are officers permanently assigned to one shift or do they rotate through all shifts?"

	No.	%
Permanent	41	35.3
Rotating	75	64.7
No response	3	-
Total	119	100.0

14. "If rotating, how often do they rotate?"

	No.	%
Rotate weekly	14	18.7
Rotate bi-weekly	2	2.7
Rotate monthly	31	41.3
Rotate every 6 weeks	1	1.3
Rotate bi-monthly	3	4.0
Rotate quarterly	20	26.7
Rotate annually	4	5.3
Total	75	100.0

15. "Does rotation of patrol personnel cause any problems for your department?"

	No.	%
Do not rotate	37	32.2
Rotation causes no problems	63	54.8
Rotation causes problems	15	13.0
No response	4	-
Total	119	100.0

16. "Does each officer receive the same days off each week?"

	No.	%
No	64	54.2
Yes	54	45.3
No response	1	-
Total	119	100.0

17. "What is the maximum number of consecutive days off according to your current schedule?"

	No.	%
2 Days	49	42.6
3 Days	34	29.6
4 Days	22	19.1
5 Days	3	2.6
More than 5 days	7	6.1
No response	4	-
Total	119	100.0

18. "In your current schedule how often is a typical officer scheduled to get the maximum number of consecutive days off?"

	No.	%
Every work period	63	56.3
Bi-weekly	7	6.3
Monthly	23	20.5
Quarterly	10	8.9
Less than quarterly	9	8.0
No response	7	-
Total	119	100.0

19. "Does the current schedule provide that over a one-year period every officer will receive some time off on weekends (i.e., either Saturday, Sunday or both)?"

	No.	%
No	40	34.5
Yes	76	65.5
No response	3	-
Total	119	100.0

20. "Will all officers over a one-year period of time have the same number of weekend days off?"

	No	%
No	57	48.3
Yes	61	51.7
No response	1	-
Total	119	100.0

21. "Does the current schedule provide the same staffing level on each shift?"

	No	%
No	82	70.1
Yes	35	29.9
No response	2	-
Total	119	100.0

22. "Are the current staffing levels by shift proportional to the workload by shift?"

	No	%
No	25	21.6
Yes	91	78.4
No response	3	-
Total	119	100.0

23. "Which shift has the greatest workload?"

(This open-ended item generated a series of non-categorical responses unsuitable for direct tabulation.)

24. "For the shift identified in Question 23, does the current schedule provide the same staffing level on each day of week?"

	No	%
No	63	54.3
Yes	53	45.7
No response	3	-
Total	119	100.0

25. "For the shift identified for Question 23, are the current staffing levels by shift proportional to the workload by day of week?"

	No.	%
No	47	41.2
Yes	67	58.8
No response	5	-
Total	119	100.0

26. "How many HOLIDAYS are allowed per year?"

	No.	%
None	3	2.7
Six	1	0.9
Seven	7	6.3
Eight	9	8.0
Nine	13	11.6
Ten	21	18.8
Eleven	29	25.9
Twelve	19	17.0
Thirteen	6	5.4
Fourteen	4	3.6
No response	7	-
Total	119	100.0

27. "How are holidays scheduled? (Check all that apply.)"

	No.	%
Cycles of the schedule provide time off	15	13.3
Time off is added to schedule	8	7.1
Officer requests days off	29	25.7
Other method	71	62.8
No response	6	-
Total	119	100.0

28a. "Is there a written policy on the manner in which each officer may take holidays?"

	No.	%
No	43	36.8
Yes	74	63.2
No response	2	-
Total	119	100.0

28b. "If 'Yes': Please explain the policy or attach a copy of the policy if that would be easier."

	No.	%
Attached	26	35.1
Explained	48	64.9
Total	74	100.0

29. "Is there any payment in place of taking a due holiday?"

	No.	%
No	56	47.9
Yes	61	52.1
No response	2	-
Total	119	100.0

30. "How many VACATION DAYS are earned by an officer for the initial year of service?"

	No.	%
Five days	8	6.8
Six days	2	1.7
Seven days	1	0.9
Eight days	1	0.9
Ten days	46	39.3
Eleven days	3	2.6
Twelve days	29	24.8
Thirteen days	3	2.6
Fourteen days	3	2.6
Fifteen days	10	8.5
Sixteen days	3	2.6
Eighteen days	2	1.7
Twenty days	6	5.1
No response	2	-
Total	119	100.0

31. "Does the amount of vacation time increase with longevity?"

	No.	%
No	7	5.9
Yes	112	94.1
Total	119	100.0

31a. "If 'Yes,' what is the maximum vacation that an officer with sufficient longevity can earn in a year's time? (Number of days)"

	No.	%
Twelve days	2	1.8
Fourteen days	2	1.8
Fifteen days	5	4.5
Eighteen days	4	3.6
Nineteen days	1	0.9
Twenty days	26	23.4
Twenty-one days	10	9.0
Twenty-two days	6	5.4
Twenty-three days	5	4.5
Twenty-four days	11	9.9
Twenty-five days	22	19.8
Twenty-six days	1	0.9
Twenty-seven days	3	2.7
Twenty-eight days	3	2.7
Twenty-nine days	2	1.8
Thirty days	7	6.3
Thirty-six days	1	0.9
No response	8	-
Total	119	100.0

31b. "Please explain the lengths of service required for various vacation entitlements--or attach a copy of a written policy if this is easier (Mark one)."

	No.	%
Attached	42	38.9
Explained	66	61.1
No response	11	-
Total	119	100.0

32. "Which of the following considerations limit the way vacations are scheduled in your department? (Check all that apply):"

	No.	%
Vacations are not permitted during designated "peak" periods.	7	5.9
Only a limited percentage of the department, shift, unit, etc., may be on vacation at one time.	90	75.6
Vacations are permitted only when the officer is assigned to a specified shift	0	0.0
There are no rigid limitations--vacations may be taken whenever the schedule reasonably permits.	43	36.1
There are other limitations.	13	10.9
Total	13**** ^f	10.9**** ^f

33. "Does the scheduling of vacation periods cause any problems for your department?"

	No.	%
No	68	58.1
Yes	49	41.9
No response	2	-
Total	119	100.0

34a. "How long is the official 'work week' of the department?"

	No.	%
35 hours	1	.8
37.5 hours	4	3.4
40 hours	88	74.6
Other length	25	21.1
No response	1	-
Total	119	100.0

^fNon-exclusive categories. Cases do not total 119 and percentages do not total 100.0 because of multiple responses.

34b. "If 'Other': Please enter the number of hours in the official 'work week' to the nearest tenth of an hour."

	No.	%
37.00 - 37.99	1	4.0
38.00 - 38.99	2	8.0
39.00 - 39.99	3	12.0
41.00 - 41.99	3	12.0
42.00 - 42.99	7	28.0
43.00 - 43.99	1	4.0
46.00 - 46.99	2	8.0
48.00 - 48.99	5	20.0
51.00 - 51.99	1	4.0
Total	25	100.0

35. "Are individual off-days scheduled for officers because the basic schedule has them working more hours per week than the official work week? (Such days are sometimes called Kelly Days.)"

	No.	%
No	103	88.8
Yes	13	11.2
No response	3	-
Total	119	100.0

36. "Are there extra days worked by officers because the basic schedule has them working fewer hours per week than the required work week? (Such days are sometimes called payback days.)"

	No.	%
No	113	95.8
Yes	5	4.2
No response	1	-
Total	119	100.0

37. "When officers are required to put in UNSCHEDULED extra hours because of special events, emergencies, etc., are they most often (Check one)."

	No.	%
Reimbursed by extra pay	63	54.8
Allowed compensatory time off.	18	15.7
Not reimbursed in <u>any</u> way	0	0.0
Reimbursed in some other fashion.	34	29.6
No response	4	-
Total	119	100.0

38. "Is training time designed into the schedule?"

	No.	%
No	49	41.9
Yes	68	58.1
No response	2	-
Total	119	100.0

39. "Excluding overtime or special pay, are patrol officers paid for the actual number of hours worked within a pay period or do they receive a set base pay each pay period?"

	No.	%
Paid for actual hours worked.	32	27.6
Receive a set base amount.	84	72.4
No response	3	-
Total	119	100.0

40. "Does an employee association influence in any way the scheduling of officers in the patrol division?"

	No.	%
No	87	75.0
Yes	29	25.0
No response	3	-
Total	119	100.0

41. "When was your current patrol schedule first implemented?"

	No.	%
Within the past six months	15	12.9
7-12 months ago	11	9.5
2-3 years ago	19	16.4
More than 3 years ago	67	57.8
Unknown	4	3.4
No response	3	-
Total	119	100.0

42. "Explain the reason for the change to your current schedule?"

	No.	%
Changing workload pattern	55	50.0
Additional staff	9	8.2
Less staff	3	2.7
Accommodate new employee benefits	22	20.0
Unknown	21	19.1
No response	9	-
Total	119	100.0

43. "Where did your current schedule come from? (How was it drawn up? Its source?) (Check all that apply.)"

	No.	%
Other police department	23	19.8
Outside consultant	1	.9
Someone in the department	87	75.0
Other	9	7.8
Unknown	5	4.3
No response	3	-
Total	119	100.0

44a. "Are there work rules that influence the schedule and how it is drawn up (police department policies, municipal personnel rules, state law, etc.)?"

	No.	%
No	76	66.7
Yes	38	33.3
No response	5	-
Total	119	100.0

44b. "If 'Yes,' please explain or attach a copy of documentation if this would be easier."

	No.	%
Rules attached	9	25.0
Explanation provided	27	75.0
No attachment or explanation	2	-
Total	38	100.0

45. "Schedule Problems
Please select a number below which best describes the degree to which the following are a problem for your department. Then write the proper number in the space next to each item."

- 0 - not a problem at all
- 1 - infrequent or unimportant problem
- 2 - an occasional problem which can be serious
- 3 - a serious frequent problem

	Not a Problem		Infrequent Problem		Occasional Problem		Frequent Problem		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
Matching staff level to the demand for service.	29	24.8	30	25.6	40	34.2	18	15.4	117	100.0
Revising schedules to accommodate vacations, sick-time, comp-time, leaves, and other personnel matters.	20	17.1	38	32.5	51	43.6	8	6.8	117	100.0
Designing the schedule to satisfy legal constraints, governmental policy directives, or collective bargaining agreements.	69	59.0	31	26.5	13	11.1	4	3.4	117	100.0
Equipment shortages during periods of peak staffing.	49	41.9	32	27.4	29	24.8	7	6.0	117	100.0
Inadequate times between shifts at changeover times.	63	54.3	34	29.3	18	15.5	1	0.9	116	100.0
Fairness in the scheduling of holidays and weekend days.	61	52.1	40	34.2	11	9.4	5	4.3	117	100.0
Maintaining "Unity of Command" or "Team Integrity" when supervisors and subordinates may have to work different schedules.	55	47.0	43	36.8	17	14.5	2	1.7	117	100.0
Lack of communication between personnel assigned to the various shifts.	23	19.7	43	36.8	47	40.2	4	3.4	117	100.0
Accommodating training, meetings, special assignments, and other administrative demands into the work schedule.	19	16.4	47	40.5	43	37.1	7	6.0	116	100.0
Compatibility with the schedules of courts and other public agencies.	27	23.1	36	32.5	45	38.5	7	6.0	117	100.0
Restrictions on outside activities such as education and extra employment due to variability in the work schedule (including shift changes).	43	36.8	51	43.6	21	17.9	2	1.7	117	100.0
Employee fatigue, boredom, and/or low morale associated with scheduling problems.	33	28.2	54	46.2	25	21.4	5	4.3	117	100.0

**APPENDIX E: POLICE AGENCIES THAT PARTICIPATED IN THE
POLICE WORK SCHEDULING PROJECT**

**APPENDIX E: POLICE AGENCIES THAT PARTICIPATED IN THE
POLICE WORK SCHEDULING PROJECT**

This appendix identifies the police agencies that provided information for use in this document. Two lists are presented. The first (Table E-1) identifies the 119 agencies, divided by region of the country, that responded to the mail survey. A complete discussion of the selection of these agencies is presented in Appendix D. The second list (Table E-2) identifies an additional 41 departments that provided scheduling information (1) by responding to a supplemental mailing of the survey to non-randomly selected departments, (2) with interviews with officers from the department, or (3) from on-site visits by the project team.

TABLE E-1

119 POLICE AGENCIES, BY REGION, THAT RESPONDED
TO THE POLICE WORK SCHEDULING MAIL SURVEY

Northeast (Connecticut, Maine, Massachusetts, New Hampshire, New Jersey,
New York, Pennsylvania, Rhode Island, and Vermont)

1. Altoona (Pennsylvania) Police Department
2. Amherst (New York) Police Department
3. Auburn (Maine) Police Department
4. Bristol Township (Pennsylvania) Police Department
5. Buffalo (New York) Police Department
6. Cambridge (Massachusetts) Police Department
7. Chautauqua County (New York) Sheriff's Department
8. Dover (New Hampshire) Police Department
9. Erie City (Pennsylvania) Police Department
10. Fulton County (New York) Sheriff's Department
11. Hempstead (New York) Police Department
12. Jefferson County (New York) Sheriff's Department
13. Lawrence Township (New Jersey) Police Department
14. Merrimack (New Hampshire) Police Department
15. Monroe County (New York) Sheriff's Department
16. Montclair Township (New Jersey) Police Department
17. New York City (New York) Police Department
18. Newport (Rhode Island) Police Department
- 19.* Norwalk (Connecticut) Police Department
20. Onondaga County (New York) Sheriff's Department
21. Port Washington (New York) Police Department
22. Saint Lawrence County (New York) Sheriff's Department
23. Southampton Town (New York) Police Department
24. Stoneham (Massachusetts) Police Department
25. Syracuse (New York) Police Department
26. Vineland (New Jersey) Police Department
27. Wayne County (New York) Sheriff's Department
28. Weymouth (Massachusetts) Police Department

North Central (Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota,
Missouri, Nebraska, North Dakota, Ohio, South Dakota, and
Wisconsin)

1. Akron (Ohio) Police Department
2. Athens (Ohio) Police Department
3. Cass County (Ohio) Sheriff's Department
- 4.* Chicago (Illinois) Police Department
5. Columbus (Ohio) Division of Police
6. Evergreen Park (Illinois) Police Department

TABLE E-1 (continued)

7. Great Bend (Kansas) Police Department
8. Greene County (Missouri) Sheriff's Department
9. Greenfield (Wisconsin) Police Department
10. Hamilton County (Ohio) Sheriff's Department
11. Independence (Missouri) Police Department
12. Johnson County (Iowa) Sheriff's Department
13. Kansas City (Missouri) Police Department
14. Kettering (Ohio) Police Department
15. Lansing (Michigan) Police Department
16. Logan County (Illinois) Sheriff's Department
17. Livonia (Michigan) Police Department
18. Madison Heights (Michigan) Police Department
19. Marquette County (Michigan) Sheriff's Department
20. Minnetonka (Minnesota) Police Department
21. Morgan County (Illinois) Sheriff's Department
22. Muskegon County (Michigan) Sheriff's Department
23. Pittsburgh (Kansas) Police Department
24. Rockford (Illinois) Police Department
25. Saint Louis City (Missouri) Police Department
26. Saint Louis County (Missouri) Police Department
27. Saint Paul (Minnesota) Police Department
28. Southfield (Michigan) Police Department
29. Springfield (Ohio) Police Department
30. Stephenson County (Illinois) Sheriff's Department
31. Waukesha County (Wisconsin) Sheriff's Department
32. Wisconsin Rapids (Wisconsin) Police Department

South (Alabama, Arkansas, Delaware, District of Columbia, Florida,
Georgia, Kentucky, Louisiana, Maryland, Mississippi, North
Carolina, Oklahoma, South Carolina, Tennessee, Texas, West
Virginia, and Virginia)

1. Aberdeen (Maryland) Police Department
2. Chesapeake (Virginia) Police Department
3. Clearwater (Florida) Police Department
4. Cleveland County (North Carolina) Sheriff's Department
5. Durham (North Carolina) Department of Public Safety
6. Farmers Branch (Texas) Police Department
7. Hagerstown (Maryland) Department of Police
8. Hampton (Virginia) Police Department
9. Huntington (West Virginia) Police Department
10. Jackson (Mississippi) Police Department
11. Kingsville (Texas) Police Department
12. Largo (Florida) Police Department
13. Lenoir (North Carolina) Police Department
14. Lincoln County (North Carolina) Sheriff's Department

TABLE E-1 (continued)

15. Mecklenburg County (Virginia) Sheriff's Department
16. Memphis (Tennessee) Police Department
17. Mobile (Alabama) Police Department
18. Nashville-Davidson County (Tennessee) Police Department
19. New Orleans (Louisiana) Police Department
20. Oklahoma City (Oklahoma) Police Department
- 21.* Portsmouth (Virginia) Police Department
22. Sherman (Texas) Police Department
23. Tampa (Florida) Police Department
- 24.* Tulsa (Oklahoma) Police Department
25. Wake County (North Carolina) Sheriff's Department

West (Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, New Mexico, Nevada, Oregon, Utah, Washington, and Wyoming)

1. Bell (California) Police Department
2. Bernalillo County (New Mexico) Sheriff's Department
3. Canon City (Colorado) Police Department
4. Carlsbad (New Mexico) Police Department
5. Clark County (Washington) Sheriff's Department
6. Davis (California) Police Department
7. El Cajon (California) Police Department
8. Eugene (Oregon) Police Department
9. Farmington (New Mexico) Police Department
10. Flathead County (Montana) Sheriff's Department
11. Grant County (Washington) Sheriff's Department
12. Hillsboro ((Oregon) Police Department
13. Josephine County (Oregon) Sheriff's Department
14. Lakewood (Colorado) Department of Public Safety
15. Larimer County (Colorado) Sheriff's Department
16. Las Vegas (Nevada) Metropolitan Police Department
17. Long Beach (California) Police Department
18. Longmont (Colorado) Department of Public Safety (Police Bureau)
19. Mesa (Arizona) Police Department
20. Modesto (California) Police Department
21. Pomona (California) Police Department
22. Port Angeles (Washington) Police Department
23. Portland (Oregon) Police Bureau
24. Provo (Utah) Police Department
25. Pueblo (Colorado) Police Department
26. San Diego (California) Police Department
27. San Jose (California) Police Department
28. Sheridan (Wyoming) Police Department
29. Siskiyou County (California) Sheriff's Department
30. Snohomish County (Washington) Sheriff's Department
31. Tacoma (Washington) Police Department

TABLE E-1 (continued)

32. Torrance (California) Police Department
33. Upland (California) Police Department
34. Ventura County (California) Sheriff's Department

*Personal interviews were also conducted with one or more representatives from department.

TABLE E-2

41 ADDITIONAL POLICE AGENCIES THAT PROVIDED INFORMATION
FOR THE POLICE WORK SCHEDULING PROJECT

1. Albuquerque (New Mexico) Police Department
2. Arlington County (Virginia) Police Department
- 3.* Aurora (Colorado) Police Department
- 4.* Austin (Texas) Police Department
- 5.* Baltimore (Maryland) Police Department
6. Baltimore County (Maryland) Police Department
7. Beloit (Wisconsin) Police Department
- 8.* Bossier City (Louisiana) Police Department
9. Boulder (Colorado) Police Department
10. Charlotte (North Carolina) Police Department
- 11.* Colorado State Patrol
- 12.* Danbury (Connecticut) Police Department
- 13.* Deerfield (Illinois) Police Department
14. DeKalb County (Georgia) Sheriff's Department
- 15.* Elmhurst (Illinois) Police Department
16. Everett (Washington) Police Department
17. Glencoe (Illinois) Department of Public Safety
18. Greece (New York) Police Department
- 19.* Harrisburg (Pennsylvania) Police Department
20. Henrico County (Virginia) Division of Police
21. Hobbs (New Mexico) Police Department
22. Huntington Beach (California) Police Department
- 23.* Indianapolis (Indiana) Police Department
24. Lawrence (Kansas) Police Department
- 25.* Los Angeles (California) Police Department
26. Los Angeles County (California) Sheriff's Department
- 27.* Louisiana Department of Public Safety
- 28.* Maryland State Police
- 29.* Massachusetts State Police
- 30.* Milwaukee (Wisconsin) Police Department
31. Norfolk (Virginia) Police Department
- 32.* Pennsylvania State Police
- 33.* Renton (Washington) Police Department
34. Springfield (Missouri) Police Department
- 35.* Victoria (Texas) Police Department
- 36.* Virginia State Police
- 37.* Washington State Patrol
- 38.* Wayne (New Jersey) Police Department
- 39.* West Virginia State Police
- 40.* Wilmington (Delaware) Department of Police
- 41.* Winston-Salem (North Carolina) Police Department

*Personal interviews conducted with one or more representatives
from department.

APPENDIX F: ANNOTATED BIBLIOGRAPHY ON
POLICE WORK SCHEDULING

APPENDIX F: ANNOTATED BIBLIOGRAPHY ON
POLICE WORK SCHEDULING

Allen, W. "Four-day Work Week: Another Approach", Police Chief, Jan. 1973, 48-49.

Discussion of the proposed four-day week plan of the Arlington, Virginia Police Department, including the advantages and scheduling problems. Three four-day periods are worked in a rotating cycle: a 9-hour midnight shift (10-7 AM), a 9-hour day shift (7 AM - 4 PM), and a 10-hour evening shift (4 PM - 2 AM).

Brown, P. "Cycle-Scheduling for Eight and Ten Hour Days", Law and Order, May 1973, 28-33; also in Police Chief, April 1974, 34-41.

In scheduling eight-hour days the system employs a twenty-one day cycle. Each man works seven days, is off two, works eight days, and is off four. The average week consists of forty hours since each man works a total of 120 hours and has six days off during the three-week cycle. In scheduling ten-hour days, the same cycling described for eight-hour days is used. In this case, a cycle of four weeks is used.

Brown, W. J. and T. Lim "The Development of Rotating Shift Schedules - for the SinVille Police Department," Canadian Police Chief, April 1980, 15-19.

A method to develop rotating shift schedules for a hypothetical jurisdiction of 500,000 population is explained and discussed. It is presented as an opportunity to break away from equal allocation of resources by shift while meeting officer demands for implementation of the compressed work week (10-hour 4-day schedule).

Brunner, G. "Law Enforcement Work Schedules - Officer's Reactions", Police Chief, Jan. 1976, 30-31.

Results of a survey of 21 Wisconsin Law Enforcement Agencies to determine which type of shift schedules are currently being employed and what preference officers have toward their work schedules. The survey included questions on type of shift worked, the effects of

shift worked on personal factors, and the effect of shift worked on job-related factors.

California Commission on Peace Officer Standards and Training. "The 'Ten Plan' in California Law Enforcement Agencies," 1973.

In response to inquiries the California POST summarized the reports of 24 municipalities using the four-day forty-hour plan. Pitfalls to avoid, the good and bad experiences, the consensus for and against are all detailed. Gaps in our knowledge to be filled by future research are listed: effects of fatigue from the longer day on officer performance, applicability to other functions than patrol, adaptation factors to agencies by size of agency/community, long-term effects on morale.

California Commission on Peace Officer Standards and Training. The Four-Ten Plan - California Law Enforcement, 1981.

Of 104 California law enforcement agencies identified as having tried 4-10 scheduling, 14 had dropped it and 68 responded to a survey taken in 1979 and again in 1981. Survey comments and post-staff observations on 10-hour a day scheduling are provided, along with planning issues that should be included in a study of and experimentation with alternative personnel deployment plans.

Cann, W. "Our 4/40 Basic Team Concept", Police Chief, Dec. 1972, 56-64; also in Law and Order, May 1973, 16-22; and in Journal of California Law Enforcement, July 1972, 72-77.

Police manpower allocation program in San Bruno, California divided patrolmen into small groups for deployment purposes and adopted the four-day week. The program's objective was to allocate manpower during the times of greater need and to reduce periods of over policing. This change gave the department a more evenly allocated work force and a better balance in offensive patrol. The report details the problems of the previous system which caused the department to initiate the change in 1970, it discusses the scheduling of work, training, and free time under the new system.

Chenney, R., and Lasater, S. "Operation Saturation: An Alternative Patrol Deployment System," Police Chief, Jan. 1980, 28-29.

Three platoons with two squads each in Hobbs, N.M. Three days on and three days off plus training days is the schedule. High visibility, the decrease of vehicle costs, and the increase of off-duty activity are emphasized.

Comrie, M. and Kings, E. "Urban Workloads," Police Research Bulletin, Spring, 1974, 32-38; and "The Flexible Use of Manpower," Police Research Bulletin, Autumn, 1974, 27-33.

A project progress in two parts studying the effect of unit beat policing in twelve English towns. Characterized by use of personal radios, wider use of vehicles for preventive patrol, assigning constables to a permanent beat, and the introduction of collators to assemble, maintain, and disperse crime prevention data. Scheduling aspects are discussed.

Dalton, D., Heyen, H., and Whitemeyer, M. "The 9-5 Plan," Police Chief, December 1978, 47-49.

Five nine-hour days followed by two/three days off in Fremont, California. Officers come into the station one hour before going off duty to complete paper work and follow up investigation (the vehicle is thus freed up). Benefits of the change are discussed.

Davis, G., and Tracy, J. "Everett's 12-hour Shift." FBI Law Enforcement Bulletin, April 1980, 7-9.

Department slowly eases into a twelve-hour shift; great improvement of police morale. Subjective and objective evaluations were made. Technical report available.

Davis, T. W. "Computer Scheduling Optimizes Police Manpower," Law and Order, September 1981, 84-86.

Work scheduling for small departments using a microcomputer is demonstrated. Necessary components of the system are explained and discussed.

Drossman, M. "Design of a Duty Schedule," Police Chief, July 1974, 60.

Combinatorial mathematics, which has to do with the various ways of combining elements and the selection of those combinations satisfying certain constraints, coupled with computers, produced a duty schedule for Suffolk County, N.Y. that was compatible with work-load requirements and manpower allocations as determined by crime rate statistics.

Gavney, R., Calderwood, J., and Knowles, L. "Attitude of Patrol Officers and Wives Toward a Four-day Workweek," Police Chief, Feb. 1979, 33-35.

Questionnaires given separately to patrol officers and wives concur substantially and are very favorable to the new four-day workweek.

Griswold, L. "Huntington Beach Police Department - The Ten Plan: An Objective Analysis," Huntington Beach California, 1972.

Report concludes that benefits of increased policeman morale and better community protection far outweigh the costs of the four-day work week, the 'Ten Plan'. Advantages include decreased response time and increased misdemeanor and felony arrests per offenses reported. This is attributable to better police coverage during the peak crime hours. Conversely, during calm hours, it is easier to schedule the appropriate number of men without shortages during more active hours. In response to a questionnaire, the employees almost unanimously endorsed the program. (NIJ Annotation)

Haste, D. "Shift Systems and the Deployment of Manpower," Police Research Bulletin, Spring, 1980, 42-47.

A summary of the possibilities of shift schedules (as understood in Great Britain) to meet demands for service.

Hand, F., Burgess, R., and Wilson, J. "A Four-Ten Plan for Moderate and Large Police Patrol Operations," Law and Order, Nov. 1975, 8-12.

Discussion of the mechanics of a specialized work schedule devised for the Dekalb County, Georgia Police Department. It is based on three over-lapping ten-hour shifts. The authors state the following advantages: maximum manpower during critical service demand hours, equal distribution of manpower, efficient watch change, rotating off-days, better morale, equal use of equipment, and specialized units utilized efficiently and effectively.

Hawk, D., and Dunham, R. The Four Day/Forty Hour Work Week: A Selected Bibliography, Council of Planning Librarians, Exchange Bibliography #1248, Mar. 1977.

A general list of references in business and industry for the four-day forty-hour week. A two page introduction; references are not annotated.

Heller, N. "Proportional Rotating Schedules," Unpublished doctoral dissertation. University of Pennsylvania, 1969.

Presents a theoretical basis for the design of proportional rotating (PR) schedules developed for use at the St. Louis Metropolitan Police Department. PR schedules can be designed to match police staffing levels to workload that varies by shift and day of the week. Thesis includes a discussion of the impact of scheduling on geographic patrol assignments and the supervision of patrol units. Manual design methods are presented.

Heller, N. What Law Enforcement Can Gain from Computer Designed Work Schedules. U.S. Department of Justice, 1974.

A summary of the benefits of using a computerized procedure to design proportional rotating (PR) schedules for police personnel. The properties of PR schedules that can be designed are identified along with the prerequisites and costs of using the computer programs.

Heller, N., McEwen, J., and Stenzel, W. Computerized Scheduling of Police Manpower, 2 volumes, St. Louis Metropolitan Police Department, 1973; "Scheduling Police Manpower by Computer," Proceedings, Fourth National Symposium on Law Enforcement Science and Technology, U.S. Department of Justice, May 1972; and "Design of Police Work Schedules," Urban Analysis, Vol. 2, 1974, 21-49.

Description of the methods and computer programs developed to design proportional rotating (PR) schedules. Volume I describes the police scheduling problem, the procedure for designing PR schedules, the explicit control of schedule attributes, and examples of PR schedules for the Evidence Technician Unit and the Traffic Safety Unit. Volume II is the User's Manual for the computer programs.

Horine, J. "The Land of Daniel Boone Adopts a Four-Day Work Week," Pennsylvania Law Enforcement Journal, Dec. 1972, 23.

The Chief of Exeter Township, Pa. police department describes his new four-day forty-hour schedule and gives hopes for the future.

International City Management Association, "Compensation and Manpower Utilization for Police, Fire, and Sanitation Workers," Urban Data Service Report, March 1974.

Data is provided on police base and maximum salaries, salary trends, city expenditures for uniformed personnel, length of work week, and police department capital outlays.

International City Management Association, "Scheduling Plan Doubles Night Patrols," Target, Nov. 1975, 1-2.

Double coverage is achieved during evening hours in N. Charleston, S.C. as five squads rotate on a 20-week cycle. Response time is reduced from one hour to about four minutes.

Kakuske, B. "A Police Experiment with the Ten-Hour Day," Police, March 1972, 15-17.

A four-day forty-hour plan is tried as an experiment in Beloit, Wisconsin and discontinued. Severe disruptions in the patrol force are given as the reason. There is insufficient coverage during shifts, and little contact between supervisors and their men.

Kolisar, P., Rider, K., Crabill, T., and Walker, W. "A Queueing-Linear Programming Approach to Scheduling Police Patrol Cars," New York City, Rand Institute, June 1974.

Authors develop an integer linear programming model to examine the impact of introducing multiple overlapping shifts to meet varying demands for police service.

Louisiana State Police Research Unit. An Interim Analysis of 12-Hour Shifts, 1979.

Each patrol division (troop) on a 12-hour shift, 28-day cycle, is divided into four teams of which two work and two are off on each day. This analysis of a three-month trial period for three troops is concerned with impact on overtime, vehicle expenses, sick leave, performance parameters, and morale. No final conclusions are drawn. Substantive materials in the appendices include a proposal on 12-hour schedules from Exxon Co., time sheet preparation during the three months, evaluation forms, and supervisor's comments.

Mang, N. "The Evolution of Labor Utilization," Police Chief, Nov., 1974, 30-32; also in Journal of California Law Enforcement, July 1974, 12-14.

The background, philosophy, and effects of the four-day work week are examined. The trend toward increasing use of the four-day work week is often seen as a partial solution to the problem of worker alienation and dissatisfaction. The author states, however, that there is little known about the physiological factors and side effects of fatigue on the worker over sustained periods of time. He states that a weekend of three days may not undo the physiological damage of the shorter, more intense work week. The increasing experimentation with four day work weeks for law enforcement personnel is then questioned due to these physiological factors.

McEwen, J. "Four-ten Plan: Police Explore Potential of Four-Day Work Week," National Criminal Justice Reference Service, Selected Topic Digest, April 1972.

Examination of the benefits and problems encountered by police departments which have experimented with the 40 hour work week. Where the 4-day and 40-hour week has been applied in police

departments, patrolmen have responded favorably. The ten-hour day, however, poses serious problems of officer fatigue and patrol car shortage. The boost in morale, resulting from a shorter work week, is considered a major gain. Bibliography.

McGinnis, W. "Small Department Duty Schedule," Police Chief, July 1974, 61-62.

Florida Atlantic University Police Department reproduces its schedule as a guide for small departments (defined as 10-40 officers). Rotation for such departments is a requirement.

McLaren, R. "Allocation and Distribution of Police Patrol Manpower," in Law Enforcement Science and Technology, Proceedings of the First National Symposium on Law Enforcement Science and Technology: Academic Press, 1967, 599-607; also in Police Research Bulletin, Winter, 1979, 23-32.

The author explains a method for the allocation and distribution of patrol manpower developed by the field operations division of the International Association of Chiefs of Police. Sample work schedules are provided.

Nielsen, S. C. "A Pragmatic Approach to Police Productivity," Police Chief, February 1981, 42, 43 and 80.

As an experiment, activities for one shift were weighted and a baseline of average productivity established in Provo, Utah. Preferential days off, vacation time, holiday-time, etc. were awarded on basis of productivity and seniority. The program was considered a success.

Phelps, L. and Murphy, R. "The Team Patrol System in Richmond, California," Police Chief, June 1969, 48-51.

The team policing concept as applied to Richmond is presented and discussed. The schedule used is reproduced.

Randall, B. J. "Case Study on The Implementation of An Extended Workday-Reduced Workweek," Torrance, California.

In order to implement a four-day work week, the Torrance Police Department and Officer's Association negotiated a nine and a half, rather than a ten-hour work day. The department also surveyed the patrol officers who would be affected by the change to determine

their attitudes toward such a program. The Torrance Police Department reports satisfaction with its four-day work week. (NIJ Annotation)

Richardson, I. and Duparcq, R. "Minimum Policing Requirement," Police Research Bulletin, Spring 1974, 28-31; and "The Calculation of Minimum Policing Requirement of a Subdivision," Police Research Bulletin, Autumn, 1974, 34-37.

A report in two parts on a theoretical model for matching police duty schedules and equipment allocations with project work load requirements calculated from crime statistics. The second part relates the results of an actual experiment with minimum policing requirement.

Robitaille, E. "Ten-Hour Shift Study - Ten Plan," Journal of California Law Enforcement, July 1970, 13-17; also in Police Chief, Sept. 1970, 16-20; and in FBI Law Enforcement Journal, Oct. 1970, 23-25.

The efficiency and morale of the Huntington Beach, California Police Department were increased after experimenting with the four-day forty-hour work schedule.

Rosenthal, E. "Are Workers Up to the Four-day Work Week?" Management Review, 1972, 14-20.

Summary of research on the effects of shortened work week on employees. Preliminary studies indicate that the attitude toward the four-day week is favorable. The incidence of fatigue and accidents is lower than expected, and absenteeism has not increased. While some employees are worried about the greater opportunities for moonlighting, many take no stand on the issue, believing that a worker's free time is not subject to employer control.

Schira, G. "The Four-Day Ten-Hour Work Week in a Small Size Police Department," Traffic Institute research paper, 1979.

A study of the difficulties and benefits for the Bloomingdale, Illinois Police Department, if a four-day schedule were adopted. Review of the literature is included with a discussion of the Huntington Beach, California adoption and the Beloit, Wisconsin rejection of the four-day schedule.

Sims, V. "A Work Schedule for the Majority," Police Chief, April 1975, 41-42.

A practical how-to guide to scheduling in police departments of ten officers or less - the majority of departments in the U.S.

Smith, L. and Greene, J. "The Tacoma Police Team," Police Chief, April 1974, 42-45.

Initiation of the team concept in Tacoma, Washington has had a beneficial effect. In addition to the benefits which stem from police officers working with a single supervisor, the team concept has instilled a friendly competition between teams in fighting crime. Scheduling in-service training days or additional manpower during peak crime periods is a simpler matter.

Stenzel, W. Optimal Multishift Proportional Rotating Schedules, Unpublished doctoral dissertation, Washington University, 1976.

Utilizing Heller's earlier work on the design of proportional rotating schedules, the author describes a series of algorithms for the derivation of an "optimal" PR schedule based upon user-specified schedule attributes. Using a sequential lexicographic decision process, the procedure utilizes the number and distribution of weekend off-duty periods (Saturday and Sunday off), the maximum number of consecutive on-duty days, the distribution and length of off-duty periods, and other schedule properties. The algorithms are used to develop schedules for two units at the St. Louis Metropolitan Police Department.

Strunk, D. "In-service Training and the Four-Day Work Week," Police Chief, July 1978, 45-46.

The benefits of four-day ten-hour scheduling for in-service training for the University of Alabama in Birmingham Police Department. A forty-five officer operations division is divided into six teams, all of which are scheduled on Wednesdays as the in-service training day.

Tyler, R. An Analysis of Various Work-Time Scheduling Methods. Austin, Texas: Texas State Department of Highways and Public Transportation, 1977.

Due to the recent emergence of the four-day workweek and several other new work-time arrangements, the standard five-days, 40-hours can no longer be considered inviolable. One way to classify the various new scheduling techniques is with regard to the degree of flexibility found in each. Four categories have been defined: fixed, staggered, flexible and variable. Fixed and staggered hours do not change once established; flexible and variable hours can change day to day.

U.S. Department of Housing and Urban Development. Work Schedule Design Handbook: Methods for Assigning Employees' Work Shifts and Days Off, 1978.

A comprehensive and excellent guide to manual methods for designing work schedules. Specific contents include procedures for analyzing an existing schedule to determine its properties; determining how many employees are needed on the basis of on-duty staffing requirements; allocating staff-days by shift and day of week; determining what type of schedule is needed; and designing fixed bracket, duty cycle, and proportional rotating schedules.

Ward, G. "The 9-40 Plan," Police Chief, Dec. 1978, 44-47.

This scheduling system divides that patrol division in half. Three nine-hour shifts for each half are provided for four days, proceeded by a 30-minute roll call and ending with an additional 30 minutes for physical fitness efforts. There is a common day for training and holidays. The drawbacks and advantages of this schedule are presented. The issues of quality time for personal development and more work involvement in the four-days are discussed.

Whisenand, P., Gates, B., and Medak, G. "The Municipal Police Department: The Four Day Forty-hour Workweek," The 1972 Municipal Year Book. Washington, D. C.: International City Management Association, 1972; also in Innovations in Law Enforcement, Washington, D. C.: National Institute of Law Enforcement and Criminal Justice, 1973; and in Journal of California Law Enforcement, Oct. 1971, 67-79.

General introduction to the four-day concept in law enforcement. Results are presented of an evaluation of its use in Long Beach, California. Survey results are given from twelve California police departments using four-day forty-hour schedules.

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