

Tucson Police Department

4-10 Work Schedules Six-Month Status Report

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Table of Contents

Section 1 Executive Summary	1-1
Section 2 Introduction	2-1
Section 3 Overtime Experience	3-1
Section 4 Response Times	4-1
Section 5 Special Unit Performance	5-1
Section 6 Patrol Activity	6-1
Section 7 Shift Differential	7-1
Section 8 Fatigue Factors	8-1
Section 9 Off-Duty Work and Sick Leave	9-1
Section 10 Recommendations	10-1

Executive Summary

A one-year test of 4-10 work schedules was implemented in Operations Division South patrol, Service Dog Unit (S.D.U.), and Identification Section (I.D.) on January 1, 1990

There were several positive results observed in the first six-months of the test:

- Patrol court overtime decreased approximately 18%. During the same period, the non-test patrol divisions, as a whole, increased 14%. S.D.U. court overtime decreased 28%.
- Extended duty overtime decreased markedly. The test patrol division decreased 50%. During the same period, the non-test patrol divisions increased about 18%. S.D.U. extended duty overtime decreased 36%. I.D. decreased 75%.
- Shift differential costs in the test division decreased about 13%. The non-test patrol divisions, as a whole, increased very slightly during the same period.
- Industrial injuries in Operations South decreased 39%. The non-test patrol divisions experienced an average 30% increase during the same period.
- Citizen complaints in the test patrol division decreased 25%. The non-test patrol divisions increased an average of 4% during the same period.

The following factors did not appear to be affected by the schedule change or more test information is necessary for evaluation:

- Response times did not change appreciably, although a slight improvement in Priority-3 responses was observed.
- Vehicle accidents increased in both test and non-test patrol divisions.

Section 1

Executive Summary

- Off-duty work rates did not increase and there was a tendency to shift off-duty work to weekends rather than workdays.
- S.D.U. and I.D. performance factors (calls handled, response times, etc.) changed very little.
- Patrol activity benefitted slightly when the test schedules were first implemented, however, the assignment of trainees to the test division mid-way into the evaluation period affected all activity factors to a greater degree than did the schedule change.

Only two significant negative effects of the change to 4-10 schedules were observed:

- I.D. court-related overtime more than doubled.
- Sick leave in Operations South increased about 20%. While this increase was expected (because each sick day is now ten hours rather than eight) the non-test divisions decreased sick leave approximately 12% during the same period.

Planning and Research recommends the test be continued for its intended one-year duration. Some modifications to the monthly evaluation reports are also recommended.

Introduction

In late 1988, the Tucson Police Department began studying the feasibility of four, ten-hour workdays per week (4-10 schedule) as an alternative to the traditional five, eight-hour workdays (5-8 schedule). Shortly thereafter, the Headquarters Desk Unit, manning the front desk and handling report call-backs, was placed on 4-10 schedules.

Planning & Research staff obtained information from many other police agencies with 4-10 experience, worked with patrol commanders to study various allocations of personnel and equipment, and polled police personnel about their opinions of a possible schedule change.

In April 1989, the 4-10 Plan Evaluation (referred to as "the feasibility study") was published and distributed. It recommended a carefully monitored test of 4-10 schedules be conducted in one patrol division, one sworn officer support unit (Service Dog Unit), and one non-sworn support unit (Identification Section). The study and its recommendations were submitted to Mayor and Council who, in December 1989, authorized a one-year test beginning January 1, 1990. Mayor and Council requested a six-month status report mid-way through the test period.

Monthly reports have been issued by Planning & Research, containing data important to the evaluation of the program. Particular emphasis was placed on overtime costs and response times. These "critical factors," if negatively affected in a significant manner, could have caused the test to be immediately terminated. None of the factors, which were continually evaluated, were affected negatively to a substantial degree. Most were positively affected.

Employees, who were surveyed several times prior to the start of the test, expressed very positive opinions about the proposed schedule change. Several comments were received, however, expressing discontent with the number of surveys, so only one additional survey will be conducted --- at the end of the twelve-month test period.

Section 2

Introduction

This is the June 1990 and six-month status report of the 4-10 schedule test in Operations Division South patrol, Service Dog Unit, and Identification Section Field Technicians.

Overtime Experience

Police overtime is a major cost to the City. In calendar year 1989, it amounted to just over \$2 million (in pay and compensatory time equivalent). During the original 4-10 Feasibility Study, many police commanders expressed concern that any negative effect of the schedule on overtime could be extremely costly. Of particular concern was court-related overtime, accounting for the majority of police overtime and over which the Police Department has little control. The original study determined that most agencies experienced no change in overtime costs in general and a reduction in extended duty overtime. The extended duty reduction was due to the greater shift overlap on 4-10 schedules (i.e. less need for officers to take calls near the end of a shift).

Background

For the purposes of this evaluation, police overtime is segregated into three categories: court-related, extended duty, and other. Police overtime is submitted by employees on a Police Department overtime form. Each submission includes a code indicating the reason for the overtime. Police overtime records are data-entered and processed on the City IBM computer on a pay period basis. After the payroll report is issued every two weeks, overtime data is archived on a computer tape. Records prior to January 1990 were obtained from the archive. Beginning that month, records were obtained directly from the bi-weekly overtime files prior to archiving. All records were downloaded from the City computer. Overtime was calculated for the period in which it was earned rather than paid. For example, overtime earned on December 30, 1989 is included in totals for the last half of calendar year 1989 rather than January 1990, when it would have been paid.

Each of the three categories of overtime is reported in total hours for each of the three, six-month evaluation periods. In addition, court-related overtime (related to the number of assigned officers) is reported on a per-officer basis. Extended duty overtime, which could be affected by how efficiently officers are scheduled relative to

Section 3 Overtime Experience

call load, is reported in hours of overtime per 100 actual duty hours in addition to total hours.

Other overtime codes involving field training pay, off-duty work for other departments, and the Connie Chambers grant-funded project, were excluded from other overtime calculations because they do not relate to working schedules. In addition, the number of hours associated with these activities is relatively large in comparison to other codes categorized as "other overtime." This would obscure any changes in the smaller categories, making evaluation difficult.

Where any costs or savings attributed to the test program are estimated, the overtime cost per hour is the actual average overtime cost per hour for all overtime incurred by that unit from January through June 1990. No fringe benefit costs (such as pension) are included.

Court-related Overtime

During the first half of calendar year 1989, Operations South and West had the highest court-related overtime experience, both in excess of 4,300 hours for the six-month period. During the second half of 1989, all patrol divisions experienced reductions in court overtime (South -13.1%, West -13.5%, Midtown -8.3%, East -30.8%). Operations South and West continued to have the greatest amounts of court overtime, both over 3,700 hours.

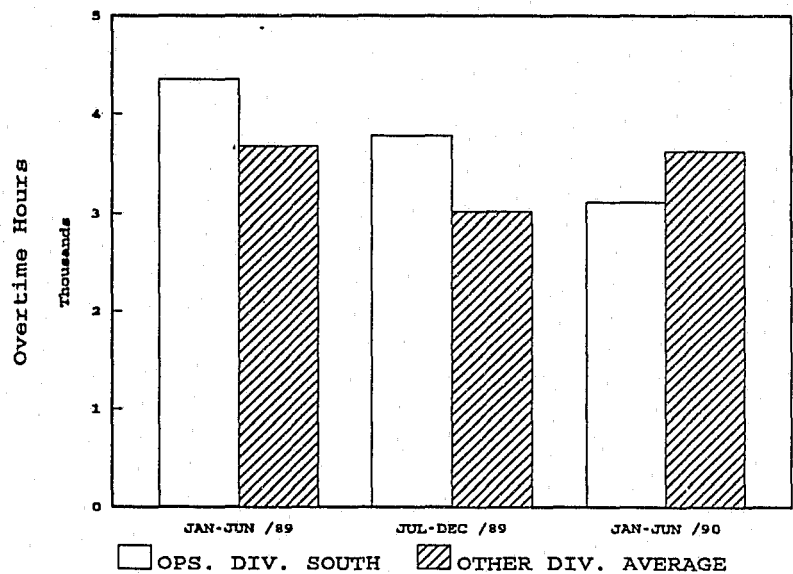
Figure 3.1
Court-related Overtime
(Total Hours)

	SOUTH	WEST	MIDTOWN	EAST
JAN-JUN 89	4349.8	4393.1	3005.3	3625.6
JUL-DEC 89	3780.9	3801.2	2755.6	2507.8
JAN-JUN 90	3089.3	3603.7	3357.8	3431.1

Section 3 Overtime Experience

During the first half of calendar year 1990, following implementation of 4-10 schedules in Operations South, two divisions increased court overtime hours (Midtown +21.8%, East +36.8%) and two decreased (West -5.2%, South -18.3%). The non-test divisions had an average of 3,674 hours of court-related overtime during the first half of 1989. During the first half of 1990, the non-test divisions' court-related overtime increased to almost the same level as the first half of 1989 (3,464 hours), an increase of 14.6% over the previous six-month period. The test division experience was exactly the opposite, a decrease in the first half of 1990. Operations South, which had been the second-highest division in court overtime, became the division with the smallest amount of overtime for the first time since January 1989.

Figure 3.2
Court-related Overtime
(Total Hours)



Section 3 Overtime Experience

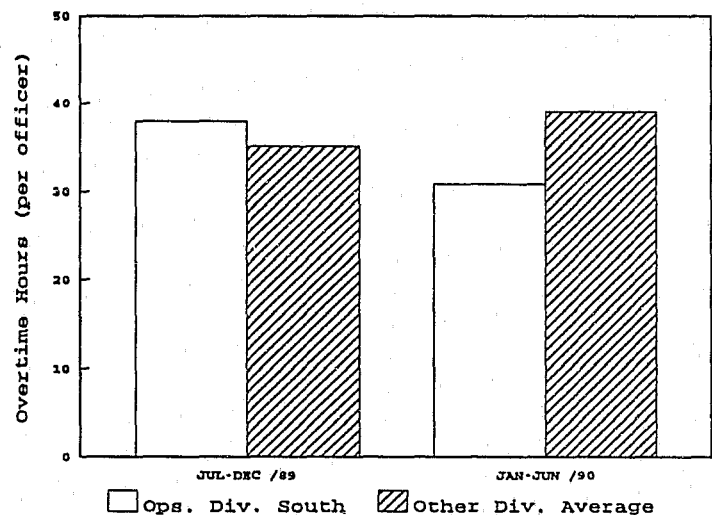
These relationships held true even when court overtime was factored by the number of officers assigned to the divisions. In the last half of 1989, Operations South was the second-highest division with 38.0 hours of court overtime per officer.

Figure 3.3
Court-related Overtime
(Hours per officer)

	SOUTH	WEST	MIDTOWN	EAST
JUL-DEC 89	38.0	41.8	33.2	29.9
JAN-JUN 90	30.8	38.8	41.3	37.8

The reductions in Operations South compared with the other divisions is further illustrated by the following chart which factors all court-related overtime by the number of officers assigned to the divisions during the six-month periods indicated.

Figure 3.4
Court-related Overtime
(Hours per officer)



Section 3 Overtime Experience

Extended Duty Overtime

In both halves of calendar year 1989, Operations South experienced by far the greatest amount of extended duty overtime. Only Operations Midtown decreased from the first half to the second half of 1989 (-3.5%). All other divisions experienced increases (South +6.2%, West +32.1%, East 10.9%).

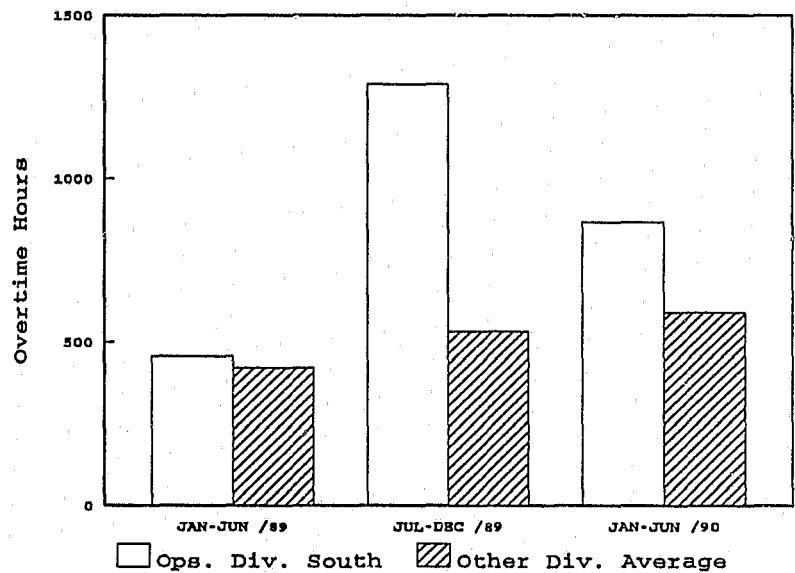
Figure 3.5
Extended Duty Overtime
(Total Hours)

	SOUTH	WEST	MIDTOWN	EAST
JAN-JUN 89	1347.4	665.9	838.1	995.1
JUL-DEC 89	1430.8	879.6	809.0	1104.1
JAN-JUN 90	709.5	862.9	1146.8	1290.9

Following implementation of 4-10 schedules in Operations South, extended duty overtime decreased dramatically in that division. For the first half of 1990, extended duty overtime in Operations South was less than half of the previous six-month period (-50.4%). During the same period, only one other division experienced a decrease and that was slight (West -1.9%). The other two divisions experienced significant increases (Midtown +41.7%, East +16.9%).

Section 3 Overtime Experience

Figure 3.6
Extended Duty Overtime
(Total Hours)



When factored by the number of hours officers were actually deployed, the results are very similar. Only Operations South experienced a decrease, from 1.8 extended duty overtime hours per 100 duty hours during the last six months of 1989 to 0.9 extended duty overtime hours per 100 duty hours during the six months following implementation of 4-10 schedules. Two of the other divisions were unchanged and the third experienced a small increase.

Figure 3.7
Extended Duty Overtime
(Hours per 100 Duty Hours)

	SOUTH	WEST	MIDTOWN	EAST
JUL-DEC 89	1.8	1.1	1.2	1.6
JAN-JUN 90	0.9	1.1	1.7	1.6

Section 3 Overtime Experience

The following chart illustrates the decrease in extended duty overtime which occurred following implementation of the test schedules in Operations Division South. Using extended duty overtime figures factored by the number of actual duty hours shows some increase (+12.8%) for the non-test divisions between the six months before and after the 4-10 schedule change, all attributable to the Midtown increase. Operations South, however, shows a dramatic (-50%) reduction.

Figure 3.8
Extended Duty Overtime
(Hours per 100 Duty Hours)



Section 3 Overtime Experience

Other Overtime

Other categories of overtime were not expected to change due to implementation of 4-10 schedules. The following table shows Operations South other-category overtime has fluctuated widely over the full 18-month period, with a sharp increase in the second half of 1989 and a reduction in 1990.

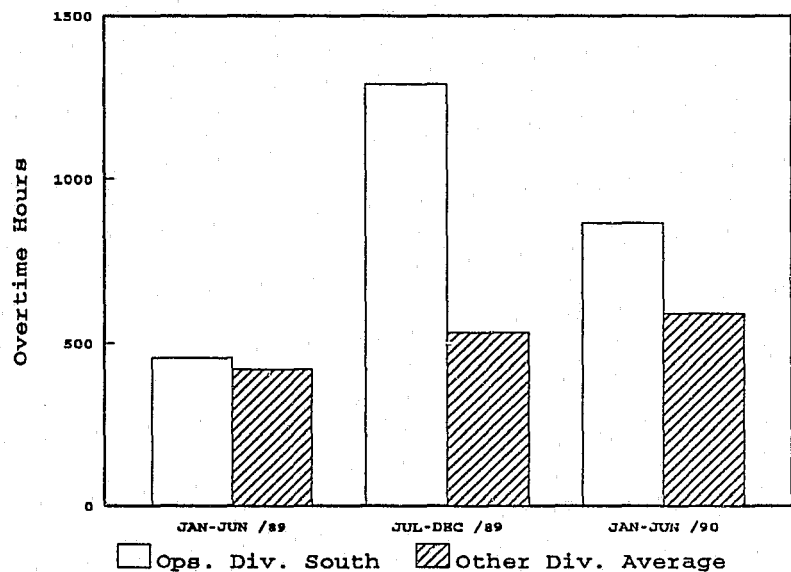
Figure 3.9
Other Overtime
(Total Hours)

	SOUTH	WEST	MIDTOWN	EAST
JAN-JUN 89	455.5	247.9	431.2	579.2
JUL-DEC 89	1289.4	492.4	546.0	557.2
JAN-JUN 90	167.1	555.5	639.9	572.2

The observed reduction should not be attributed to the schedule change, however. Operations South established a "beat officer" program unrelated to 4-10 schedules in the Spring of 1989 that required officers to attend beat meetings, in many cases off duty. A check of other overtime from July through December 1989 confirmed that meetings were the largest single contributor to the category during the time. Other divisions did not have a similar program.

Section 3 Overtime Experience

Figure 3.10
Other Overtime
(Total Hours)



Support Unit Overtime

There was a slight decrease (-5.8%) in court-related overtime hours for the Service Dog Unit during the second half of calendar year 1989 when compared with the first half. Following implementation of 4-10 schedules, court-related overtime decreased significantly (-28.5%).

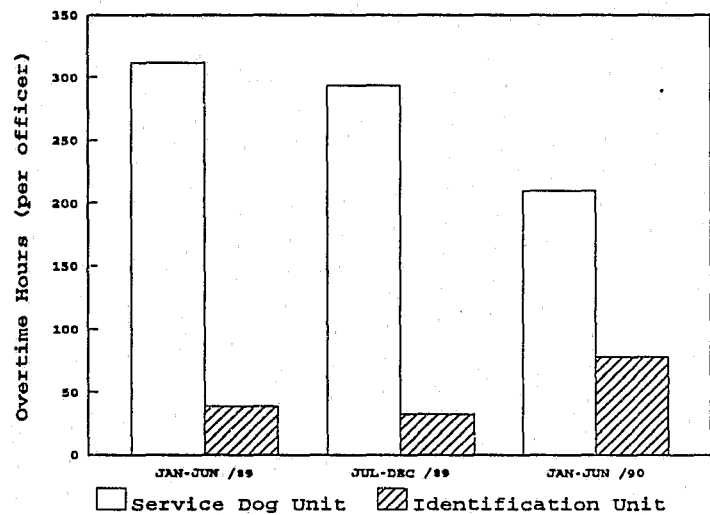
The Identification Unit experienced a significant increase in court-related overtime following implementation of 4-10 schedules (139.7%). However, unlike the patrol divisions, I.D.'s court overtime is historically low in comparison with its extended duty overtime which decreased even more dramatically (see extended duty analysis, below).

Section 3 Overtime Experience

Figure 3.11
Special Unit Court Overtime
(Total Hours)

	S.D.U.	I.D.
JAN-JUN 89	311.5	38.7
JUL-DEC 89	293.3	32.5
JAN-JUN 90	209.6	77.9

Figure 3.12
Support Unit Court Overtime
(Total Hours)



Section 3 Overtime Experience

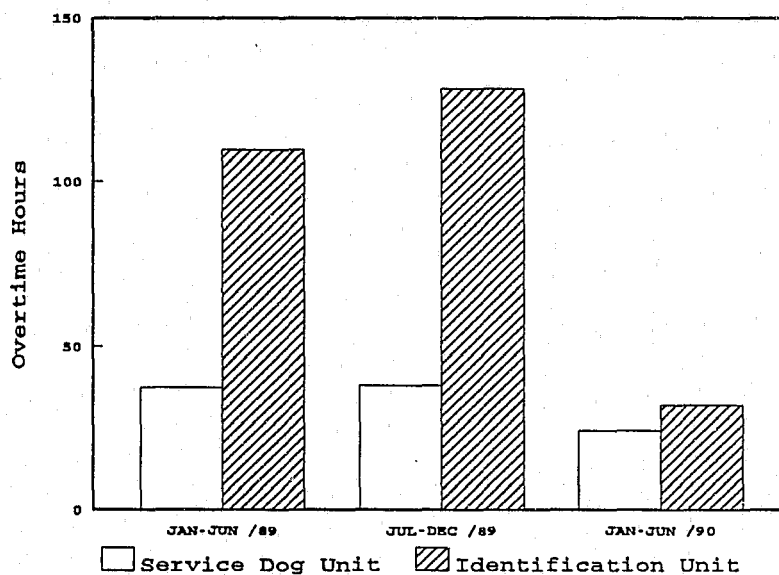
The Service Dog Unit experienced almost the same extended duty overtime in both halves of calendar year 1989. Following implementation of 4-10 schedules, extended duty overtime decreased 35.9%.

The Identification Unit's extended duty overtime has normally been considerably higher than court overtime. Following implementation of 4-10 schedules, I.D. extended duty overtime decreased 74.9%.

Figure 3.13
Support Unit Extended Overtime
(Total Hours)

	S.D.U.	I.D.
JAN-JUN 89	37.7	109.7
JUL-DEC 89	38.2	128.5
JAN-JUN 90	24.5	32.2

Figure 3.14
Support Unit Extended Overtime
(Total Hours)



Section 3 Overtime Experience

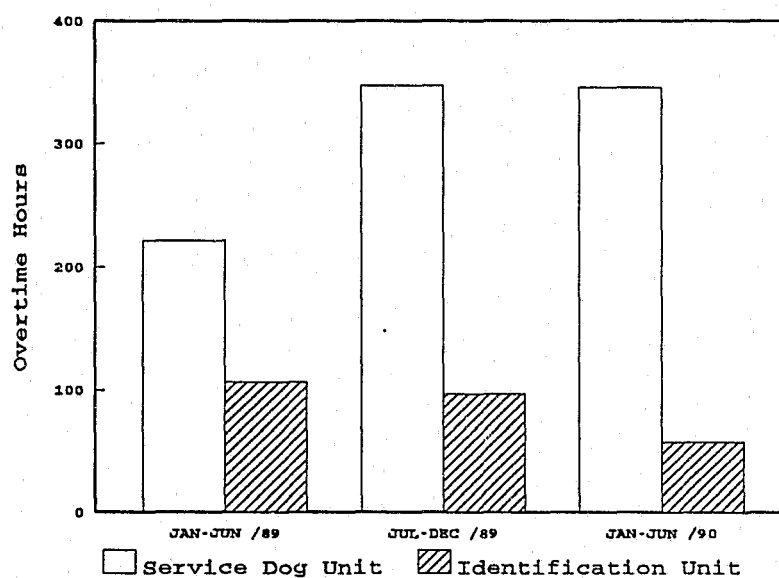
Other overtime for the Service Dog Unit was approximately the same after implementation of 4-10 schedules as it was during the preceding six-month period.

The Identification Unit experienced a 41.3% reduction in other-category overtime after implementation of 4-10 schedules.

Figure 3.15
Support Unit Other Overtime
(Total Hours)

	SDU	ID.
JAN-JUN 89	221.5	106.2
JUL-DEC 89	347.3	96.7
JAN-JUN 90	345.5	56.8

Figure 3.16
Support Unit Other Overtime
(Total Hours)



Section 3 Overtime Experience

Costs

The non-test divisions experienced an overall 14.6% increase in total court hours and an overall 12.3% increase in court hours per officer from the last six months of 1989 to the first six months of 1990. Operations South decreased 18.3% and 18.9% respectively after implementation of 4-10 schedules (during the same period). Assuming Operations South would have had similar increases had 4-10 schedules not been implemented, savings to the City during the six-month period was approximately \$27,770 (1243.6 hours at \$22.33/hour) using the total hours measure, or \$26,559 (1189.4 hours at \$22.33/hour) using overtime hours per officer (Operations South has approximately 100 officers).

Savings estimates for court-related overtime reductions for the Service Dog Unit were made assuming no increase or decrease in overtime would have occurred had 4-10 schedules not been implemented. This should be conservative as there is no reason to believe S.D.U. court overtime would not have performed similarly to the patrol divisions. Such a projection was not made because there was no comparable division upon which to make a comparison. Savings to the City was approximately \$2,131 (83.7 hours at \$25.46/hour).

Identification Unit estimates were also made assuming no change from the last six months of 1989 would have occurred had 4-10 schedules not been implemented. Additional cost to the City was approximately \$912 (45.4 hours at \$20.08/hour).

The non-test divisions experienced an overall increase of 18.2% in extended duty hours. Two of the three non-test divisions experienced no change in extended duty hours per 100 actual duty hours. Operations South decreased 50.4% and 50% respectively. Assuming Operations South would have had similar increases in total hours, or no change in the number of extended duty hours per 100 duty hours, savings to the City during the six-month period was approximately \$19,840 (888.5 hours at \$22.33/hour) using the total hours measure or \$16,189 (725 hours at \$22.33/hour) using the per 100 duty hours measure).

Section 3 Overtime Experience

Savings estimates for the Service Dog Unit and Identification Unit extended duty overtime were made assuming no increase in overtime would have occurred after implementing 4-10 schedules for the same reasons as the court overtime estimates. Savings to the City in S.D.U. extended duty overtime were approximately \$348 (13.7 hours at \$25.46/hour). Savings associated with I.D. extended duty overtime was approximately \$1,934 (96.3 hours at \$20.08).

Because other overtime costs are not directly schedule-dependent, no conclusion should be drawn from the observed decrease in other overtime experienced by Operations South during the test period.

The estimated overall savings in court and extended duty overtime costs during the six-month test period is \$46,249.

Conclusions

The observed reductions in court-related and extended duty overtime which occurred only in the test division and following implementation of 4-10 schedules are related to the change of schedules. No program that would affect either of these factors in Operations South differentially from any other patrol division was implemented either internally or externally during the same period. The observed reduction in court overtime is greater than was originally expected. A significant reduction in extended duty overtime was expected and, in fact, materialized.

Response Times

Background

Response times to calls for police service were considered a critical factor of the evaluation of 4-10 schedules. The more efficiently officers can be scheduled to call demand, the better response time can be expected. The Tucson Police Department is not considered fully staffed, however, and concern that insufficient personnel might cause a degradation of response time required investigation and evaluation.

Police Department objectives include response to all Priority-1 calls within five minutes, Priority-2 calls within ten minutes, and Priority-3 calls within thirty minutes. These priorities are defined as follows:

- **Priority-1.** A report of a serious personal offense in progress, or of an incident involving serious injury or imminent serious injury. Police response is to an extreme emergency.
- **Priority-2.** A report where a rapid police response will increase the probability of apprehension of a felon or the prevention of injuries. Police response is to an emergency or other urgent need for police presence.
- **Priority-3.** A report where immediate police attention is not required, but police assistance is still necessary. Police response to these calls is considered routine.

Response time is considered to be the time from receipt of the call-for-service until the first officer arrives at the scene.

Response time data is obtained from the Police Department's Consolidated Records Indexing System (CRIS) computer.

The 4-10 feasibility study concluded no change (or a slight improvement) in response times could be expected if 4-10 schedules were implemented.

Another measure used by the Police Department to evaluate service delivery, is the percentage of all calls that are outside of the time

Section 4 Response Times

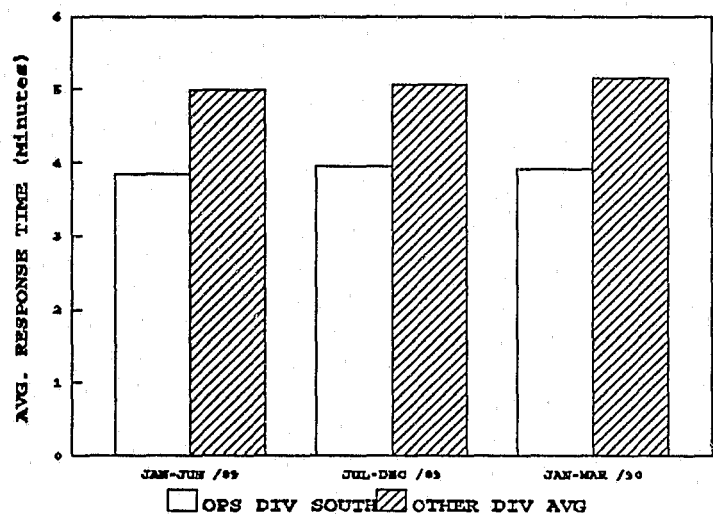
limit objectives. While the average response times are important, it is equally, if not more, important to know how often the department's actual objectives are not met.

Analysis

Due to a backlog of indexing in the Records Section, response time data is only available for the first three months of the test.

As illustrated in the following three charts, there was essentially no change in Priority-1 and Priority-2 call response times during the limited period for which data is available. There was a slight improvement in Priority-3 response times.

Figure 4.1
Priority-1 Calls
Average Response Time



Section 4 Response Times

Figure 4.2
Priority-2 Calls
Average Response Time

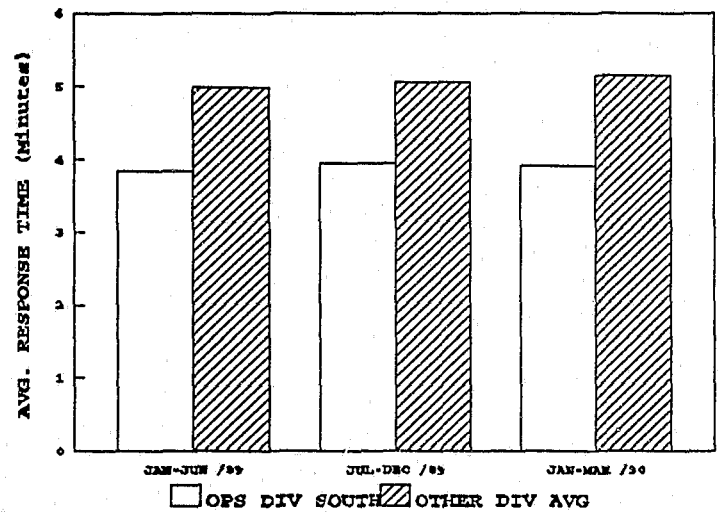
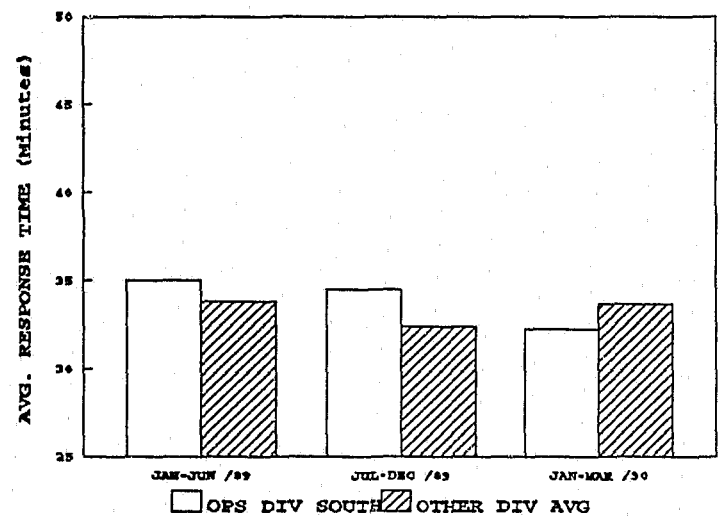


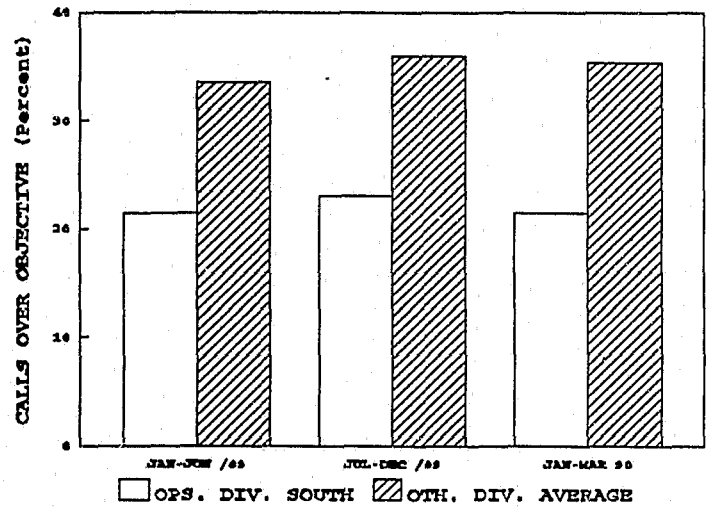
Figure 4.3
Priority-3 Calls
Average Response Time



Section 4 Response Times

As was the case with average response times, the test division's percentage of calls over stated objectives did not change significantly after implementation of 4-10 schedules, as illustrated in the following three charts. Again, there was a very slight improvement observed in Priority-3 performance.

Figure 4.4
Priority-1 Calls
Percent over Objective



Section 4 Response Times

Figure 4.5
Priority-2 Calls
Percent over Objective

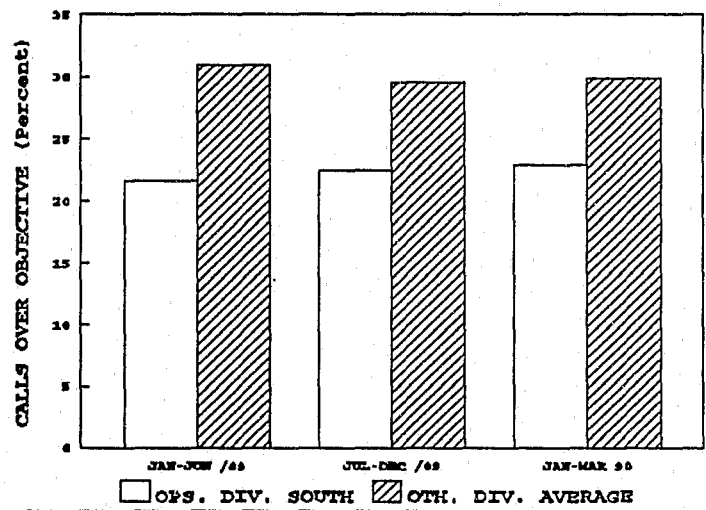
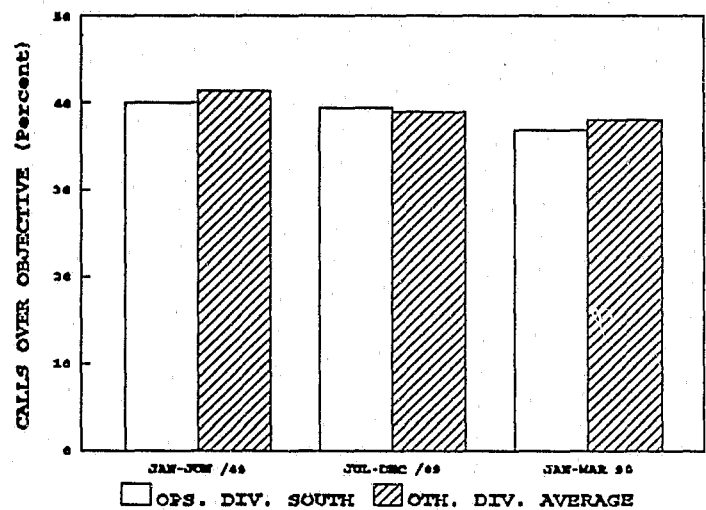


Figure 4.6
Priority-3 Calls
Percent over Objective



Section 4

Response Times

Conclusions

Implementation of 4-10 schedules in Operations South had little effect on response times during the first three months of the test. There was a slight improvement in Priority-3 responses.

Special Unit Performance

Police agencies have a myriad of support units, some composed entirely of sworn officers, others entirely of non-sworn personnel. The suitability of 4-10 schedules for support units was questioned and two Police Department support units were selected to test the schedules: Service Dog and Identification Field Technicians.

Background

Other police agencies reported little experience with support units and 4-10 schedules. Either few had tried it or their reports were limited to the major police department function of patrol response.

Tucson Police commanders and supervisors were asked to comment on the feasibility of 4-10 schedules for various department units. The Identification Section and Service Dog Unit were selected for the test because their proposed schedules offered better coverage than existing 5-8 schedules. ID, an exclusively non-sworn assignment, expected to reduce overtime (evaluated in Section 3), decrease response time, and process more service requests.

The Service Dog Unit, composed of sworn police officers, expected to provide better field coverage during peak hours, thereby receiving more requests for service. The number of calls received immediately before and after shift were expected to decrease due to better schedule coverage.

Both support units felt that requests for their services were going unasked, particularly during peak-demand hours. This belief resulted in their common expectation that calls-for-service would increase.

Service Dog Unit

The Service Dog Unit handled 15.8% more calls in the first six months of 1990 than the last six months of 1989. Calls were up 5.4% over the first six months of 1989.

Response time was virtually unchanged when compared with the last six months of 1989. It was slightly better (6.5%) than the first six months of 1989.

Section 5 Special Unit Performance

The number of call outs increased approximately 40%, although the number of total other-category overtime hours (which includes call-out overtime) remained essentially unchanged (see Section 3).

The number of calls to and from work decreased approximately 38%, corresponding with the reported 36% reduction in extended-duty overtime (see Section 3).

Figure 5.1
Service Dog Unit
Performance Statistics

	JAN-JUN /89	JUL-DEC /89	JAN-JUN /90
Calls handled	4234	3850	4460
Response Time	4.27	4.50	4.55
Call-outs	63	61	87
Calls to-from work	193	202	121

Identification Section

The Identification Section Field Technicians handled 11.5% fewer calls in the first six months of 1990 than the last six months of 1989! Calls were down 20.4% from the first six months of 1989.

Response times during the six months of the test increased slightly (4.3%) from the same period one-year earlier and slightly better (-5.5%) than the previous six-month period.

The total amount of time spent on calls was lower and the average time per call was virtually unchanged.

Section 5 Special Unit Performance

Figure 5.2
Identification Section
Performance Statistics

	JAN-JUN /89	JUL-DEC /89	JAN-JUN /90
Calls handled	1590	1429	1265
Response Time	22.82	25.20	23.80
Total hours on calls	3166	3235	2836
Average time per call	1.97	2.28	2.25

Conclusions

Although 4-10 schedules provide better clock-coverage for the Service Dog and Identification Units, substantial increases in demand for their services did not increase as expected. The call demand appears to be driven by factors other than availability (nature of call, etc.). The assertion that requests for service were not made because of unavailability of these special units is not supported by this analysis.

There were no performance changes of consequence noted when these support units were placed on 4-10 schedules. The only benefits observed were reductions in overtime experience and S.D.U. calls to-and-from work.

Patrol Activity

One clear benefit of a 4-10 schedule is a decreased percentage of duty time spent in administrative activities such as briefing and vehicle preparation, breaks, meals, and debriefing periods. This is due to fact that these periods are day-dependent and a reduction in the number of work days per week results in a corresponding reduction in the number of these administrative periods, freeing the time for more productive work activity.

On a five-day schedule, 600 minutes per week is obligated for these activities. On a four-day schedule, 480 minutes is obligated, a twenty percent reduction. Two additional hours per week, per officer are available for patrol activity.

Background

Several different options existed to evaluate how officers use this additional available time. Other agencies with 4-10 experience reported increases in officer-generated activities such as traffic citations, field interviews, on-sight arrests, etc. This was reported to have caused an increase in certain support units' workloads (such as Records).

The Tucson Police Department measures the numbers of these "contacts" in addition to several other possibly useful indicators. On-sight contacts are the total number of on-sight arrests and traffic contacts (including citations, warnings, and repair orders).

Community involvement time is the amount of time spent specifically interacting with the public in a community-involved approach such as foot patrol or neighborhood watch meetings. It does not include "routine" patrol.

Another indicator of patrol strength to work-load are the overall percentage of dispatched activity (calls), administrative activity (briefings, meals, court, training, etc.), and self-initiated activity (community-oriented, problem directed patrol, traffic contacts, etc.).

Section 6

Patrol Activity

The only time available for routine (otherwise known as "random") patrol, is that remaining after these three categories are addressed.

Arrests, contacts, and time ratios are reported on officers' activity sheets which are compiled monthly by patrol divisions. Planning and Research obtained these records back to January 1989. The manner in which activity is logged differs from division-to-division, so no comparison to non-test divisions was attempted. Comparisons were made between the pre-test and the six-month test periods.

Another possible indicator of actual increased patrol activity is vehicle mileage. At least some of the additional available time should be used driving (whether responding to calls or random patrol). Mileage figures for Operations South were obtained beginning in September 1989.

Activity

There were moderate increases in contact and community involvement activity in the second half of 1989 when compared with the first half. A decrease of about 12% in contacts per 100 duty hours and a similar, but larger, decrease in community involvement time occurred in the six-month test period.

Figure 6.1
Ops. Div. South Activity Statistics
On-sight contacts and
Community Involvement

	On-Sight (Contacts ¹)	O/S Confs. (/100 DH ²)	Com. Inv. (Hours)	Com. Inv. (/100 DH)
JAN-JUN 89	16592	26.9	6356	10.3
JUL-DEC 89	17654	27.1	7426	11.4
JAN-JUN 90	14488	23.8	5639	9.3

¹On-sight contacts include: on-sight felony and misdemeanor arrests and traffic contacts.

²100 DH = 100 Duty Hours

Section 6

Patrol Activity

These decreases, both in overall number and number per 100 duty hours, may be the result of trainees, however. The factored number is reduced by the additional working hours of the trainees. Also, the trainers will not be as active while fulfilling training duties. This conclusion is supported by the month-to-month statistics. In January and February 1990, contacts and community involvement activity were higher than the same two months one year earlier. Beginning in March 1990 (coincident with the assignment of the trainees to active training) both types of activity decreased markedly from the same period in 1989. Because of this apparent relationship, no conclusions should be drawn about patrol activity until more data (without the influence of trainees) is available.

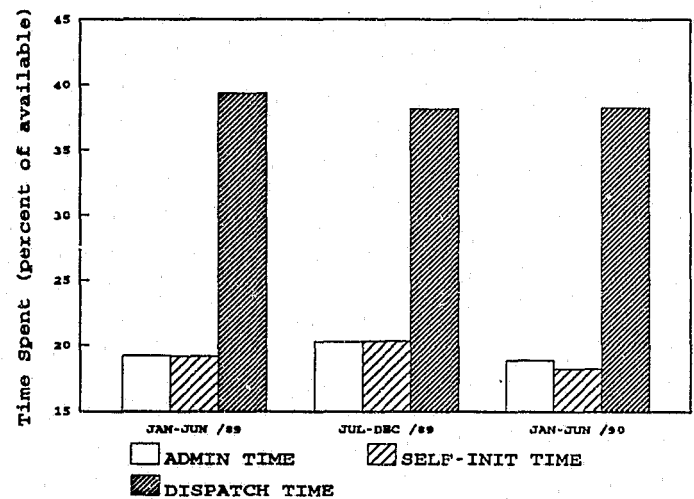
To examine the effect of the activity change on Records, the number of written reports (excluding traffic citation, warnings, and repair orders) resulting from on-sight activity was obtained. Operations South decreased the number of on-sight reports 26.4% (from 5098 to 3750) in the first half of 1990 when compared with the last half of 1989. This is consistent with the overall reduction of activity during the same period. The non-test divisions decreased 18.4% during the same period.

Section 6 Patrol Activity

Activity Ratios

All of the categories (administrative, dispatched, self-initiated) show very slight reductions in the first half of 1990 when compared with the identical period one-year earlier. Two of the three show slight reductions when compared with the last six months of 1989.

Figure 6.2
Operations Division South
Activity Ratios

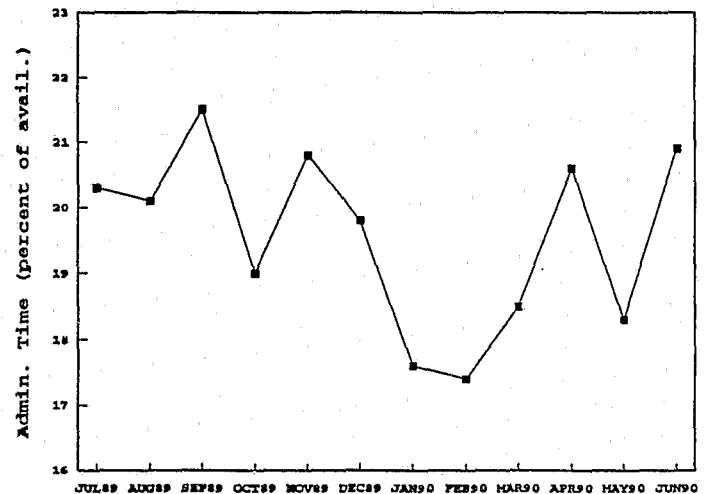


Section 6

Patrol Activity

The effect of new trainees appears to have influenced the administrative time category. Training time is logged as administrative time and may be masking what would otherwise be a decrease. As illustrated in the following graph, administrative time (as a percentage of overall available time) decreased markedly in January and February. Beginning in March, coincident with assignment of the first group of trainees to training duty, administrative time increased and fluctuated greatly month-to-month.

Figure 63
Administrative Time
(as percent of available time)



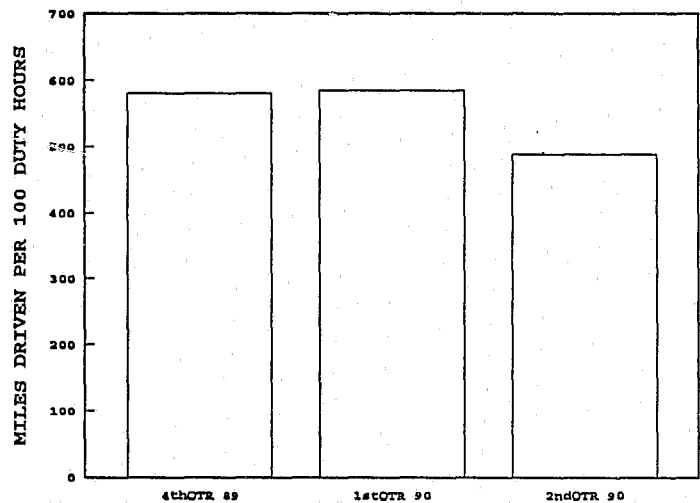
Section 6 Patrol Activity

Vehicle Mileage

Vehicle mileage figures could not be obtained prior to October 1989 because, just prior to that date, there was a mass reassignment of vehicles from division to division due to Mobile Data Terminal (M.D.T.) installation. During the last quarter of Calendar Year 1989, Operations South averaged 580.7 miles per 100 duty hours. In the first quarter of 1990, there was no significant change in vehicle mileage (584.2 miles per 100 duty hours).

Because trainees are assigned to 2-officer cars, the assignment of trainees, beginning in late February, affected miles driven. Training duties reduce the mileage driven by trainers also, contributing to a general reduction.

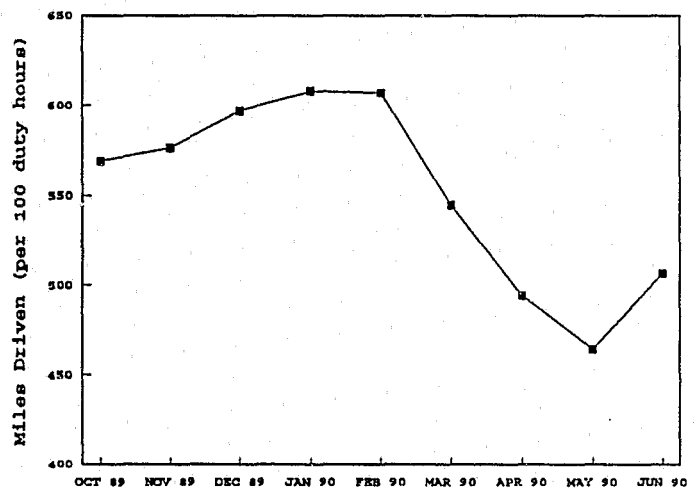
Figure 6.4
Patrol Miles Driven
(per 100 duty hours)



Section 6 Patrol Activity

The implementation of 4-10 schedules January 1 did not appear to have a significant effect on mileage. Assignment of the trainees, however, did. As illustrated by the following graph, when trainees were assigned, a significant reduction in mileage driven occurred.

Figure 6.5
Patrol Miles Driven
(per 100 duty hours)



Due to the influence of the trainees on vehicle mileage, no conclusions should be drawn about this factor until the last six months 1990 data are available.

Section 6
Patrol Activity

Conclusions

There were slight, rather than the expected significant, increases in patrol activity after 4-10 shifts were implemented and prior to the assignment of trainees to the test division. Support units' workloads, as confirmed by the evaluation of on-sight reports received by the Records Section, were not affected by the change.

Administrative time reductions did occur, however, the measurement of them was obscured by the administrative time increases associated with the assignment of trainees to the test division. Vehicle mileage, one possible indicator of the administrative reduction, did not change significantly after implementation of 4-10 schedules. This indicator was clearly affected by the assignment of trainees.

Shift Differential

Shift differential pay is very common among law enforcement agencies and is most frequently a premium payment, paid on a per-hour basis, for working hours on evenings, late nights and, occasionally, weekends.

Background

None of the agencies with 4-10 experience reported any evaluation of the schedule's effect on shift differential costs.

The City of Tucson compensates police officers, as well as other non-overtime-exempt employees, with an additional \$.30 per hour for every hour worked between 6:00 P.M. and midnight and \$.35 per hour for every hour worked between midnight and 6:00 A.M. Shift differential is not paid in addition to other premium pay (such as overtime) which might be in effect, nor is it paid when an employee is off duty (vacation, sick leave, etc.). As such, shift differential costs are purely a function of the number of personnel assigned to night hours.

Payroll roster data was downloaded from the City IBM mainframe computer. These records contain, among other things, the number of "P.M. hours" (6:00 P.M. - 12:00 A.M.) and "A.M. hours" (12:00 A.M. - 6:00 A.M.) paid as shift differential each working day. The number of overall duty hours was also determined for this analysis, because the number of shift hours paid is proportional to the number of personnel and how many hours they work.

Analysis

Total P.M. shift differential hours increased for all divisions except Operations South in the six months following implementation of 4-10 schedules in the test division (South -9.4%, West +3.0%, Midtown +6.3%, East +12.7%).

Only the test division and Operations Midtown experienced decreases in A.M. shift hours during the same period (South -6.0%, West +8.1%, Midtown -9.2%, East +22.1%).

Section 7 Shift Differential

Figure 7.1
Shift Differential
(Total Hours)

		SOUTH	WEST	MDT.	EAST
JUL-DEC 1989	P.M. Shift	29362.8	22227.8	21126.1	21406.1
	A.M. Shift	17319.4	14142.8	14878.4	14564.5
JAN-JUN 1990	P.M. Shift	26610.1	22897.9	22467.2	24115.8
	A.M. Shift	16275.3	15294.0	13507.5	17781.5

The results are similar when the number of shift differential hours are factored by the number of actual duty hours, thereby eliminating differences due to the numbers of personnel assigned. Operations South was the only division to experience a decrease in P.M. shift hours (South -11.4%, West +1.8%, Midtown +8.8%, East +0.7%). Operations South and Midtown were the only divisions to experience a decrease in A.M. shift hours (South -8.5%, West +7.3%, Midtown -7.0%, East +9.3%).

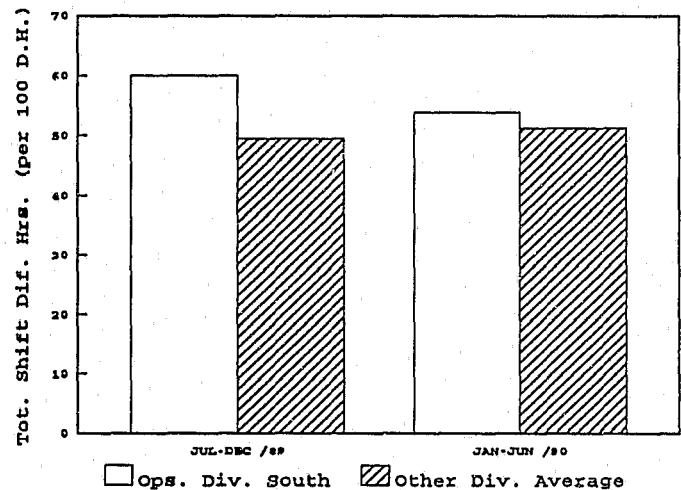
Figure 7.2
Shift Differential
(Hours per 100 duty hours)

		SOUTH	WEST	MDT.	EAST
JUL-DEC 1989	P.M. Shift	37.7	28.2	30.5	30.2
	A.M. Shift	22.3	17.9	21.5	20.5
JAN-JUN 1990	P.M. Shift	33.4	28.7	33.2	30.4
	A.M. Shift	20.4	19.2	20.0	22.4

Section 7 Shift Differential

Operations South was the only division to experience a decrease in total shift differential hours per 100 duty hours, as illustrated in the following graph.

Figure 7.3
Shift Differential
(Hours per 100 duty hours)



Assuming Operations South would have experienced an increase in shift differential comparable to the average of the non-test divisions, South would have incurred \$15,791.54 in shift differential costs. The actual cost of shift differential in Operations South was \$13,679.38 during the first half of Calendar Year 1990, a savings of \$2,112.16.

Conclusions

Implementation of 4-10 schedules in Operations South caused shift differential costs to decrease slightly.

Fatigue Factors

One of the most common concerns about extending the working hours of police officers by two hours is that of potential increases in "fatigue factors" such as industrial injuries, vehicle accidents, citizen complaints, and sick leave. Police commanders shared this concern when asked their opinions about the possibility of establishing 4-10 schedules in Tucson. Their comments were reported in the April 1989 4-10 feasibility study.

Background

The experience of other police agencies that had implemented 4-10 schedules was examined. Most reported no change in these fatigue factors. Some, however, reported decreases.

Industrial injuries are job-related illnesses or injuries incurred while on duty. Also included are injuries sustained off duty when taking police action. An employee who suffers an injury is required to report to a supervisor who must arrange for medical treatment (if necessary) and completion of documenting paperwork. All industrial injury reports are forwarded to Police Personnel for further distribution and entry into that unit's microcomputer files.

Vehicle accidents are collisions involving City vehicles operated by employees whether on public or private property. Records of these accidents are kept in the Police Department's Internal Affairs Division computer. These collision records include only those where the employee was determined to be at fault or otherwise negligent. Records of collisions involving employees who were not at fault were not available for this review.

Citizen complaints are calls or personal contacts with the Police Department's Internal Affairs Division alleging improper police conduct or behavior. These records are also computerized and include cases where the complaint was substantiated as well as those where the employee was exonerated.

In each of the above cases, computer records contained the date and time of incident, the employee involved, and (in some cases) the

Section 8

Fatigue Factors

employee's duty shift. Planning and Research obtained copies of these computer records and correlated them with duty rosters to determine the employee's assignment (division and shift). The total number of each of the three types of incidents was determined for each patrol division during the last six months of Calendar Year 1989 and the first six months of Calendar Year 1990.

In addition to the total numbers of incidents, duty rosters were analyzed from computer records (see Section 3, Overtime Experience, Background) to determine the number of actual duty hours worked by officers in each of the divisions. Each of the fatigue factors was also examined on a per-duty-hour basis to equalize, as much as possible, the working strength of each division.

Sick leave is reported in total hours sick, days sick, and on a per-employee basis. Sick leave hours, as a whole, were expected to increase due to the fact that each sick call would be ten hours rather than eight. No change in the number of days called in sick would result in a 20% increase in the number of hours sick.

Section 8 Fatigue Factors

Industrial Injuries

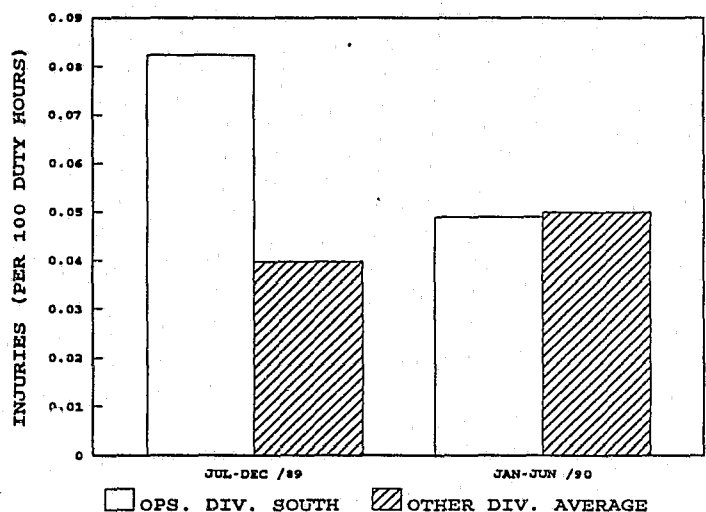
The most significant change in the three primary fatigue factors was in industrial injuries. In the first six months of 1990, the non-test divisions averaged 37.7 injuries each, an increase of 30% over the last six months of 1989. Operations South experienced 39 injuries, a decrease of 39% during the same period. The reduction brought Operations South, a traditionally high industrial injury area, down nearly to the other division average.

Figure 8.1
Industrial Injuries
(Number of incidents)

	SOUTH	WEST	MIDTOWN	EAST
JUL-DEC 89	64	38	21	28
JAN-JUN 90	39	39	38	36

When factored by the number of actual working hours, the results are similar, as illustrated by the following graph.

Figure 8.2
Industrial Injuries
(Incidents per 100 Duty Hours)



Section 8 Fatigue Factors

Vehicle Accidents

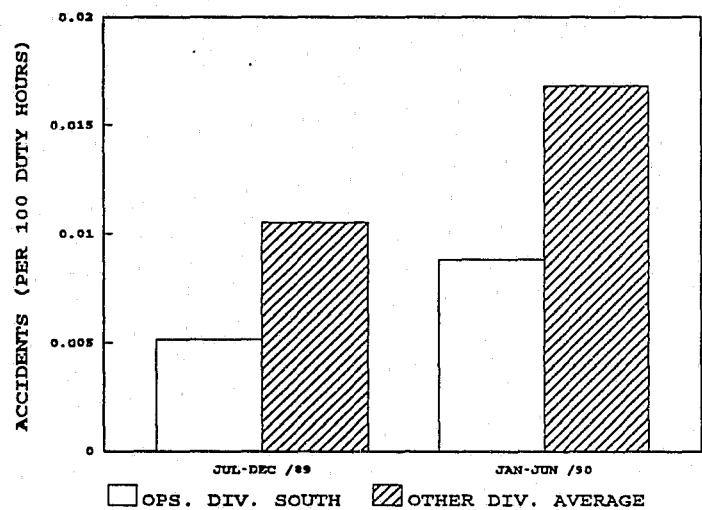
Operations South experienced about one-half the number of vehicle accidents of the non-test divisions during both six-month periods. All of the patrol divisions experienced increases in vehicle accidents during the first six months of 1990 (South +75%, West +60%, Midtown +12.5%, East +160%). The number of incidents, however, is very small and any change would represent a large percentage change.

Figure 8.3
Vehicle Accidents
(Number of incidents)

	SOUTH	WEST	MIDTOWN	EAST
JUL-DEC 89	4	10	8	5
JAN-JUN 90	7	16	9	13

Due to the very small number of incidents, the value when factored by the number of duty hours becomes extremely small. The following graph does illustrate the relative change, however.

Figure 8.4
Vehicle Accidents
(Incidents per 100 duty hours)



Section 8 Fatigue Factors

Citizen Complaints

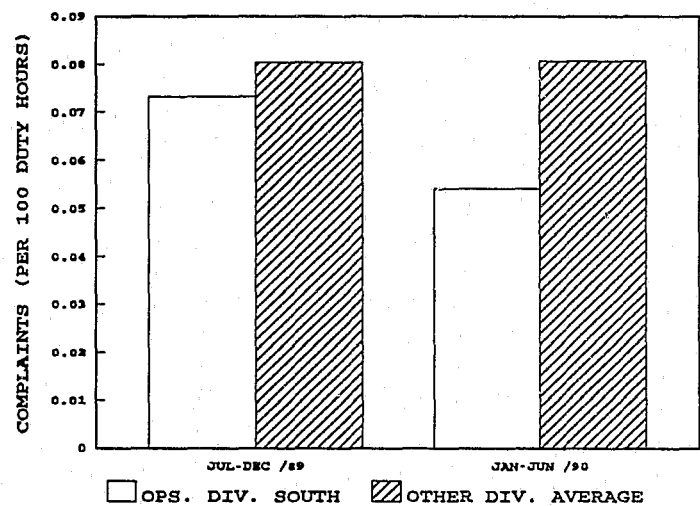
From the last six months of 1989 to the first six months of 1990, the number of citizen's complaints in the non-test divisions combined increased slightly (+3.9%). Operations South, however, decreased -24.6%.

Figure 8.5
Citizen Complaints
(Number of incidents)

	SOUTH	WEST	MIDTOWN	EAST
JUL-DEC 89	57	59	51	66
JAN-JUN 90	43	69	65	49

When factored by the number of actual duty hours, the results are similar. The non-test divisions experienced no change in the number of citizen complaints per 100 duty hours. Operations South, however, decreased 26.0%.

Figure 8.6
Citizen Complaints
(Incidents per 100 duty hours)



Section 8 Fatigue Factors

Sick Leave

From the last six months of 1989 to the first six months of 1990, the test division experienced a 20.3% increase in total sick hours. As indicated in the Background Section above, a 20% increase in overall sick hours was expected due to each sick day being ten hours rather than eight. The non-test divisions experienced an 11.4% overall reduction in sick leave hours during the same period (West +7.9%, Midtown -15.6%, East -23.9%).

Figure 8.7
(Total sick hours)

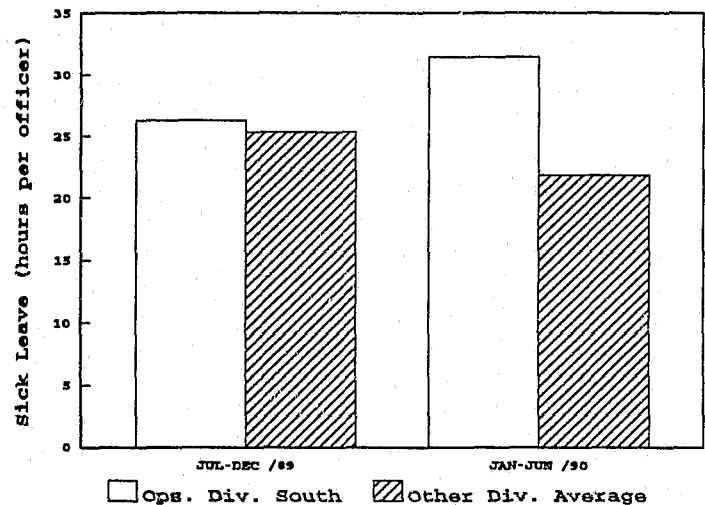
	SOUTH	WEST	MIDTOWN	EAST
JUL-DEC 89	2614.3	2058.0	1899.2	2561.3
JAN-JUN 90	3145.0	2220.5	1603.5	1948.8

When factored by the number of officers assigned to each division, the results are similar: a 13.8% overall reduction in the non-test divisions, from 25.3 sick hours per officers from July-December 1989 to 21.8 sick hours per officer from January-June 1990. Operations South increased 19.4%, from 26.3 sick hours per officer to 31.4 sick hours per officer during the same period.

Section 8

Fatigue Factors

Figure 8.8
(Sick hours per officer)



When analyzed from the point of view of days sick rather than hours, Operations South decreased slightly (-3.8%) after 4-10 schedules were implemented. The non-test divisions decreased 11.4% during the same period.

The analysis based on total hours is a valid one (even considering the extra hours per sick day) because the hours represent actual duty time which is lost as a function of the longer day (similar to the increase in duty time associated with fewer briefing and lunch periods). A comparable overall reduction of sick hours in Operations South would have resulted in 2253.5 hours of sick leave during the first half of Calendar Year 1990, a difference of 891.5 hours under that which occurred. Had there been no overall sick leave decrease and no 4-10 schedules in effect, Operations South would have experienced 2614.3 sick hours during the first half of 1990, a difference of 530.7 hours under that which occurred. In comparison, Operations South gained approximately 5,200 hours of time during the same period due to the reduced number of administrative periods.

Section 8 Fatigue Factors

Costs

For simplicity, the costs and savings calculated in this section are based on the same hourly rate determined from actual overtime payments made to Operations South officers during the first six months of 1990 (\$14.89/hour, no fringe benefit costs included).

The value of the sick leave experienced in Operations South beyond that of the non-test divisions during the six-month test period is \$13,274 (891.5 hours at \$14.89/hour).

Using the same approach for the gain in patrol time associated with the reduction of administrative periods, results in a gain of \$77,428 (5,200 X \$14.89/hour).

Both of these cases do not represent actual cash cost or savings (as is the case with overtime costs), therefore, these figures are not reported as costs or savings attributable to the test program.

Conclusions

Following implementation of 4-10 schedules in Operations Division South, there was a substantial decrease in industrial injuries and citizen complaints. There was no change in the rate of motor vehicle accidents. Sick leave was somewhat greater than expected because there should have been a reduction comparable to the non-test divisions. There was not.

Off-Duty Work and Sick Leave

Former City Manager Joel Valdez requested the Police Department evaluate off-duty work behavior by officers, particularly relating to sick leave use by officers on 4-10 schedules who also work off duty.

Background

Off-duty jobs are volunteer assignments by officers responding to requests from private firms or organizations to employ peace officers on an intermittent basis. Occasionally, off-duty work is performed for other City departments, such as Parks and Recreation during festivals. Other examples of off-duty work include traffic control at major construction projects, Convention Center security, the Fourth Avenue Street Fair, and the Tucson Gem and Mineral Show.

To arrange for employment of an off-duty officer, the private firm or organization contacts the Police Department's Community Services Division, which arranges a "sign-up" for interested officer volunteers. Officers may sign up for off-duty jobs subject to limits imposed by department rules and procedures. Department regulations require eight continuous hours of rest in every 24-hour period and eight continuous hours of rest before return to duty. There is a 25-hour per week maximum limit on total off-duty work unless the officer is on leave for the entire week. Officers may take vacation or use accumulated compensatory time (if approved by their commander) to work an off-duty job.

In November 1989, the Police Department reported the results of a very limited study of off-duty work and sick leave use by Headquarters Desk Unit officers who had been assigned to a 4-10 schedule. The study determined that of twenty-eight officers who were assigned to the Headquarters Desk from July through October 1989, only seven (25%) worked any off-duty at all. During this period, a total of seventy-four off-duty jobs were worked by these seven officers. Fifty-one jobs (69%) were worked on one of the officer's scheduled days off. The other twenty-three (31%) of the jobs were worked on the same day as a scheduled tour-of-duty. The average length of an off-duty job on a day off was 6.0 hours compared with 4.7 hours for a duty-day job. The two officers with the greatest number of off-duty

Section 9
Off-Duty Work and Sick Leave

jobs used no sick leave during the four-month period. For the seven officers who worked the seventy-four off-duty jobs, it was discovered that as off-duty work hours increased, sick leave decreased.

The report predicted a reduction of off-duty work on working days and an increase on non-duty days. This expectation did, in fact, materialize.

For the purposes of this six-month evaluation, computerized off-duty work records were obtained from the Police Department Community Services Division and payroll roster records were downloaded from the City IBM mainframe computer. Several non-patrol divisions' roster records are not computerized, so while this analysis includes raw numbers of jobs worked by non-patrol personnel, hours and sick leave comparisons were made only for those personnel who were assigned to a patrol squad at some time during the respective six-month evaluation periods. The six-month pre-test period of July 1 through December 31, 1989 and the test period of January 1 through June 30, 1990 were compared.

Analysis

There was a slight decline in the percentage of all officers who worked off-duty from the last half of Calendar Year 1989 to the first half of Calendar Year 1990. This was not related to the implementation of 4-10 schedules as the decline was almost identical for the combined patrol divisions as it was for Operations South. In 1989, 42.4% of all patrol officers worked off-duty (44.9% in Operations South). In 1990, 36.4% of all patrol officers worked off-duty (37.6% in Operations South).

Section 9

Off-Duty Work and Sick Leave

Figure 9.1
Off-Duty Workers¹

		SOUTH	WEST	MIDT.	EAST
1989	OFF-DUTY WORKERS	40	37	28	38
	NON OFF-DUTY WORKERS	49	49	51	45
1990	OFF-DUTY WORKERS	41	32	40	28
	NON OFF-DUTY WORKERS	68	57	51	70

¹Off-duty workers are the number of officers who were assigned to the indicated division and worked any off-duty during the last six months of 1989 or the first six months of 1990.

In the pre-test period, the ratio of off-duty jobs worked on an officer's day off was very similar to the Headquarters Desk study (33.4% of all off-duty jobs worked by patrol officers were worked on duty days). Operations South (test division) personnel worked 34.4% of off-duty jobs on duty days.

For the six-month test period following implementation of 4-10 schedules in Operations South patrol, the non-test divisions' experience changed very little, averaging 31.0% of off-duty jobs (209/675) on duty days. Operations South, on the other hand, decreased markedly to 17.4% (36/207) of off-duty jobs worked on duty days. The number of jobs worked off-duty on duty days dropped almost by half, despite a significant overall increase in the number of off-duty jobs worked (+11% South, +34% overall). This overall increase may be seasonal, for example, the Tucson Gem and Mineral Show in February was a very large off-duty employer.

Section 9

Off-Duty Work and Sick Leave

Figure 9.2
Off-Duty Jobs

		SOUTH	WEST	MIDT.	EAST
1989	WORKDAYS	64	58	57	41
	OFF DAYS	122	111	114	91
1990	WORK DAYS	36	91	81	37
	OFF DAYS	171	214	159	93

A comparison of the overall hours of off-duty work yields similar results. In 1989, Operations South's patrol personnel worked 295 of 983.5 (30%) of off-duty hours on duty days. The average of the other divisions was very comparable (801 of 2642 hours, 30.3%). In 1990, Operations South patrol personnel worked 171.5 of 1272 (only 13.5%) of off-duty hours on duty days. The average of the other divisions was substantially different (1136 of 4451.5 hours, 25.5%)

Figure 9.3
Total Off-Duty Hours

		SOUTH	WEST	MIDT.	EAST
1989	WORK DAYS	295.0	313.5	293.0	194.5
	OFF DAYS	688.5	678.0	660.5	502.5
1990	WORK DAYS	171.5	471.5	488.5	176.0
	OFF DAYS	1100.5	1495.0	1139.0	681.5

Section 9

Off-Duty Work and Sick Leave

The overall number of hours per off-duty job changed little from the last half of Calendar Year 1989 to the first half of Calendar Year 1990. In 1989, duty-day jobs averaged 5.0 hours each, in 1990, 5.8 hours each. Operations South averaged 4.6 hours each for duty days and 5.6 hours each for non-duty days. In 1990, the overall duty day average was 5.3 hours. The non-duty day average was 6.9 hours. Operations South's experience was comparable at 4.8 hours per job on duty days and 6.4 hours on non-duty days. These figures must be considered with the fact that off-duty jobs are for a minimum duration of three hours.

Figure 9.4
Hours per Off-Duty Job

		SOUTH	WEST	MIDT.	EAST
1989	WORK DAYS	4.6	5.4	5.1	4.7
	OFF DAYS	5.6	6.1	5.8	5.5
1990	WORK DAYS	4.8	5.2	6.0	4.8
	OFF DAYS	6.4	7.0	7.2	7.3

Sick Leave

Off-Duty vs. Non Off-Duty Workers

Analysis of sick leave use during the two, six-month periods shows a general tendency toward fewer sick leave hours as off-duty work rates increase. This finding is the same as observed in the Headquarters Desk study.

Section 9

Off-Duty Work and Sick Leave

In addition, the overall average sick leave use for officers working off-duty was less than officers who did not. In the last half of Calendar Year 1989 (prior to implementation of 4-10 schedules) officers who worked off-duty averaged 18.3 hours of sick leave use. Officers who worked no off duty averaged 22.0 hours. The results were very similar in the first half of Calendar Year 1990 (after implementation of the 4-10 schedules). Officers who worked off-duty averaged 18.5 hours of sick leave; those who worked no off-duty averaged 21.7 hours. Operations South results were comparable in both periods, as illustrated in Figure 9.5.

Figure 9.5
Sick Leave²

		SOUTH	WEST	MIDT.	EAST
1989	OFF-DUTY WORKERS	19.9	12.3	18.7	22.3
	NON OFF-DUTY WORKERS	18.1	23.1	22.4	24.6
1990	OFF-DUTY WORKERS	19.0	22.2	18.1	13.9
	NON OFF-DUTY WORKERS	20.7	20.4	17.5	26.7

²Average number of sick hours used during the six-month period (Jul. 1 - Dec. 31, 1989 and Jan. 1 - Jun. 30, 1990).

Conclusions

Implementation of 4-10 schedules does affect off-duty work behavior of officers. Approximately one-third to one-half of all patrol officers work off-duty, scheduling most of these jobs on non-duty days. When a 4-10 schedule is implemented, officers shift a much greater percentage of their off-duty work to non-duty days.

Sick leave is not negatively affected due to increased off-duty work activity.

Recommendations

Planning & Research recommends the test be continued for its intended one-year duration. Because there is less concern for a sudden negative outcome, Planning also recommends the monthly reports be simplified to save staff time and materials. Monthly reports will continue to contain information about overtime totals, response times, patrol activity totals, and special unit performance. Other factors would be analyzed as part of the final evaluation in early 1991.