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# CRIME ON THE RAIL SYSTEM

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Robert Jochelson

148788

U.S. Department of Justice  
National Institute of Justice

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## **PREFACE**

On the 19th of August last year a young girl was reportedly menaced and indecently assaulted on a North Sydney train. The following month, at Regent's Park railway station, a teenager was reportedly stabbed in the back with a knife when attacked by 30 high school students. A month later, in October, a youth was attacked with a knife while travelling in a train at Bondi Junction.

When assaults and other forms of serious criminal offence occur at railway stations or on trains they are widely reported in the media and arouse understandable anxiety about the risks associated with using the rail system. Not all of this anxiety will necessarily be justified. Whether justified or not, however, any increase in public concern about the risks of using trains can easily lead to reduced rail patronage, a fall in government revenue and inefficient utilisation of rail services.

The State Rail Authority has been engaged in an active program of crime prevention, both to reduce real rates of crime on the rail system and to reassure rail passengers of the Authority's commitment to ensuring a safe rail system. Recent initiatives include the 'nightsafe' program, in which late night passengers travel in the same or adjacent carriages as crew members, the introduction of additional train security staff and the creation of an improved rail crime information system.

The purpose of the present report is to assist the NSW Police and the State Rail Authority in their crime prevention planning, and to give the general public a more objective picture of the risks of crime on the rail system. The report involves an examination of all stealing, assault, sexual assault and robbery offences recorded as occurring on trains or stations in New South Wales between January 1990 and December 1992. This data has been analyzed in conjunction with rail patronage data supplied by the State Rail Authority.

When the number of reported offences is considered against the number of rail users, trains and railway stations emerge as much safer places than some media reporting would appear to suggest. This should serve as a source of reassurance to the general public. At the same time the likelihood of each of the offences examined does vary markedly according to location, time of day and day of week. The nature of this variation should greatly assist the NSW Police and the State Rail Authority in targeting public safety initiatives.

Dr Don Weatherburn  
Director

March 1994

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# CONTENTS

<b>1. INTRODUCTION</b>	1
<b>2. OFFENCES ON THE RAIL SYSTEM</b>	3
2.1 Distribution by offence type	3
2.2 Distribution across rail facilities	4
2.3 Day of week - frequency on the rail system	5
2.4 Time of day - frequency on the rail system	5
2.5 Patronage profiles and risk on the rail system	6
2.6 Day of week - risk on the rail system	8
2.7 Time of day - risk on the rail system	8
2.8 An overall temporal perspective - risk on the rail system	9
<b>3. OFFENCES AT RAILWAY STATIONS</b>	11
3.1 Day of week - frequency at railway stations	11
3.2 Day of week - risk at railway stations	12
3.3 Time of day - frequency at railway stations	12
3.4 Time of day - risk at railway stations	13
3.4.1 Risk of assault at railway stations	14
3.4.2 Risk of sexual offences at railway stations	15
3.4.3 Risk of robbery at railway stations	15
3.4.4 Risk of steal from person offences at railway stations	16
<b>4. OFFENCES ON TRAINS</b>	18
4.1 Day of week - frequency on trains	18
4.2 Day of week - risk on trains	18
4.3 Time of day - frequency on trains	19
4.4 Time of day - risk on trains	20
4.4.1 Risk of assault on trains	20
4.4.2 Risk of sexual offences on trains	21
4.4.3 Risk of robbery on trains	22
4.4.4 Risk of steal from person offences on trains	22

<b>5. REGIONAL VARIATIONS IN RISK AT RAILWAY STATIONS</b>	24
<b>6. DISCUSSION</b>	26
6.1 Situational crime prevention and opportunity reduction	27
6.1.1 Designing out crime	27
6.1.2 Closed circuit television	27
6.1.3 The characteristics of commuting	28
6.2 Law enforcement	28
6.2.1 Policing the rail system	28
6.2.2 Internal reporting systems	28
6.3 Social crime prevention strategies	29
<b>NOTES</b>	30
<b>REFERENCES</b>	31
<b>APPENDIX</b>	32

# 1. INTRODUCTION

The rail system is an integral part of our public infrastructure, providing the community with ready mobility for both business and social purposes. Crimes committed on the rail system range from vandalism and fare-evasion through to robberies and more serious assaults. Personal security has become a crucial factor in deciding which mode of transport is chosen and how frequently it is used. Parolin (1986) cited evidence of widespread avoidance of train travel during off-peak periods in Sydney, with potential public transport commuters opting to use other forms of transport because of security concerns.<sup>1</sup>

Public apprehensiveness about using the rail system may stem from a variety of sources. Some people may be wary of travelling on the rail system if they have been victimised in some way or have witnessed an offence on a railway facility. Others are influenced by the environment in and around railway stations. This environment may include dark and unclean stations, intimidating graffiti, and rowdy behaviour by groups (Spring 1991). Furthermore, crimes that occur on the rail system are often accentuated by the media causing apprehension amongst both existing and potential commuters.

Regardless of how perceptions of crime on the rail system are engendered, they are likely to adversely affect passenger patronage and consequently prevent the efficient utilisation of rail services. To the extent that public fear of crime on the rail system is unwarranted, it needs to be dispelled. Where public concern about crime on the rail system is justified, we need accurate data on the risk of criminal victimisation to plan effective crime control strategies.

This report endeavours to examine the incidence of crime and the level of risk of victimisation on the rail system in NSW. The report examines the profiles of selected offences that were recorded as having occurred on the rail system in NSW between January 1990 and December 1992.

Section 2 of this report presents an overall indication of the distribution of the offences across the entire rail system. The report examines four offence types, namely, *assault*, *sexual offences*, *robbery* and *steal from person*.<sup>2</sup> To gain an understanding of the nature and patterns of crime on the rail system, Section 2 also details the temporal distributions of the offence types. In determining the level of risk per commuter, an indicator of average risk is developed by using the number of passenger journeys during various periods as denominators for the number of offences that occurred during those periods. The level of risk for each day of the week and each time period of the day is presented as the number of offences per 100,000 passenger journeys.

The third section of this report deals with offences that occurred at railway stations while the fourth section deals with offences that occurred on trains. Each of these sections details the temporal frequency patterns and the temporal patterns of risk of criminal victimisation for each of the four offence types.

The temporal patterns presented in Sections 2 to 4 are based on data across the entire State. However, given that different geographical regions within the State are likely to experience different levels of crime, the regional variation in crime on the rail system is addressed in Section 5. The risk of victimisation on the rail system is estimated for each region in the Sydney Statistical Division by considering the number of offences at railway stations within each region in relation to the level of rail patronage in each region. The



correlation between the level of crime at the railway stations in each region and the general level of crime in each region is investigated.

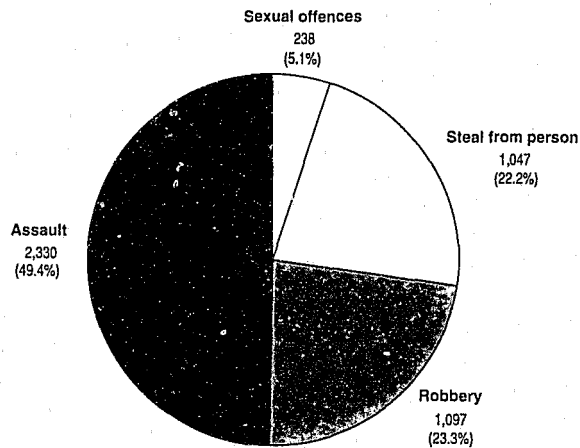
The final section, Section 6, discusses the results of analyses in Sections 2 to 5 and briefly considers crime prevention strategies, examining recent initiatives undertaken by rail authorities in NSW and elsewhere.

## 2. OFFENCES ON THE RAIL SYSTEM

### 2.1 DISTRIBUTION BY OFFENCE TYPE

All the offences considered in this report were recorded as occurring on the rail system in NSW between January 1990 and December 1992. The proportional breakdown of the four offence types examined in this report is shown in Figure 1 below. The figure shows that of the offence types examined there were 4,712 recorded offences. The most frequently recorded offence was *assault*, accounting for 49.4 per cent of the offences on the rail system. A further 23.3 per cent of the recorded offences were *robberies* while another 22.2 per cent were *steal from person* offences and 5.1 per cent were *sexual offences*.

Figure 1: Number and percentage of recorded offences on the rail system, by offence type, NSW, 1990 - 1992



Most offence types are, in turn, made up of a number of offence categories.<sup>3</sup> Table 1 shows the proportions in which the offence categories constitute each offence type.

From Table 1 it can be seen that of the 2,330 *assaults* recorded on the rail system, 14.0 per cent were classified as *aggravated assaults* and 86.0 per cent were *non-aggravated assaults*.

The 238 *sexual offences* were comprised of *aggravated sexual assaults* (4.6%), *sexual assaults* (10.5%), *aggravated indecent assaults* (2.1%), *indecent assaults* (80.3%) and *other sexual offences* (2.5%).

The majority of the 1,097 *robberies* on trains did not involve weapons (69.8%), but in 21.6 per cent of the *robberies*, a weapon other than a firearm was produced. Firearms were produced in 1.3 per cent of *robberies*. *Demand money with menaces* accounted for the remaining 7.3 per cent of the *robbery* offences.

**Table 1: Number and percentage of recorded offences on the rail system, by offence category, NSW, 1990 - 1992**

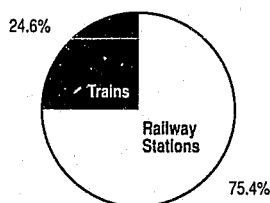
Offence category	No.	%
<b>Assault</b>	<b>2330</b>	<b>100.0</b>
Aggravated assault	326	14.0
Non-aggravated assault	2004	86.0
<b>Sexual offences</b>	<b>238</b>	<b>100.0</b>
Aggravated sexual assault	11	4.6
Sexual assault	25	10.5
Aggravated indecent assault	5	2.1
Indecent assault	191	80.3
Other sexual offences	6	2.5
<b>Robbery</b>	<b>1097</b>	<b>100.0</b>
Robbery - no weapon	766	69.8
Robbery - with firearm	14	1.3
Robbery - weapon not firearm	237	21.6
Demand money with menaces	80	7.3
<b>Steal from person</b>	<b>1047</b>	<b>100.0</b>

## 2.2 DISTRIBUTION ACROSS RAIL FACILITIES

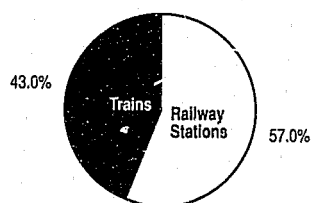
Figures 2a to 2d show the distribution of the four offence types across two types of rail facilities, namely railway stations and trains. Railway stations were the location for 75.4 per cent of recorded *assaults*, 56.1 per cent of recorded *steal from person* offences,

**Figure 2: Proportion of recorded offences occurring at railway stations and on trains, NSW, 1990 - 1992**

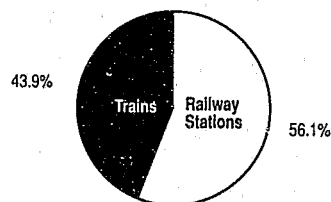
**Figure 2a: Assaults**



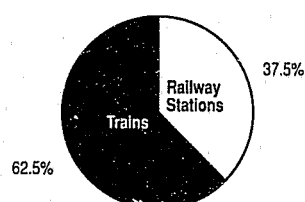
**Figure 2c: Robberies**



**Figure 2b: Steal from person**



**Figure 2d: Sexual offences**

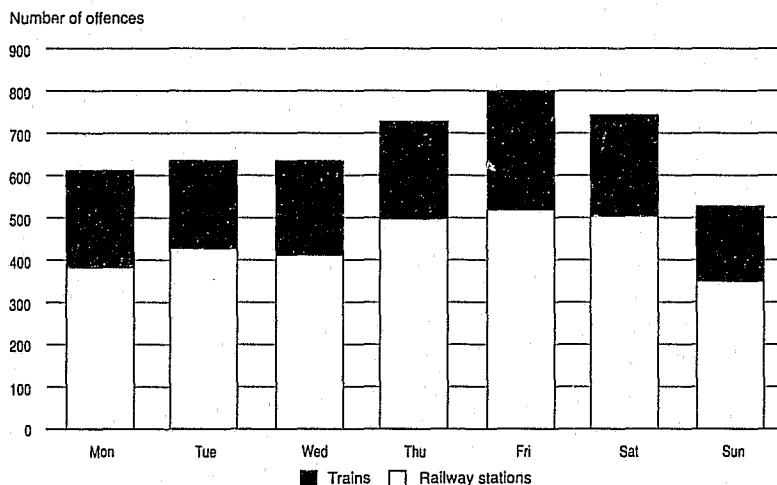


57.0 per cent of recorded *robberies* and 37.5 per cent of recorded *sexual offences* on the rail system.<sup>4</sup> Trains were therefore the location of 24.6 per cent of the *assaults*, 43.9 per cent of the *steal from person* offences, 43.0 per cent of the *robberies* and 62.5 per cent of the *sexual offences*. Thus, *sexual offences* were the only offences of the four types examined to occur more frequently on trains than at railway stations. Overall, railway stations were the location for 65.0 per cent of the 4,712 offences examined while trains accounted for 35.0 per cent.

### 2.3 DAY OF WEEK - FREQUENCY ON THE RAIL SYSTEM

Figure 3 shows the frequency of recorded offences on the rail system by day of the week and by type of rail facility. It shows that recorded offences, for both types of facility, were highest on Fridays, followed by Saturdays and then Thursdays. The lowest number of recorded offences occurred on Sundays. Furthermore, Figure 3 shows that, for each day of the week, the majority of the offences occurred at railway stations. The proportion of offences occurring at railway stations relative to those occurring on trains was similar on any given day.

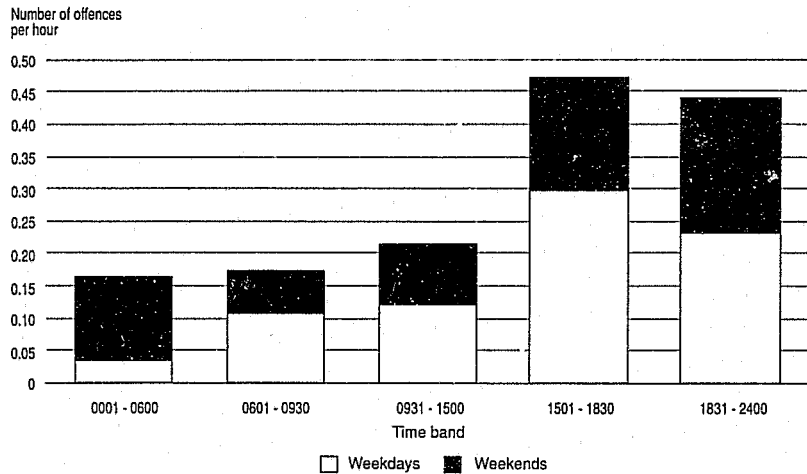
**Figure 3: Number of recorded offences on the rail system, by day of the week, railway stations and trains, NSW, 1990 - 1992**



### 2.4 TIME OF DAY - FREQUENCY ON THE RAIL SYSTEM

Figure 4 shows the frequency of recorded offences per hour by time of day and according to whether the offence took place on a weekend or a weekday. The number of offences per hour has been calculated for comparative purposes because the time periods are of unequal length.<sup>5</sup> From Figure 4 it can be seen that the number of offences per hour was lowest from 0001 to 0600 hours and then increased fractionally during the morning peak commuting period between 0601 and 0930 hours. After another slight increase in the middle of the day, the number of offences per hour doubled to reach a maximum level in the afternoon peak commuting period between 1501 and 1830 hours. The number of offences per hour declined slightly between 1831 and 2400 hours.

**Figure 4: Number of recorded offences on the rail system per hour, by time of day, weekends and weekdays, NSW, 1990 - 1992**



From Figure 4, it appears that the proportion of weekend to weekday offences varied over the course of the day. The proportion of offences per hour that occurred on weekends was much higher in the early morning between 0001 and 0600 hours (77.9%) than during the other time periods (37.8% - 47.5%).

## 2.5 PATRONAGE PROFILES AND RISK ON THE RAIL SYSTEM

Although the frequency distributions in Figures 3 and 4 provide a guide to the relative volume of crime on the rail system at different times, they do not provide an accurate estimate of the risk of victimisation for a particular commuter at any given time. The reason for this is that they do not take into account variations in the number of rail users at different times. The risk of a particular individual being victimised on the rail system at a specific time depends not only on the volume of crime on the rail system at that time but also on the number of rail commuters at that time.

A suitable measure of the number of rail users at any time can be found in the form of passenger journeys. A passenger journey entails a commuter travelling from one location to another, boarding at one station and alighting at another. Each boarding and each alighting is considered to be a passenger interchange. Thus a passenger journey was defined as consisting of two passenger interchanges. Data on interchanges on the CityRail network are available from a CityRail survey of station usage, using counts of passenger interchanges at railway stations as a unit of measurement (CityRail Planning 1991).

As may be expected there is considerable variation in the patterns of rail patronage according to the day of the week and the time of day. This variation is evident in Table 2 which shows the temporal variation in passenger journeys on the CityRail network.

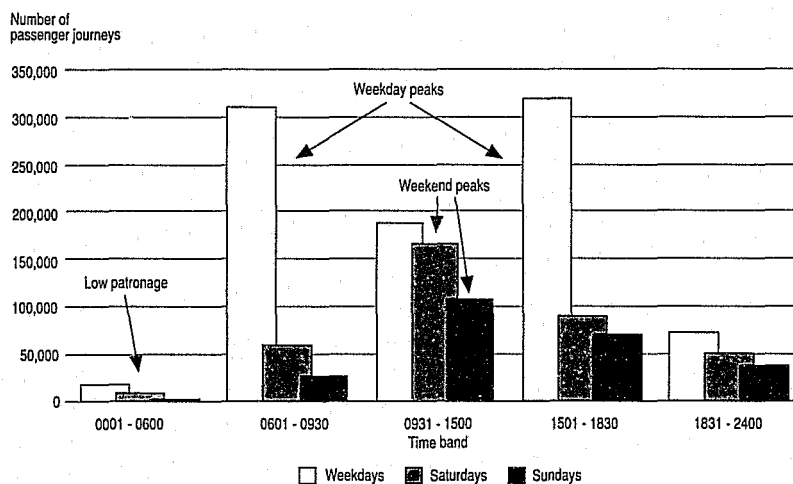
On average, 914,769 passenger journeys occurred on each weekday, approximately two and a half times as many as occurred on Saturdays (381,299 passenger journeys) and three and a half times as many as occurred on Sundays (249,967 passenger journeys). The passenger journey profile is depicted graphically in Figure 5.

**Table 2: Number of passenger journeys on the CityRail network, by day of week and time of day, NSW**

Time band	<i>Journeys each weekday</i>	<i>Journeys on Saturday</i>	<i>Journeys on Sunday</i>	<i>Journeys weekly</i>	<i>Journeys annually</i>
0001 - 0600	18,666	10,137	3,375	106,842	5,555,784
0601 - 0930	311,984	61,401	28,448	1,649,769	85,787,988
0931 - 1500	189,035	166,931	109,016	1,221,122	63,498,344
1501 - 1830	322,029	92,086	70,508	1,772,739	92,182,428
1831 - 2400	73,055	50,744	38,620	454,639	23,641,228
<b>Total</b>	<b>914,769</b>	<b>381,299</b>	<b>249,967</b>	<b>5,205,111</b>	<b>270,665,772</b>

Source: CityRail Planning, 1991.

Weekdays (Monday to Friday) were characterised by two peak travelling periods. The first occurred between 0601 and 0930 hours and the second occurred between 1501 and 1830 hours. These two peaks reflect the daily commuting characteristics of the workforce. On Saturdays and Sundays the peak commuting period occurred between 0931 and 1500 hours, perhaps reflecting travel for more recreational purposes. The level of patronage on the rail system between 0001 and 0600 hours for both weekends and weekdays was considerably lower than during other time periods.

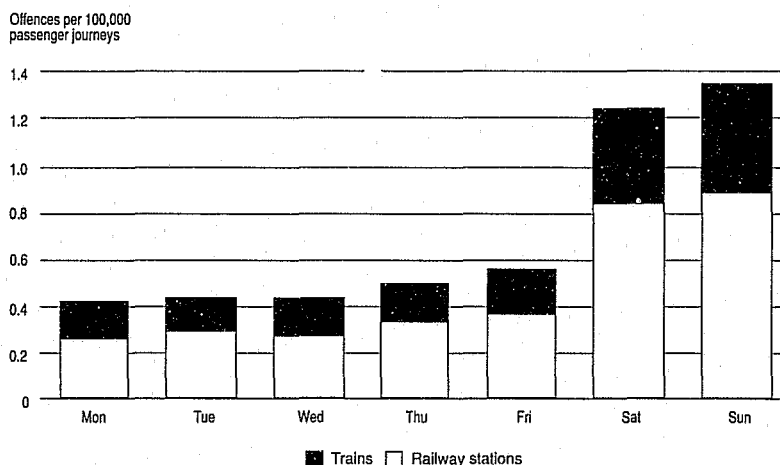
**Figure 5: Number of passenger journeys per day on the city rail network, by day of week and time of day, NSW, 1990 - 1992**

## 2.6 DAY OF WEEK - RISK ON THE RAIL SYSTEM

Having established the patronage profile, we can now calculate the risk of criminal victimisation to an individual commuter on different days of the week and at different times of the day. Figure 6 shows the number of offences on the rail system per 100,000 passenger journeys according to the day of the week and location of the offence.

From Figure 6 it is evident that the risk of criminal victimisation at railway stations is far greater than on trains. It is also evident that the risk of criminal victimisation in both locations is much higher on weekends than it is during the week. In fact, the rate of victimisation was approximately two and half times greater on Saturdays and Sundays than on the weekdays. Despite these variations, the risk of criminal victimisation, even on weekends, appears very low. The highest level (which occurred on Sundays) was 1.36 offences per 100,000 passenger journeys. However, it must be remembered that an unknown number of offences on the rail system pass unreported.

**Figure 6: Number of recorded offences on the rail system per 100,000 passenger journeys, by day of week, railway stations and trains, NSW, 1990 - 1992**



## 2.7 TIME OF DAY - RISK ON THE RAIL SYSTEM

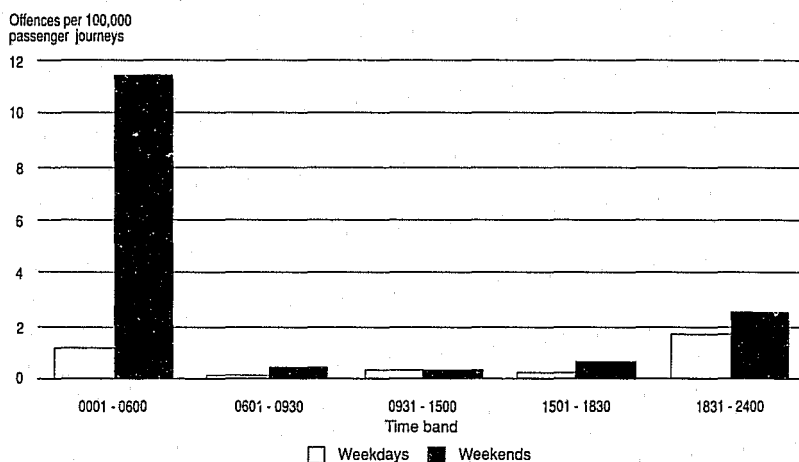
Figure 7 shows the risk of criminal victimisation on the rail system at varying time periods during the day. For each time period the risk of victimisation was higher on weekends than on weekdays.

On weekdays the level of risk was lowest from 0601 to 0930 hours, increased slightly in the middle of the day and then remained level until 1830 hours. The weekday level of risk peaked between 1831 and 2400 hours. During this period the risk of criminal victimisation was five times greater than in the preceding period (1501 to 1830 hours). After midnight (in the 0001 - 0600 hour period) on weekdays, the level of risk declined slightly.

Weekends showed greater variations in risk. While the level of risk was relatively low from 0601 to 1830, it was considerably higher between 1831 and 2400 hours, and dramatically higher in the 0001 - 0600 hour period. The 0001 - 0600 hour period on weekends stood out as the period of highest risk, exhibiting a rate that was at least four times higher than any other weekend period and at least five times higher than the highest weekday period. Nonetheless, even during this period, the level of risk is still quite low in absolute terms (11.5 offences per 100,000 passenger journeys).

Comparing Figures 4 and 7, it can be seen that the period of highest risk, namely the 0001 - 0600 hour period on weekends (See Figure 7), does not correspond to the period accounting for the highest frequency of recorded offences, namely the 1501 - 1830 hour period on weekdays (See Figure 4).

**Figure 7: Number of recorded offences on the rail system per 100,000 passenger journeys, by time of day, weekdays and weekends, NSW, 1990 - 1992**



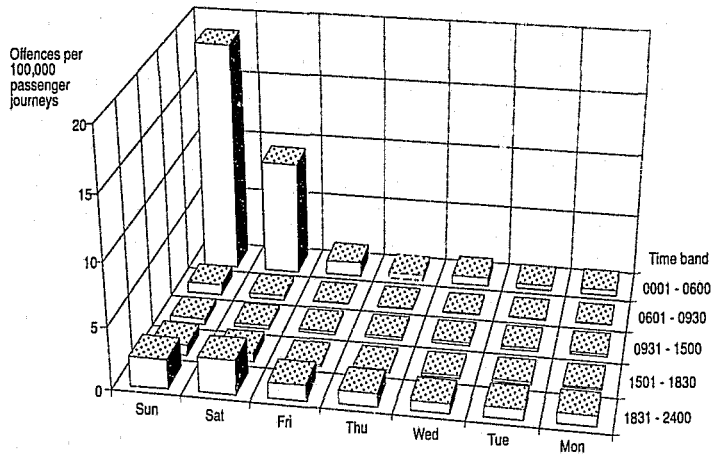
## 2.8 AN OVERALL TEMPORAL PERSPECTIVE - RISK ON THE RAIL SYSTEM

An overall temporal pattern for risk of victimisation can be obtained by merging the day of week and time of day risk profiles illustrated above in Figures 6 and 7, respectively, into a three dimensional graph.

Accordingly, Figure 8 shows the level of risk per 100,000 passenger journeys, by day of week and time of day simultaneously. From Figure 8 it is evident that the level of risk is consistently low in the periods 0601 - 0930 hours, 0931 - 1500 hours, and 1501 - 1830 hours, both on weekends and weekdays. Throughout the week, risk levels were noticeably higher at night in the 1831 - 2400 hour period. However, the highest levels of risk by far occurred in the 0001 - 0600 hour period on Sundays, followed by the 0001 - 0600 hour period on Saturdays. Each of these periods exhibited a risk that was about seven times higher than the risk in the preceding period, namely the 1831 - 2400 hour period on Saturdays and the 1831 - 2400 hour period on Fridays, respectively.



**Figure 8: Criminal victimisation risk by day of week and time of day, rail system, NSW, 1990 - 1992**



Despite the dramatic peaks on Saturdays and Sundays in the 0001 - 0600 hour period, the risk at the highest level was still quite low (18.6 offences per 100,000 passenger journeys). Overall, the average risk was 0.5 offences per 100,000 passenger journeys.

### 3. OFFENCES AT RAILWAY STATIONS

The offences that were recorded as occurring at railway stations may have been committed either on the railway station platforms or elsewhere in the stations' premises, but do not include offences committed in railway station car-parks.

The NSW rail system services 360 railway stations. Of these, 294 are serviced by CityRail and the remainder by CountryLink, with some overlap in services at outer suburban stations and at Central Station.

#### 3.1 DAY OF WEEK - FREQUENCY AT RAILWAY STATIONS

Table 3 shows the frequency distribution of offences by day of week for offences recorded as occurring at railway stations between January 1990 and December 1992. Of the four offence types examined, *assault* was the most commonly recorded offence (1,757 cases) followed by *robbery* (615 cases), *steal from person* offences (597 cases) and *sexual offences* (95 cases).

The frequency distributions in Table 3 suggest that each offence type had a distinctive daily occurrence pattern. The highest percentages of *assaults* occurred on Fridays (17.8%) and Saturdays (17.5%), while *sexual offences* were more likely in the earlier part of the week, peaking on Tuesdays (25.3%). *Robberies* were most common on Thursdays (17.2%) and Saturdays (17.1%), while *steal from person* offences were most common on Thursdays (18.3%) and Fridays (17.8%).

**Table 3: Number and percentage of recorded offences at railway stations, by day of week and offence type, NSW, 1990 - 1992**

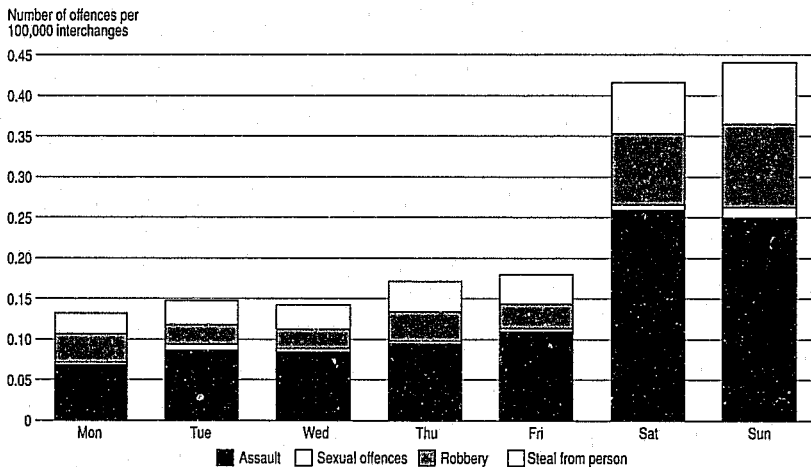
	<i>Assault</i>		<i>Sexual offences</i>		<i>Robbery</i>		<i>Steal from person</i>		<i>Total</i>	
	<i>No.</i>	<i>%</i>	<i>No.</i>	<i>%</i>	<i>No.</i>	<i>%</i>	<i>No.</i>	<i>%</i>	<i>No.</i>	<i>%</i>
Monday	194	11.0	16	16.8	96	15.6	74	12.4	380	12.4
Tuesday	245	13.9	24	25.3	69	11.2	88	14.7	426	13.9
Wednesday	238	13.5	14	14.7	70	11.4	85	14.2	407	13.3
Thursday	266	15.1	9	9.5	106	17.2	109	18.3	490	16.0
Friday	312	17.8	12	12.6	89	14.5	106	17.8	519	16.9
Saturday	308	17.5	9	9.5	105	17.1	75	12.6	497	16.2
Sunday	194	11.0	11	11.6	80	13.0	60	10.1	345	11.3
Total	1757	100.0	95	100.0	615	100.0	597	100.0	3664	100.0

### 3.2 DAY OF WEEK - RISK AT RAILWAY STATIONS

Because the number of passengers on the rail system varies quite considerably according to time and day, the number of recorded offences at a particular point in time is not a good estimate of the risk per commuter at railway stations at that point in time. In this section of the report, measures of risk are obtained by dividing the number of offences during a specific period by the number of passenger interchanges during that period. Passenger interchanges rather than passenger journeys are used as denominators for offences at railway stations as they reflect the actual passenger flows through the stations.

Figure 9 shows the number of recorded offences per 100,000 passenger interchanges by day of week for the four types of offence. In the figure, Sundays appear to exhibit the highest level of risk per interchange, closely followed by Saturdays. These weekend rates are more than twice as high as the levels of risk on weekdays (Monday to Friday). The proportional mix of offences appears fairly constant from day to day with *assaults* exhibiting the highest risk on each day. On any given day, the average level of risk for all offences combined at railway stations was below 0.5 in 100,000 passenger interchanges.

**Figure 9: Rate of recorded offences at railway stations per 100,000 passenger interchanges, by day of week and offence type, NSW, 1990 - 1992**

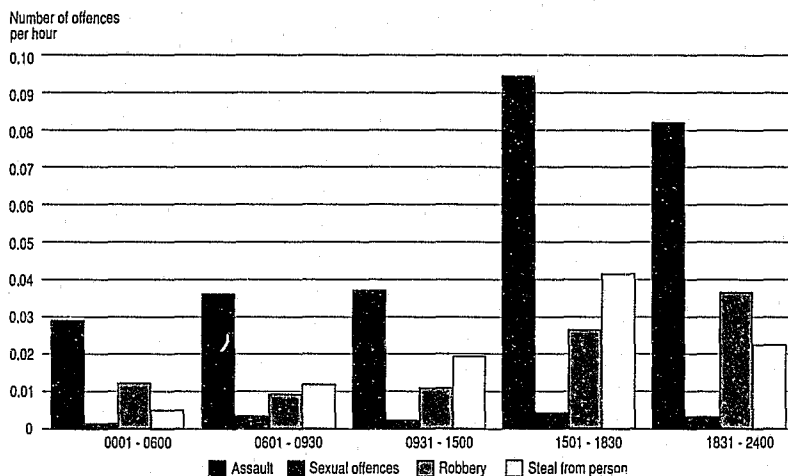


### 3.3 TIME OF DAY - FREQUENCY AT RAILWAY STATIONS

For 81.0 per cent of the recorded offences at railway stations, the time of the day that the offence occurred was recorded by police. Figure 10 shows the variation in the number of recorded offences per hour for each offence type by time of day.<sup>6</sup>

Figure 10 shows that *assault* was the most frequently occurring offence in each time period at railway stations. The number of *assaults* per hour was fairly constant from 0001 through to 1500 hours, and then doubled to reach a maximum level during the peak afternoon

**Figure 10: Number of recorded offences per hour at railway stations, by time of day and offence type, NSW, 1990 - 1992**



commuting period between 1501 and 1830 hours. The number of *assaults* per hour declined slightly between 1831 and 2400 hours.

*Sexual offences* showed the lowest recorded frequency per hour of the four offence types. Figure 10 shows that the number of *sexual offences* per hour was highest during the afternoon peak commuting period between 1501 and 1830 hours followed by the morning peak commuting period between 0601 and 0930 hours.

Figure 10 shows that the number of *robberies* per hour was around 0.01 between 0001 and 1500 hours. This number more than doubled in the 1501 - 1830 hour period and then more than tripled to a peak in the 1831 - 2400 hour period. Thus the number of *robberies* per hour peaked later in the day than the other offence types which all peaked in the 1501 - 1830 hour period. Further analysis shows that robberies involving weapons are more likely to occur after dark than during daylight hours.

Figure 10 shows that the number of *steal from person* offences per hour increased constantly from the 0001 - 0600 hour period onwards, reaching a maximum during the afternoon peak commuting period between 1501 and 1830 hours. The number of offences per hour declined in the period between 1831 and 2400 hours.

While all four offence types exhibited a greater frequency during the afternoon peak commuting period (1501 - 1830 hours) than during the morning peak commuting period (0601 - 0930 hours), the discrepancy was largest for *steal from person* offences. Compared with the 0601 - 0930 hour period, the 1501-1830 hour period accounted for about three and a half times as many *steal from person* offences, about two and a half times as many *assaults*, three times as many *robberies* and roughly the same number of *sexual offences*.

### 3.4 TIME OF DAY - RISK AT RAILWAY STATIONS

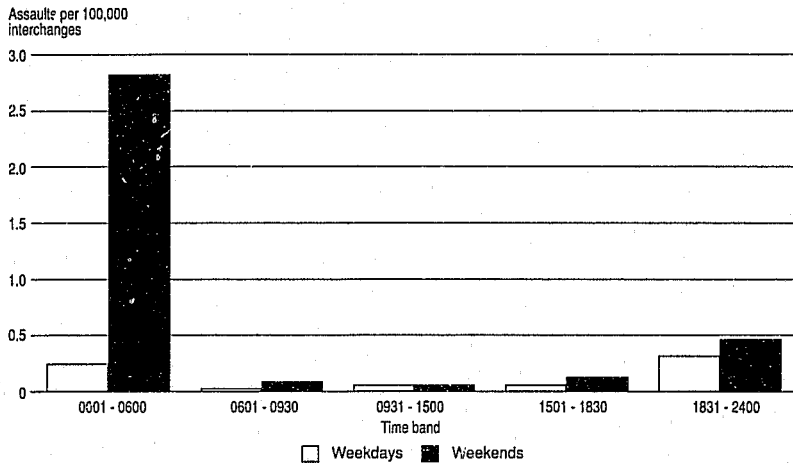
In contrast to the preceding figure which shows the frequency of each offence type at railway stations by time of day, the following four figures show the risk of victimisation

at railway stations per 100,000 passenger interchanges for each offence type by time of day. Weekday and weekend offences are considered separately.

### 3.4.1 Risk of assault at railway stations

Figure 11 shows the variation in the risk of *assault* by time of day on weekdays and weekends.

**Figure 11: Rate of recorded assaults at railway stations per 100,000 passenger interchanges, by time of day, weekends and weekdays, NSW, 1990 - 1992**



On weekdays the risk of *assault* increased gradually from 0601 through to 1830 hours, escalating by fivefold in the 1831 - 2400 hour period, and then decreasing slightly after midnight in the 0001 - 0600 hour period.

On weekends, the *assault* rate also generally climbed from 0601 onwards. After tripling from the 1501 - 1830 hour period to the 1831 - 2400 hour period, the risk of *assault* increased again after midnight by a factor of five to reach a maximum level in the 0001 - 0600 hour period (2.8 *assaults* per 100,000 passenger interchanges).

The periods with the highest levels of risk on weekends, 1831 - 2400 and 0001 - 0600 hours, coincide with times customarily associated with travelling home after social activities which may involve frequenting pubs, clubs or restaurants. This situation raises the question of whether alcohol consumption patterns may play a role in shaping the pattern of risk evident in Figure 11.

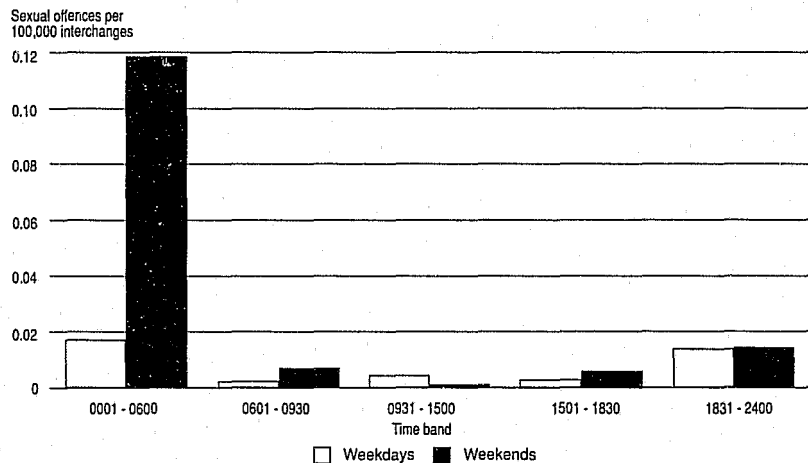
The police *assault* reports analysed for the purposes of this study do provide data on whether an *assault* was alcohol-related and show that the greatest proportion of alcohol related *assaults* at railway stations occurred between 0001 and 0600 hours on both weekdays and weekends.<sup>7</sup> During this time period 33.0 per cent of the *assaults* were

recorded as being alcohol-related. A similar proportion of *assaults* were reported to be alcohol-related in the period between 1831 and 2400 hours (31.4%). The proportions of alcohol-related *assaults* in the remaining time periods were between 10.5 per cent and 17.8 per cent.

### 3.4.2 Risk of sexual offences at railway stations

Figure 12 shows the variation in risk for *sexual offences* by time of day. The number of offences involved in Figure 12 is small ( $n=95$ ), so the pattern shown in the figure must be treated with caution. Overall, the level of risk of *sexual offences* was lower than those of the other offence types considered. For both weekdays and weekends, the 0001 - 0600 hour period evidenced the highest risk for *sexual offences*. However, whereas the peak risk for weekdays was only fractionally higher than the next highest risk, which occurred in the preceding period, the peak risk for weekends (0.12 *sexual offences* per 100,000 passenger interchanges) was about six times higher than the next highest risk (which also occurred in the preceding period). Even at its highest level the risk of a *sexual offence* was 25 times lower than the highest risk of *assault*.

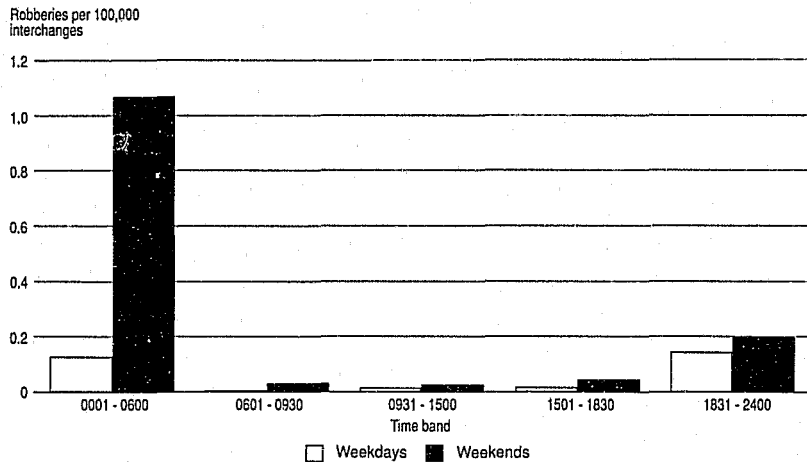
**Figure 12: Rate of recorded sexual offences at railway stations per 100,000 passenger interchanges, by time of day, weekends and weekdays, NSW, 1990 - 1992**



### 3.4.3 Risk of robbery at railway stations

The variation in risk of *robberies* at railway stations according to time of day is presented in Figure 13. The risk of *robbery* was higher during each period on weekends than it was on weekdays. For both weekdays and weekends the risk of *robbery* generally rose from 0601 through to 2400 hours. However, whereas the level of risk on weekdays declined slightly after midnight, on weekends it rose sharply in the 0001 - 0600 hour period to reach a peak level that was at least five times that of the period before.

**Figure 13: Rate of recorded robberies at railway stations per 100,000 passenger interchanges, by time of day, weekends and weekdays, NSW, 1990 - 1992**

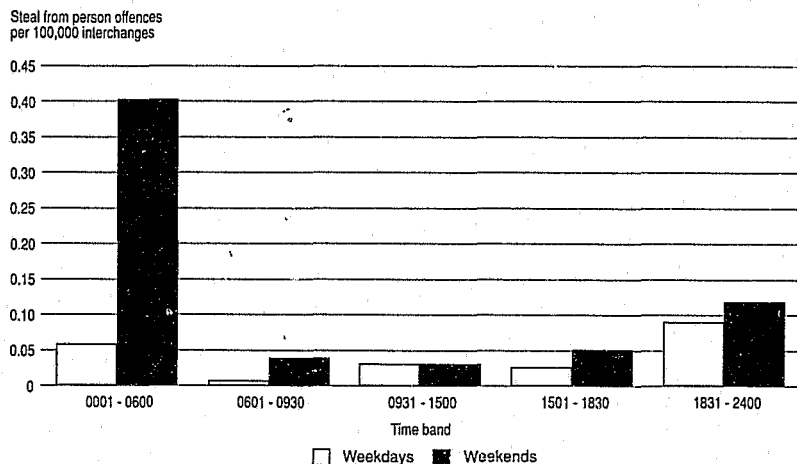


#### 3.4.4 Risk of steal from person offences at railway stations

Figure 14 shows the variation in risk by time of day for offences involving *steal from person*. The weekday rate was lowest in the 0601 - 0930 hour period and did not increase substantially until it tripled, to peak between 1831 and 2400 hours. The rate dropped off somewhat after midnight although the 0001 - 0600 hour period accounted for the second highest weekday risk.

The weekend profile showed a doubling in risk between 1831 and 2400 hours followed by a substantial jump in risk in the 0001 - 0600 hour period to a rate three times greater than the preceding 1831 - 2400 hour period.

**Figure 14: Rate of recorded steal from person offences at railway stations per 100,000 passenger interchanges, by time of day, weekends and weekdays, NSW, 1990 - 1992**



In summary, as was the case for the rail system in general, the risk of victimisation for all offences at railway stations tended to be highest during the 0001 - 0600 hour period on weekends despite the relatively low volume of offences during this early morning period. The next highest levels of risk were generally between 1831 and 2400 hours on weekends, between 1831 and 2400 hours on weekdays and between 0001 and 0600 hours on weekdays, respectively.



## 4. OFFENCES ON TRAINS

Offences recorded as occurring on trains are categorised as those that took place in a carriage of either a moving or stationary train.

### 4.1 DAY OF WEEK - FREQUENCY ON TRAINS

Table 4 shows the frequency distribution by day of the week for offences that were recorded as occurring on trains between January 1990 and December 1992. Of the offence types examined, *assault* was the most frequently recorded offence (573 cases), followed by *robbery* (482 cases) and then *steal from person* offences (450 cases). *Sexual offences* (143 cases) were the least frequently recorded of the offence types on trains. Nonetheless, as noted earlier, *sexual offences* were the only offence type of the four types examined that were recorded as occurring more frequently on trains than at railway stations.

As with offences at railway stations, each offence type exhibited a distinctive daily pattern. For example, Table 4 shows that *assaults* were most frequently recorded as occurring on Fridays (18.0%) and Thursdays (17.3%) while *sexual offences* were most frequently recorded on Mondays (18.9%). *Robberies* on trains were most frequently recorded as occurring on Fridays and Saturdays (17.8% and 17.0% respectively) and *steal from person* offences were most frequently recorded on Wednesdays (17.1%).

**Table 4: Number and percentage of recorded offences on trains, by day of week and offence type, NSW, 1990 - 1992**

	<i>Assault</i>		<i>Sexual offences</i>		<i>Robbery</i>		<i>Steal from person</i>		<i>Total</i>	
	No.	%	No.	%	No.	%	No.	%	No.	%
Monday	70	12.2	27	18.9	74	15.4	66	14.7	237	14.4
Tuesday	83	14.5	23	16.1	47	9.8	62	13.8	215	13.0
Wednesday	62	10.8	21	14.7	74	15.4	77	17.1	234	14.2
Thursday	99	17.3	18	12.6	59	12.2	66	14.7	242	14.7
Friday	103	18.0	23	16.1	86	17.8	73	16.2	285	17.3
Saturday	90	15.7	17	11.9	82	17.0	59	13.1	248	15.0
Sunday	66	11.5	14	9.8	60	12.4	47	10.4	187	11.3
Total	573	100.0	143	100.0	482	100.0	450	100.0	1648	100.0

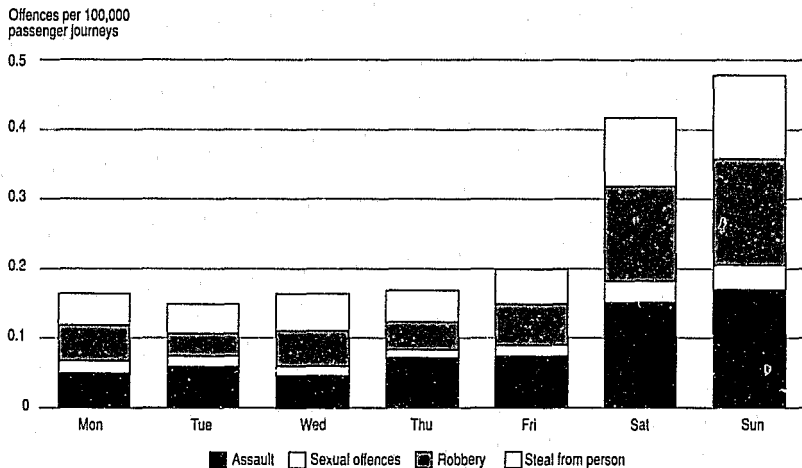
### 4.2 DAY OF WEEK - RISK ON TRAINS

The risk of victimisation on trains is estimated by dividing the number of offences during a specific period by the number of passenger journeys during that period. Passenger

journeys rather than passenger interchanges are used as denominators for offences on trains because they indicate the actual number of commuting trips. Thus, the level of risk on trains is expressed in terms of offences per 100,000 passenger journeys.

Figure 15 shows the relative risk of different offences on trains by day of the week. As with offences at railway stations, Sundays appear to exhibit the highest level of risk on trains followed by Saturdays with weekdays showing significantly lower levels of risk. The proportional mix of offences does not vary substantially from day to day with *sexual offences* exhibiting the lowest risk on each day. The average level of risk for all offences combined is below 0.5 in 100,000 passenger journeys.

**Figure 15: Number of recorded offences on trains per 100,000 passenger journeys, by day of week and offence type, NSW, 1990 - 1992**



#### 4.3 TIME OF DAY - FREQUENCY ON TRAINS

For 82.0 per cent of the recorded offences on trains, the time of the day that the offence occurred was recorded by police. Figure 16 shows the variation in the number of recorded offences per hour for each offence type across certain time intervals.<sup>8</sup>

Figure 16 shows that the number of *assaults* per hour were lowest in the 0001 - 0600 hour period and then doubled between 0601 and 0930 hours. After remaining fairly constant until 1500 hours, the number of *assaults* per hour tripled to reach a maximum level between 1501 and 1830 hours (0.037). The number of *assaults* per hour then declined somewhat between 1831 hours and midnight but remained considerably higher than it was between 0001 and 1500 hours.

Figure 16 shows that the highest number of *sexual offences* per hour were recorded between 0601 and 0930 hours, the period which, on weekdays, represents the morning peak commuting period. During this period throughout the week there were more *sexual offences* per hour on trains than *robberies* or *steal from person* offences. *Sexual offences* were the only offences which peaked in the morning. The second highest rate of *sexual offences* per hour occurred between 1501 and 1830 hours, the period which represents the afternoon peak commuting period on weekdays.

Figure 16 shows that the number of recorded *robberies* per hour increased constantly as the day progressed, from the 0001 - 0600 hour period to the 1831 - 2400 hour period. The peak period for *robberies*, between 1831 - 2400 hours occurred later than the peak for any other offence type. Further analysis shows that robberies involving weapons are more likely to occur after dark than during daylight hours.

**Figure 16: Number of recorded offences per hour on trains, by time of day and offence type, NSW, 1990 - 1992**

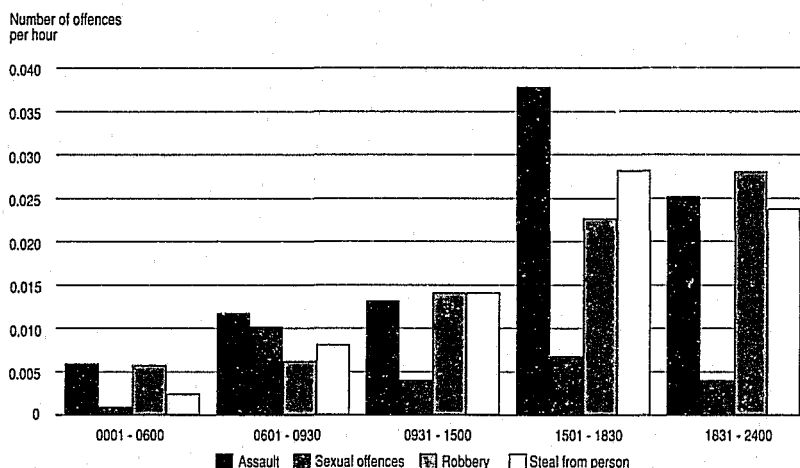


Figure 16 shows that the number of *steal from person* offences per hour increased sharply from the 0001 - 0600 hour period over the course of the day until it reached a peak between 1501 and 1830 hours (0.028). After that time, the rate declined slightly in the 1831 - 2400 hour period.

#### 4.4 TIME OF DAY - RISK ON TRAINS

In contrast to the frequency distributions detailed above, the following four figures show the risk of victimisation on trains per 100,000 passenger journeys by time of day for each offence type. Weekday and weekend offences are considered separately.

##### 4.4.1 Risk of assault on trains

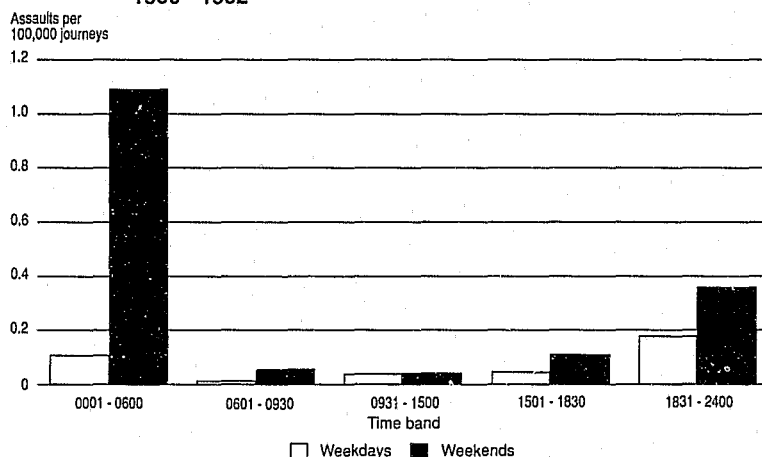
Figure 17 shows the variation in risk of *assault* by time of day. On weekdays the risk of *assault* increased gradually from 0601 hours onwards, peaked between 1831 and 2400 hours and subsequently decreased slightly in the 0001 - 0600 hour period.

On weekends, the *assault* rate increased in a similar fashion, however the risk of *assault* increased much more dramatically from the 1831 - 2400 hour period to the 0001 - 0600 hour period - a threefold increase. The peak risk level in the 0001 - 0600 hour period (1.1 *assaults* per 100,000 passenger journeys) was about three times higher than the level in any other period on weekends and at least four times higher than the level in any period on weekdays.

The police *assault* reports show that the greatest proportion of alcohol-related *assaults* on trains occurred between 1831 and 2400 hours on both weekdays and weekends.

During this time period 25.0 per cent of the *assaults* were recorded as being alcohol-related. The second highest percentage of alcohol-related *assaults* occurred in the subsequent period between 0001 and 0600 hours (18.0%). Thus, the two periods with the highest risks correspond to the two periods with the highest percentages of alcohol-related *assaults*. The lowest proportion of alcohol-related *assaults* on trains was in the 0931 - 1500 hour period (3.8%).

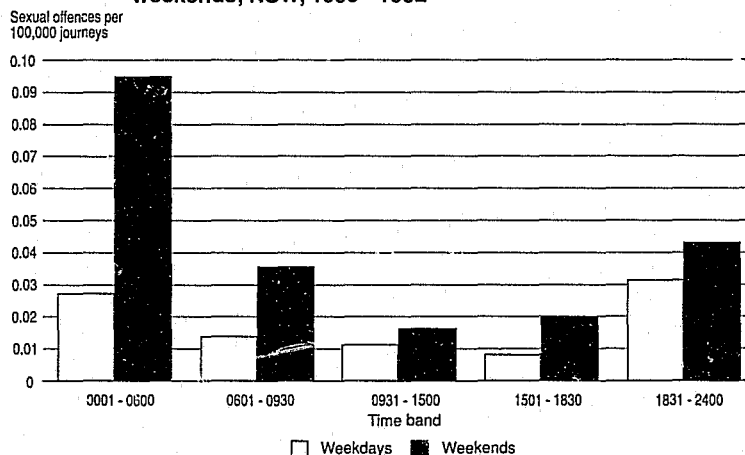
**Figure 17: Rate of recorded assaults on trains per 100,000 passenger journeys, by time of day, weekdays and weekends, NSW, 1990 - 1992**



#### 4.4.2 Risk of sexual offences on trains

Figure 18 shows the rate of *sexual offences* per 100,000 passenger journeys by time of day. The number of offences involved in Figure 18 is small ( $n = 143$ ), so the pattern shown in the figure should be treated with caution.

**Figure 18: Rate of recorded sexual offences on trains per 100,000 passenger journeys, by time of day, weekdays and weekends, NSW, 1990 - 1992**



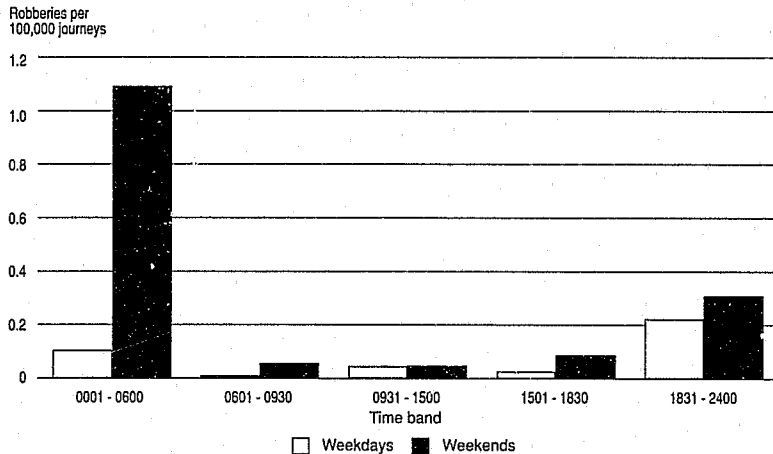
As with *assault*, the risk of *sexual offences* tended to be higher at every time period on weekends than it was during the corresponding time period on weekdays. On weekdays the most risky periods were between 1831 and 2400 hours and between 0001 and 0600 hours.

On weekends, these same periods were the most risky but the levels of risk were higher. As was the case for *assaults*, the maximum risk level occurred in the 0001 - 0600 hour period on weekends and represented a risk that was at least twice as high as any other weekend or weekday period.

#### 4.4.3 Risk of robbery on trains

The risk of *robbery* on trains by time of day is presented in Figure 19. The risk of *robbery* was higher during each period on weekends than it was on weekdays. As with *assault*, the risk of *robbery* generally rose from 0601 through to 2400 hours on weekdays and then declined somewhat after midnight. Again, as with *assault* and *sexual offences*, the peak risk for *robbery* occurred in the 0001 - 0600 hour period on weekends (1.10 robberies per 100,000 passenger journeys) and was considerably higher than the risk in any other weekend or weekday period.

**Figure 19: Rate of recorded robberies on trains per 100,000 passenger journeys, by time of day, weekdays and weekends, NSW, 1990 - 1992**

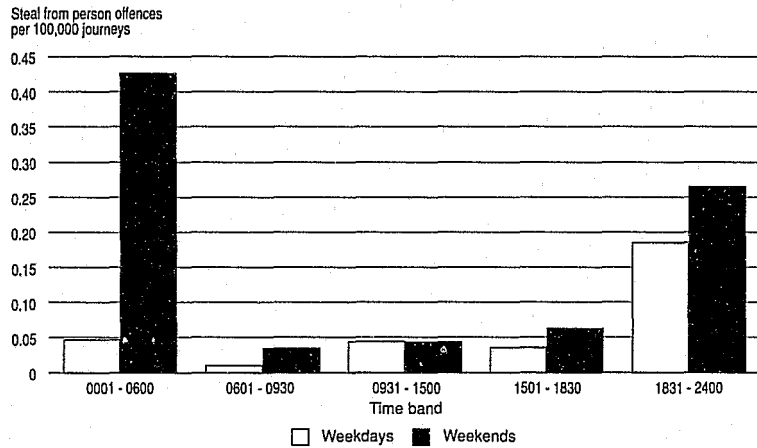


#### 4.4.4 Risk of steal from person offences on trains

Figure 20 shows the variation in risk by time of day for offences involving *steal from person*. The weekday rate generally increased from 0601 onwards, quadrupling after 1830 hours to peak between 1831 and 2400 hours. The level of risk then decreased substantially after midnight.

The weekend profile also showed a fourfold increase in risk in the 1831 - 2400 hour period. This increase was followed by another substantial increase in the 0001 - 0600 hour period. As with the other offence types, the peak risk occurred in the 0001 - 0600 hour period on weekends and was greater than the risk in any other weekend or weekday period by a factor of approximately two times or more.

**Figure 20: Rate of recorded steal from person offences on trains per 100,000 passenger journeys, by time of day, weekdays and weekends, NSW, 1990 - 1992**



## 5. REGIONAL VARIATIONS IN RISK AT RAILWAY STATIONS

Although, in general, offences occur with greatest frequency at those stations dealing with the heaviest passenger traffic, usage levels alone do not explain all the variation in risk across regions. Some commentators have found that the regional location of crime on public transport is a reflection of the general level of crime in the surrounding geographical area (Shellow et al. 1974). If this were true for the NSW rail system, the highest risk stations should be located in areas with the highest crime rate in general.

To test this hypothesis, the correlation between the general rate of offending in a given area and the rate of offending at railway stations within that area was examined. If the rate of offending at railway stations is reflective of the general rate of offending within the local communities in which they are located, there should be a significant positive correlation between area crime rates and corresponding railway station crime rates.

In what follows, the relevant correlation between railway stations and the surrounding area is examined for violent offences (namely *assault*, *sexual offences* and *robbery*) and for the non-violent offence of *steal from person*. Railway stations have been grouped according to the Statistical Subdivision (SSD) in which they are located.<sup>9</sup> The analysis is restricted to Sydney's SSDs because there are too few offences at country stations to allow valid comparisons. The offences occurring at metropolitan stations within each SSD were

**Table 5: Rate of recorded offences in Sydney Statistical Subdivisions (SSDs) and in railway stations within SSDs, violent offences and steal from person offences, NSW, 1990 - 1992**

Statistical Subdivision	Rate of violent offences in SSD per 100,000 population (a)	Rate of violent offences at stations in SSD per 100,000 passenger interchanges (b)	Rate of steal from person offences in SSD per 100,000 population (c)	Rate of steal from person offences at stations in SSD per 100,000 passenger interchanges (d)
Blacktown – Baulkham Hills	562	0.31	1569	0.03
Fairfield – Liverpool	754	0.27	1740	0.03
Gosford – Wyong	579	0.26	2206	0.02
Outer South Western Sydney	705	0.20	1730	0.01
Outer Western Sydney	492	0.19	1641	0.02
Canterbury – Bankstown	570	0.17	1541	0.04
Central Western Sydney	766	0.17	2016	0.02
Inner Sydney	2355	0.16	7881	0.08
Inner Western Sydney	650	0.13	2299	0.03
St George – Sutherland	403	0.13	1510	0.01
Eastern Suburbs	766	0.12	3072	0.05
Hornsby – Ku-ring-gai	251	0.08	1101	0.01
Lower Northern Sydney	421	0.05	2494	0.01

pooled along with the relevant passenger interchange data to obtain estimates of the risk of an offence at railway stations within each SSD. These estimates were then correlated against SSD rates of recorded offences per 100,000 population drawn from recorded crime statistics for 1991 (New South Wales Bureau of Crime Statistics and Research 1992).

Table 5 shows for each SSD, the rate of recorded violent offences (*assault, sexual offences and robbery*) and the rate of recorded *steal from person* offences per 100,000 population. The table also shows the rate of recorded violent offences (*assault, sexual offences and robbery*) and the rate of recorded *steal from person* offences at railway stations within each SSD.

A correlation test was performed on the data in Table 5.<sup>10</sup> It was found that there was no statistically significant correlation between columns (a) and (b) ( $n = 13$ ,  $r_s = 0.225$ ,  $p > 0.05$ ) nor between columns (c) and (d) ( $n = 13$ ,  $r_s = 0.505$ ,  $p > 0.05$ ). These results do not support the hypothesis that the stations exhibiting the highest risk are situated in the areas with the highest crime rates.

The highest rate of violent offences at railway stations (0.31 per 100,000 passenger interchanges) was in the Blacktown-Baulkham Hills SSD.<sup>11</sup> This rate is about six times greater than the lowest rate of violent offences at railway stations (0.05 per 100,000 passenger interchanges) observed for the Lower Northern Sydney SSD. The Fairfield - Liverpool and Gosford - Wyong SSDs exhibited the second and third highest levels of risk of violent offences at railway stations (0.27 and 0.26 per 100,000 passenger interchanges respectively) followed by the Outer South Western Sydney SSD (0.20).

Recorded non-violent offences (*steal from person*) per 100,000 passenger interchanges at railway stations were highest in the Inner Sydney SSD (0.08) and in the Eastern Suburbs (0.05). These two SSDs also have the highest annual number of passenger interchanges per railway station.



## 6. DISCUSSION

The frequency and risk profiles reveal that the period exhibiting the highest frequency of offences, the late afternoon period from 1501 to 1830 hours, does not correspond with the period exhibiting the highest level of risk. Rather, the risk profiles show that the risk of criminal victimisation tended to increase as the level of patronage decreased. For all offences considered, the period exhibiting the greatest risk was the weekend period between 0001 and 0600 hours which was also the period with the lowest passenger flow. Nevertheless, as mentioned before, even at its highest level, the risk of criminal victimisation on the rail system is still extremely low.

The high rates of offences at railway stations during periods of low patronage may be due in part to crimes that occur at unused or deserted stations in the dark hours of the morning. Those involved may not necessarily be railway patrons.

*Assaults* were the most commonly reported offences on the rail system. While the present data do not provide any reliable information on the identity of the *assault* offenders, the NSW Transit Police attribute a large proportion of *assaults* on the rail system to youths (*The Weekend Australian* 17-18 Sep. 1988, cited in Geason & Wilson 1990). A significant proportion of *assaults* were found to be alcohol-related. The fact that these alcohol-related *assaults* were most common in the late hours of the night and in the dark hours of the morning presents a policy dilemma. While the public are encouraged to use public transport rather than drink and drive, the congregation and interaction of people under the influence of alcohol on public transport facilities may well increase the incidence of *assault* and other crimes.

Most of the recorded *sexual offences* on the rail system in the present sample are classified as *indecent assaults* (80.3%). In other words they entail touching, groping or offensive sexual behaviour other than sexual intercourse without consent. It has been suggested by Beller et al. (1980) that sexual offenders on public transport seem to prefer crowded rush hour trains and platforms, probably because crowding maximises the possibility of physical contact and provides more credible excuses for bodily contact. The present data are consistent with this suggestion given that *sexual offences* both at railway stations and on trains were somewhat more frequent in the morning (0601 - 0930 hour) and afternoon (1501 - 1830) peak commuting periods when passenger density is highest. Nonetheless it should be noted that the risk of a *sexual offence* against any given individual was greatest during the 0001 - 0600 hour period, when passenger density is lowest. Interestingly enough, Beller et al. (1980) also point out that a distinguishing characteristic of *sexual offences* on the rail system is that they seem to be perpetrated by strangers rather than someone acquainted with the victim.

The analysis shows that whilst the use of firearms in *robberies* was extremely uncommon on the rail system (14 incidents over the three year period), weapons other than firearms were used in 237 of the *robberies* (21.6 %). Darkness may play some conducive role in the incidence of *robberies* involving weapons, with incidents involving weapons most likely to occur between 1831 and 0600 hours.

The regional analysis shows that there is no significant correlation between the level of crime at Sydney's railway stations and the general level of crime in the corresponding Statistical Subdivisions. Where the rate of crime at railway stations is ranked higher

than the rate of crime in the surrounding area it is possible that the physical environment in and around the railway stations may be conducive to offending.

## **6.1 SITUATIONAL CRIME PREVENTION AND OPPORTUNITY REDUCTION**

The rational choice theory of crime suggests that criminal choices result when the rewards of crime are judged to exceed the costs in terms of risk and effort (Cornish & Clarke 1986). Based on this theory, situational crime theory asserts that certain types of crimes are more likely to be committed when opportunities present themselves in an environment conducive to crime.

### **6.1.1 Designing out crime**

Situational opportunities for crime on public transport may eventuate as a result of the 'environmental design' of a facility. Dark tunnels at railway stations, obscured zones on platforms, or secluded areas can provide an environment conducive to offences such as *robbery* or *assault*. 'Designing out' crime through situational measures aimed at increasing both the difficulty and the risk of offending have become popular crime prevention strategies. Situational or 'target hardening' strategies include initiatives like improving illumination, installing vandal proof equipment and redesigning stations to facilitate efficient passenger flow.

Gaylord and Galliher (1991) describe a successful attempt to design out crime on public transport in their examination of the Mass Transit Railway (MTR) in Hong Kong. The MTR was especially designed to discourage criminal behaviour by reducing opportunities through clever environmental design and inventive passenger flow processes. Although, compared with the NSW rail system, the MTR is a far smaller system and is entirely underground, there are many relevant aspects of this system which have been pursued in NSW.

NSW rail authorities have begun renovating stations to create a more pleasant, less run-down appearance by eliminating barriers and obscured dead-end corridors (Easteal & Wilson 1991). Furthermore, well-lit 'safety zones' or 'nightsafe areas' can be found on many of Sydney's platforms. Recent initiatives propose that late night trains will have only two carriages open for service. These two carriages, as well as being adjacent to a crew member's carriage, will stop in the designated 'safety zones' to allow passengers on and off. This scheme, it is hoped, will prevent late night passengers from spreading too thinly along the platform or train and becoming isolated, and hence will work on the basis of 'safety by numbers'.

### **6.1.2 Closed circuit television**

Closed circuit television (CCTV) has been a popular device used to prevent crimes on railway platforms. CCTV extends the area of a platform that can be monitored by railway personnel and in theory increases the risk of arrest (Burrows 1980). As well as deterring potential offenders, enhanced video images can be used as evidence in court. According to Burrows (1980), CCTV has been shown to significantly reduce vandalism and theft on railway platforms, but Trasler (1986) suggests that this may have led to a displacement of crimes from platforms onto trains or to other stations that do not have CCTV.

Nevertheless, while these displacement effects are difficult to confirm, the deterrent effects of using CCTV for security surveillance on railway platforms are apparent.

### *6.1.3 The characteristics of commuting*

Certain aspects of commuting by public transport place commuters in vulnerable situations. Railway stations and trains can serve as locations where, at certain times, large numbers of commuters congregate in confined or congested areas, creating opportune conditions for pickpockets, purse-snatchers and other perpetrators. Because of the nature of ticket purchase and collection, wallets and purses are often exposed at ticket collection booths at railway stations.

A commonly reported scenario entails an assailant jumping off a train onto the platform just as the train doors close, leaving a commuter on the carriage without their briefcase or handbag. Alternatively, some offenders can evade apprehension and make off with their spoils by quickly boarding a departing train with items stolen from a victim on the platform. The ease of escape of the offender is therefore an inherent problem confronting public transport crimes.

In addition to the temporal and regional factors, the amount of time spent waiting on a railway platform for a train may also affect a person's risk of victimisation. Any measures aimed at reducing the amount of time spent on the platform, such as accurately displaying departure times at stations, may reduce potential opportunities for crimes. 'Help Points' which allow two way communication, in the case of emergency, between passengers on the station platforms or carriages and the railway personnel are being installed by CityRail in Sydney.

## **6.2 LAW ENFORCEMENT**

### *6.2.1 Policing the rail system*

The NSW Transit Police are the primary law enforcement branch responsible for rail safety. Since 1988, 300 members of the State Rail Authority Transport Investigation Branch have been transferred to the NSW Police Service as Transit Police. CityRail has also pursued a wide range of measures to promote passenger safety. Ticket officers are being trained at the NSW Police Academy in various aspects of security, and private security guards are being employed at various railway stations.

### *6.2.2 Internal reporting systems*

One of the main problems in formulating crime prevention strategies is the lack of accurate information regarding the incidents. Inevitably, a proportion of offences will not be reported by victims at all (Burrows 1980), particularly when the offence is minor or when there is no-one present at the station to whom the incident can be reported. Furthermore, details concerning offender and victim characteristics are often not recorded. To overcome these reporting and recording inadequacies, CityRail has introduced an internal reporting system whereby detailed incident reports can be filled out at railway stations by railway personnel. This allows minor offences to be reported and accurately recorded by railway personnel without necessarily having to call police. The incident report forms are later passed on by CityRail to the NSW Police Service. It is hoped that increasing the ease of incident reporting will encourage the reporting of incidents on the rail system, so that the recorded rate of offences will also more accurately

reflect the actual rate of offences thus forming a more comprehensive data base for analysis. More importantly, a detailed reporting system would allow accurate victim and offender profiles to be established. It would also be interesting to determine the extent to which multiple victims or multiple offenders are involved in crimes on the rail system.

Successful strategies to create a safer public transport system for the future depend largely on public participation. Reporting all offences to authorities is imperative if the issue is to be addressed in its entirety.

### **6.3 SOCIAL CRIME PREVENTION STRATEGIES**

Whilst situational crime prevention strategies and increased law enforcement targeted at rail facilities may create a rail system less conducive to crime, such measures may in effect displace the problem to the surrounding area. Therefore social crime prevention strategies should be considered concurrently with situational crime prevention measures which specifically target transport facilities. Social crime prevention or 'social intervention' essentially involves increasing the incentives for a potential offender to become a law abiding citizen. Such crime prevention measures focus on public health, education, housing, as well as occupational and leisure circumstances of potential offenders (Pinkerton James 1993). In areas where loitering youth congregate at railway stations and commit offences, social intervention may step in where situational measures such as target hardening have been unsuccessful in preventing crimes on the rail system.

## NOTES

- <sup>1</sup> In 1986, a public opinion poll carried out for the New South Wales State Rail Authority (SRA) found that 80 per cent of Sydney-siders surveyed were worried about their personal safety on trains (Geason & Wilson 1990).
- <sup>2</sup> While these four offence types are not by any means the only offences committed on the rail system facilities, they are the most relevant to personal security. The specific offence categories examined for each of these four offence types are listed in the Appendix. Vandalism, fare-evasion and drug-related offences have not been included in this study.
- <sup>3</sup> Each offence category is defined in the Appendix.
- <sup>4</sup> The offences that were recorded as occurring at railway stations may have been committed either on the railway station platforms or elsewhere in the stations' premises, but do not include offences committed in railway station car-parks.
- <sup>5</sup> Time intervals of unequal length were used because rail patronage data were readily available in this format. The number of offences per hour in a specific time period was calculated by dividing the number of recorded offences in each time period across 1990, 1991 and 1992 by the number of hours in that period over the three years.
- <sup>6</sup> Figure 10 excludes the 19 per cent of cases (589 cases) for which the time of day of offence was not recorded.
- <sup>7</sup> The assessment of whether or not an assault is alcohol-related is made on a subjective basis by the police officer concerned.
- <sup>8</sup> Figure 16 excludes the 18 per cent of cases (283 cases) for which the time of day of offence was not recorded.
- <sup>9</sup> Statistical Divisions and Subdivisions are the regions used by the Australian Bureau of Statistics for publishing demographic data. For example see Australian Bureau of Statistics, 1993.
- <sup>10</sup> A Spearman's rank order correlation test.
- <sup>11</sup> The majority of offences in the Blacktown - Baulkham Hills SSD can be attributed to the Blacktown local government area (LGA) which has 10 railway stations. Baulkham Hills LGA has only one railway station.

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## APPENDIX

### ASSAULT

*Aggravated assault* incorporates the following offences:

- assault causing grievous bodily harm,
- assault causing actual bodily harm,
- malicious wounding,
- shoot with intent to cause grievous bodily harm,
- shoot with intent to prevent lawful apprehension, and
- negligent acts causing grievous bodily harm.

*Non-aggravated assault* incorporates:

- common assault,
- assault police, and
- assault female.

### SEXUAL OFFENCES

*Aggravated sexual assault* incorporates the following offences:

- aggravated sexual assault
- inflict grievous bodily harm and sexual intercourse without consent,
- inflict or threaten actual bodily harm and sexual intercourse without consent, and
- assault with intent to have sexual intercourse.

*Sexual assault* incorporates:

- sexual assault
- intercourse without consent.

*Aggravated indecent assault* incorporates:

- aggravated indecent assault, and
- aggravated act of indecency.

*Indecent assault* incorporates:

- indecent assault, and
- act of indecency.

*Other sexual offences* include:

- carnal knowledge,
- incest,
- homosexual intercourse,
- act of gross indecency with male,
- other sexual offences.

### ROBBERY

*Robbery* offences are offences where money or goods are taken from someone by violent means or through the threat of violence and include:

- robbery without a weapon,
- robbery with a firearm,
- robbery with a weapon not a firearm, and
- demand money with menaces.

### STEAL FROM PERSON

*Steal from person* offences are offences whereby property is unlawfully taken from the person without the use or threat of violence.