

**SOUTH JERSEY
TRANSPORTATION
PLANNING ORGANIZATION**

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SOUTH JERSEY TRANSPORTATION PLANNING ORGANIZATION

**SAFETY TRENDS REPORT:
OCCUPANTS**

2003-2009

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SAFETY TRENDS REPORT: OCCUPANTS

INTRODUCTION

Traffic safety is a long-time mission for SJTPO. One of the steps in transportation safety planning is to obtain and analyze data that will assist in the safety issue prioritization process. This report presents statistics for vehicle occupant in crashes for the South Jersey region (**Atlantic, Cape May, Cumberland, and Salem Counties**), for the seven-year period from 2003 through 2009. This section is entitled, Occupants; it summarizes statistics about occupants in crashes, such as physical condition, seat belt use, etc. Other sections focus on crashes drivers, vehicles, and pedestrians.



percent in 2003 to 92 percent in 2009, but increased sharply in the back row, from 77 percent in 2003 to 90 percent in 2009. Seat belt usage is vital because occupants that use seat belts have much lower rates of injury and fatality. Seat belt use is also associated with a decreased chance of the occupants being ejected, partially ejected, or trapped in their vehicle. This contradicts the belief of some road users who believe that seat belt use will increase their risk of being trapped in their vehicle during a crash.

OCCUPANTS: 2003-2009

Occupant Condition

During the seven-year period, from 2003 to 2009, the number of occupants injured in any manner of physical condition has fallen. From 2003 to 2009 occupants killed fell from 89 to 71, incapacitated dropped from 240 to 165, moderately injured declined from 1,753 to 1,259 and those complaining of pain went down from 6,104 to 5,319 (see Figure 1). Figure 2 shows the total breakdown of physical condition over the period.

SUMMARY

Factors such as seat belt use, and the occupant's position in the vehicle, are associated with different injury rates. The driver position had notably higher numbers killed (446), incapacitated (1,111), and moderately injured (7,716). However when the number of occupants per position is taken into account to calculate rates for each position, the driver and second row middle positions were tied for the highest fatality rate (1.9 per 1,000 occupants), and the front-middle position had the highest incapacitated rate (5.0 per 1,000 occupants), as well as the highest rate of moderate injuries (40.8 per 1,000 occupants).

Seat belt use by the occupants involved in crashes from 2003 to 2009 increased slightly for occupants in the front row, from 88

Figure 1 - Physical Condition, by Year

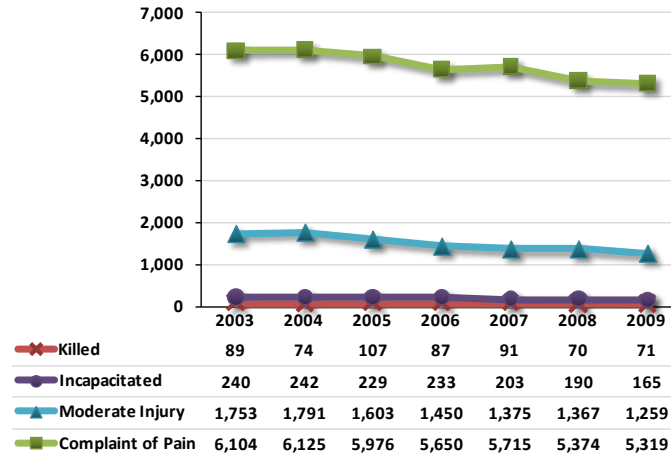
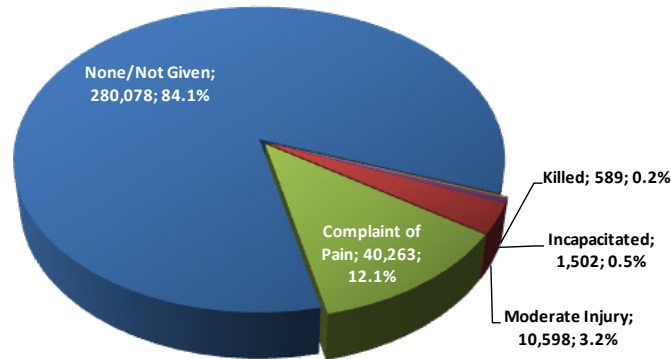


Figure 2 - Physical Condition, Total

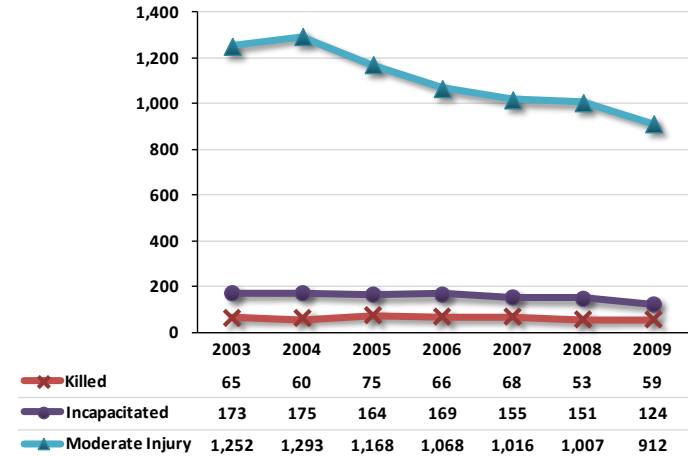


Occupant Position:

The number of occupants killed, incapacitated, or otherwise injured varies by the position within the vehicle. The driver position generated the most occupants killed (446), incapacitated (1,111), and moderately injured (7,716). This is expected, as there are more occupants classified as being in the driver position than any other

vehicle position. The totals have a decreasing trend for the seven-year period (see Figure 3).

Figure 3 - Physical Condition in Driver Position, by Year



The figures below (Figure 4 -Figure 7) indicate the rates of occupants killed (Figure 4), incapacitated (Figure 5), moderately injured (Figure 6), or complaining of pain (Figure 7), taking into account the number of times that each vehicle position, was occupied at the time of a crash. With this, a rate of occurrence (per 1,000 occupants) is created for the resulting physical condition for each position.

Figure 4 - Rate Killed (per 1,000), by Position, Total

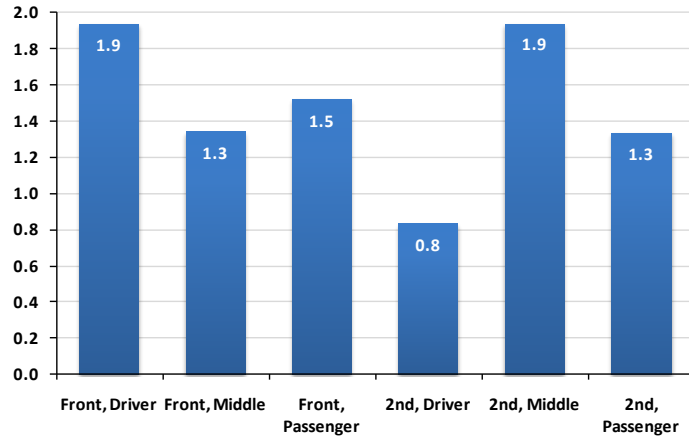


Figure 6 - Rate Moderately Injured (per 1,000), by Position, Total

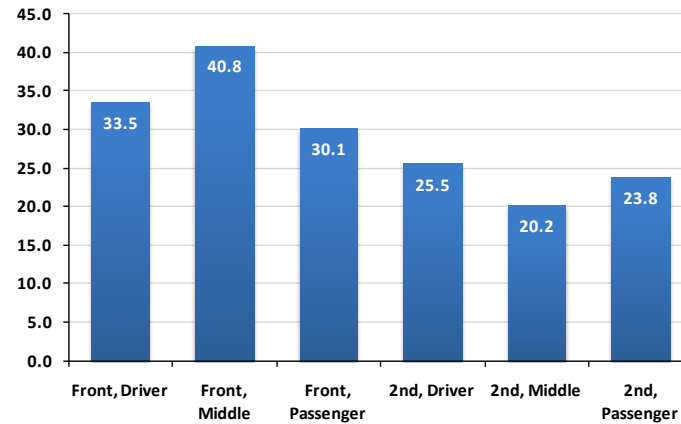


Figure 5 - Rate Incapacitated (per 1,000), by Position, Total

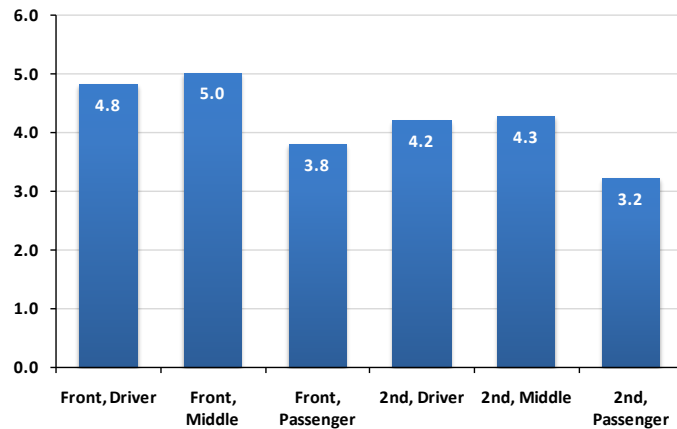
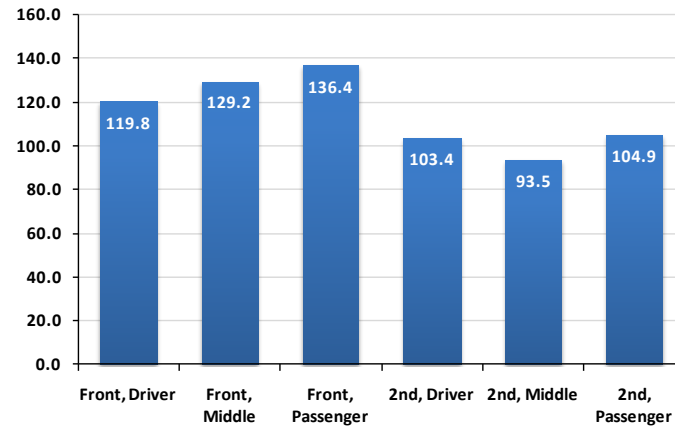


Figure 7 - Rate Complaining of Pain (per 1,000), by Position, Total



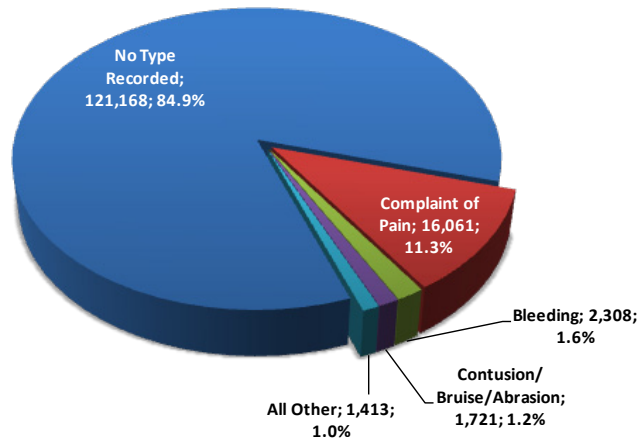
The driver and second row middle positions had the highest fatality rates, 1.9 fatalities for every 1,000 occupants (Figure 4). The front passenger position is a distant third, at 1.5 fatalities per 1,000 occupants. The front middle position had the highest rate of occupants incapacitated, at 5.0 per 1,000 (Figure 5), as well as the

highest rate of moderate injury, at 40.8 per 1,000 (Figure 6). The driver position produced the second highest rates for incapacitated (4.8 per 1,000) and moderate injury (33.5 per 1,000). Complaint of Pain was dominated by the front passenger position, at 136.4 per 1,000, followed by front middle then driver (Figure 7).

Types of Injuries

The type of most severe injury is recorded for the occupants in a crash. This is different from the general physical condition categories (killed, incapacitated, moderately injured, and complaining of pain) that were presented above, as it refers to the specific injury (bleeding, contusion, etc). As shown in Figure 8, there is a sizable number of occupants in crashes that have either an injury or a complaint of pain. During the seven-year period from 2003 to 2009, 21,503 occupants were injured. Within the most serious injuries, the most prominent injuries recorded are Bleeding and Contusions (Figure 8).

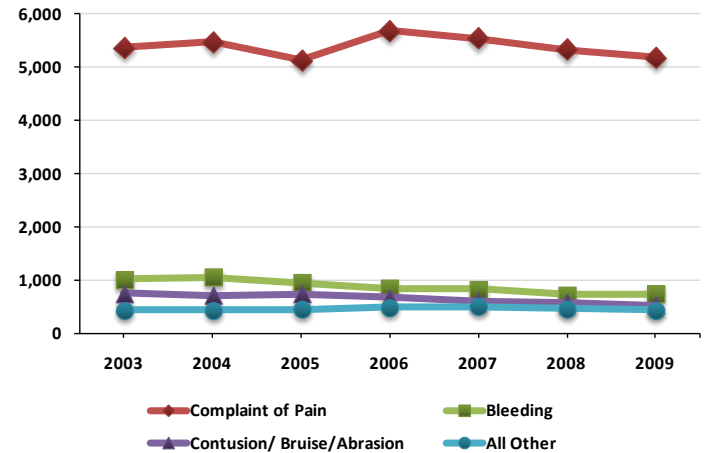
Figure 8 - Type of Physical Injury, Total



Over the seven-year period, there appears to be a movement downward in the number of injuries (see Figure 9) however Complaint of pain did see an increase at first, between 2003 and 2006 before that also saw a decline. It should be noted that during this seven-year period, more occupants were utilizing safety

equipment, especially in the second row. It is possible that the safety equipment use moved some occupants from more severe injury categories, to the complaint of pain category.

Figure 9 - Injury Severity, by Year



The location of these injuries was also recorded. The Neck was the location identified most often, at 3.3 percent (Figure 10), followed by the Head (2.5 percent) and Back (1.9 percent).

Figure 10 - Location of Most Severe Injuries, Total

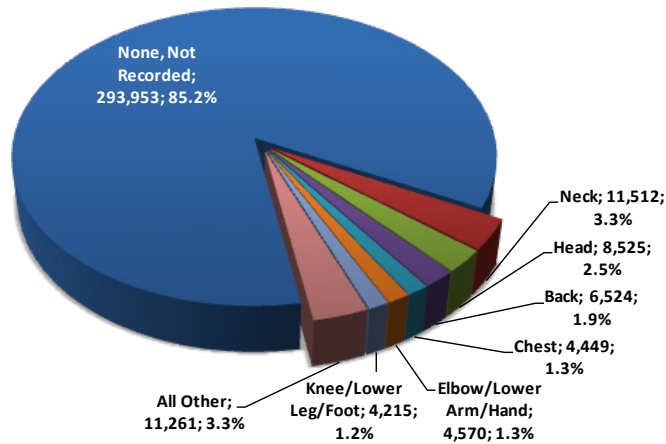
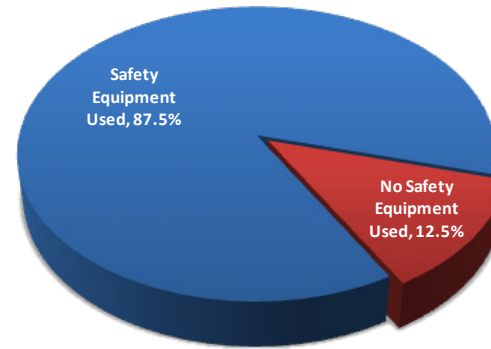


Figure 12 - Safety Equipment Used, Total



Use of Safety Equipment

There is an increasing (favorable) trend in the use of safety equipment, such as seat belts among occupants in crashes. The improvement is more pronounced for male occupants (Figure 11). Males have shown a lower rate of safety equipment use, and thus offer more room for improvement.

The New Jersey crash records contain data regarding safety equipment use for each occupant position for vehicles in crashes. Front row occupants had a higher rate of safety equipment use than did second row occupants. However, second row occupant seat belt use increased by a very sizable margin, from 77 percent in 2003 to 90 percent in 2009, nearly matching front row occupants (Figure 13).

Figure 11 - Safety Equipment Use, by Gender, by Year

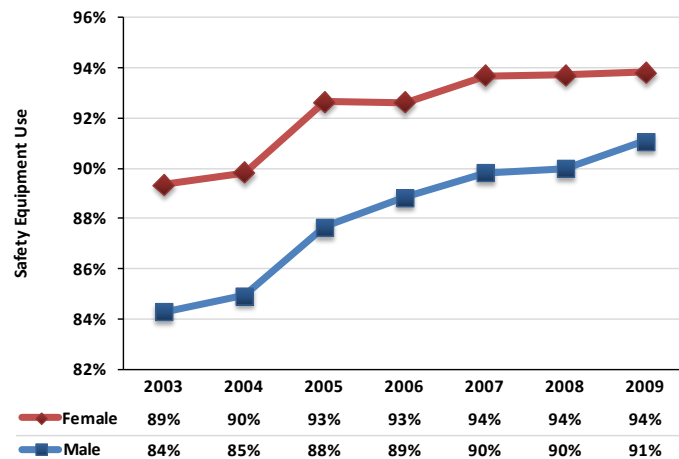
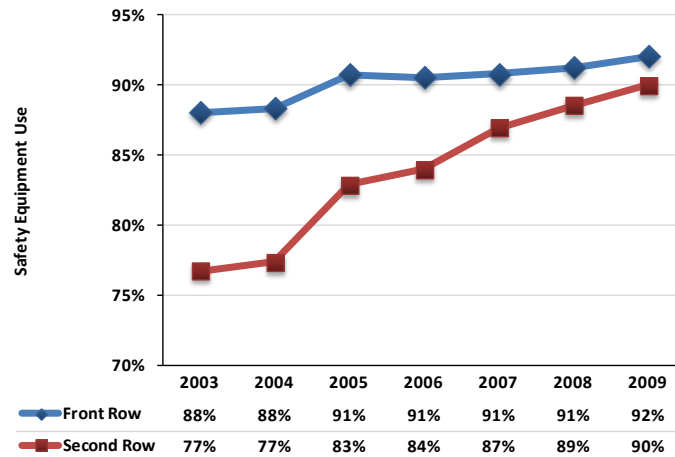


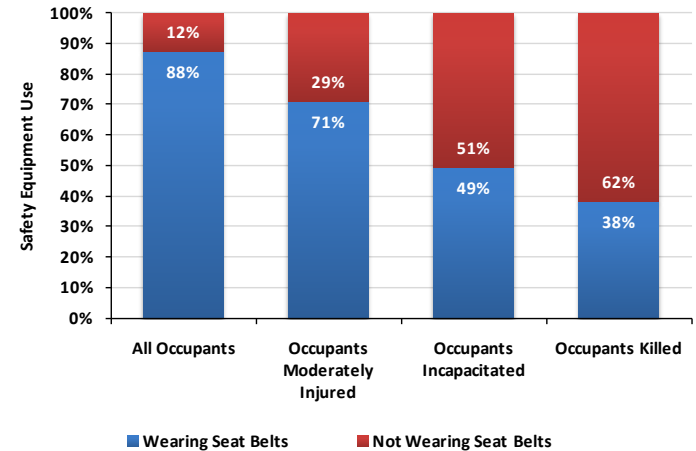
Figure 13 - Safety Equipment Use in Front v. Second Row, by Year



Use of Safety Equipment and Physical Condition:

This section attempts to identify the differences in occupant use of safety equipment and their recorded physical condition after a crash. Figure 14, below is very clear in showing the correlation between safety equipment use and physical condition after an accident. Occupants in crashes not wearing seat belts were only 12 percent of total occupants in crashes. However, occupants not wearing seat belts accounted for a much higher percentage of occupants injured or killed in crashes (Figure 14). Of occupants moderately injured, 29 percent were not wearing seat belts. This trend is even more pronounced as injuries get more severe, as 51 percent of occupants incapacitated didn't wear a seat belt, and a staggering 62 percent of occupants who are killed in crashes did not wear a seat belt. This relationship between seat belt use and injury severity is a clear argument for all occupants to wear a seat belt.

Figure 14 - Percent of Safety Equipment Use, by Injury Condition, Total



Use of Safety Equipment and Vehicle Ejection:

One of the functions of safety equipment is to prevent occupant ejection from the vehicle. This section looks at the relationship between safety equipment use and vehicle ejection. One reason that occupants avoid safety equipment is a fear of being trapped during a crash. There were more restrained occupants trapped in their vehicle during a crash; however, there are far more seat belt users than non-users. Figure 15 shows that unrestrained occupants have a much greater chance of being trapped in their vehicle during a crash.

Although unrestrained occupants represent only 13 percent of all occupants, they represent 94 percent of all occupants ejected, 68 percent of occupants partially ejected, and 25 percent of occupants trapped in their vehicle (Figure 15).

Figure 15 - Percent of Safety Equipment Use, by Ejection Status, Total

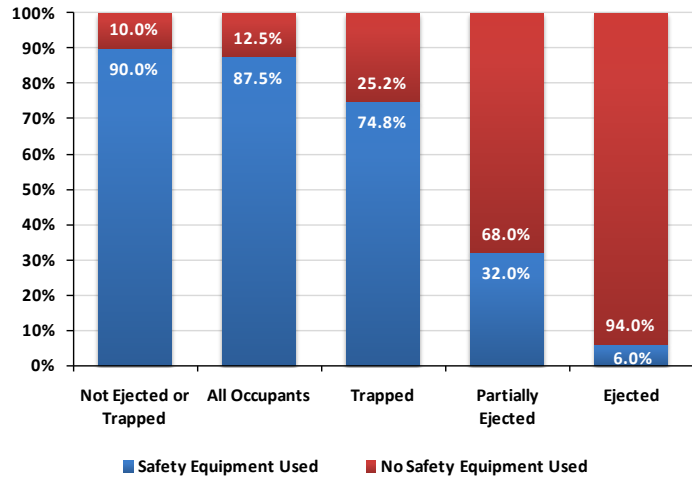
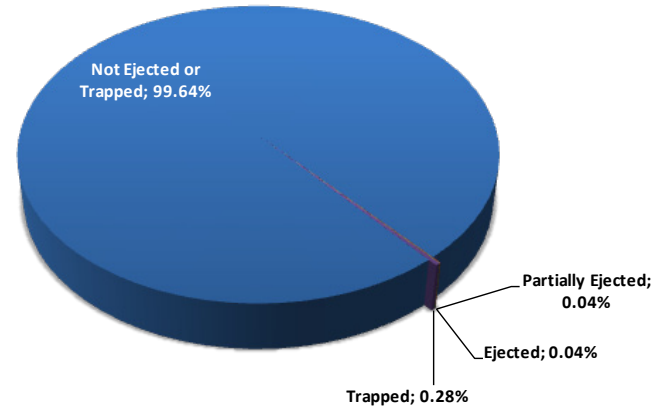


Figure 16 - Ejection Status Where Safety Equipment was Used, Total



The next Figure also demonstrates this relationship. Figure 16 shows what happened to occupants in South Jersey crashes during the seven-year period who wore proper safety equipment. Occupants who were properly restrained were only trapped, ejected or partially ejected 0.36 percent of the time. Figure 17 shows what happened to occupants who were not restrained, and nearly 8 percent were trapped, ejected, or partially ejected. Compared to 0.36 percent when properly restrained, this number is staggering.

Figure 17 - Ejection Status Where No Safety Equipment was Used

