An Analysis of Vehicle - Vehicle Collisions

by Colin den Ronden

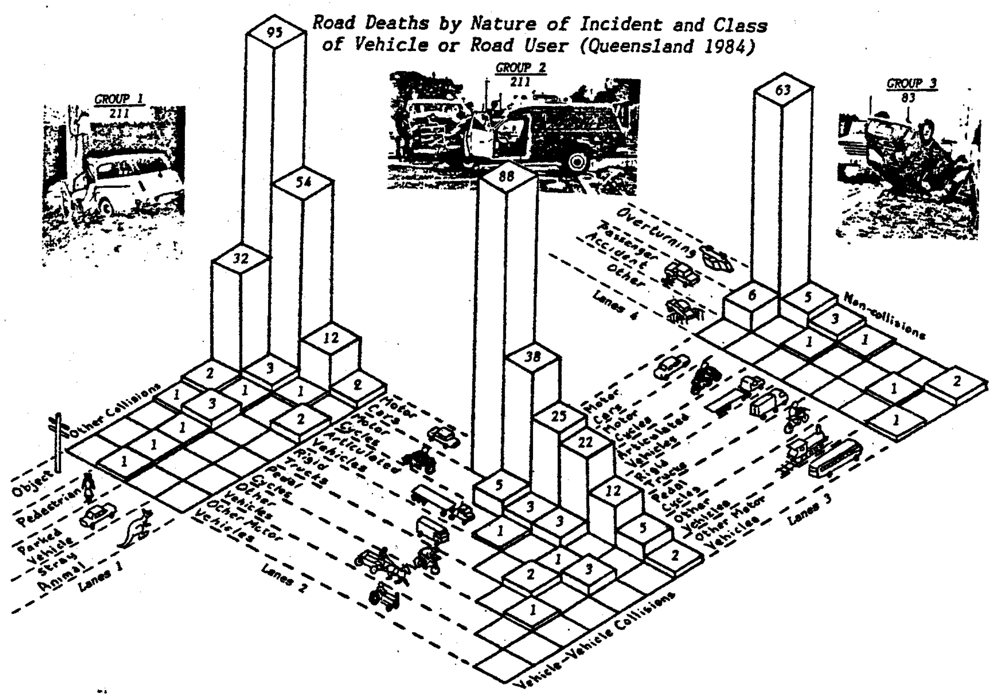

FIGURE 1

Road Deaths by Nature of Incident and Class of Vehicle or Road User (Queensland 1984)

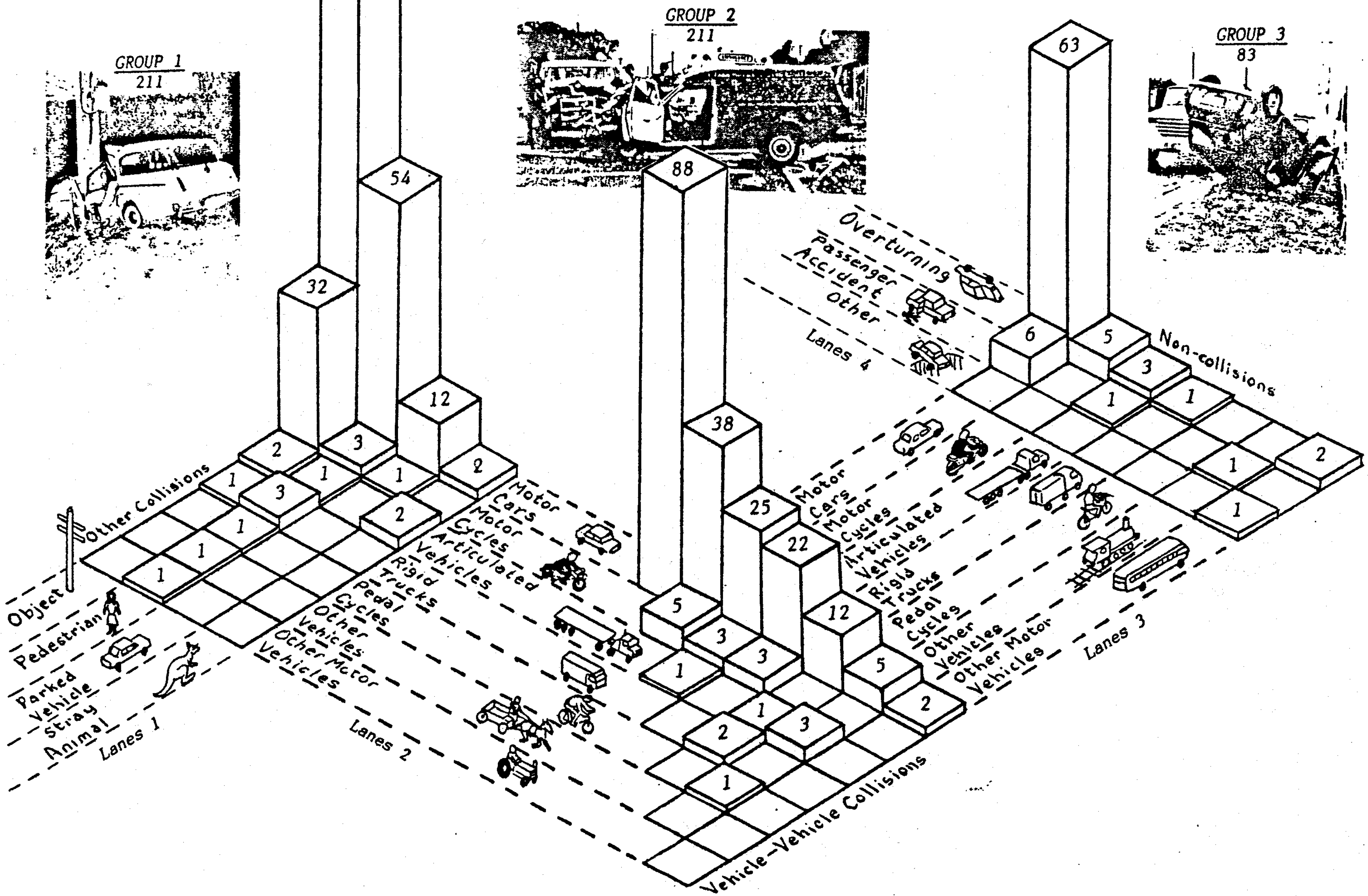

Fig. 1

An Analysis of Vehicle-Vehicle Collisions

by C.W. den Ronden B.A.

Figure 1 is a graph showing how many people died on Queensland roads in 1984 and how they died. This paper will deal with the central portion of the graph, the vehicle-vehicle collisions. The most conspicuous part of this section of the graph is the number of people killed in collisions between motorcars and other motorcars. Intuitively, one would expect this to be higher than other types of collisions because there are more of these types of vehicles on the road. However, one could also ask if it is as high as to be expected given the traffic flux, or whether or not it diverges from these expectations due to other factors besides the traffic flux. Consider for example the fact that a large percentage of road smashes are the result of drunk driving. One would expect that most of this activity happens during a driver's leisure time, and as such it would happen mostly whilst a driver was using his own private vehicle, his motorcar. One could deduce from this that collisions involving motorcars would be much higher than can be accounted for by traffic flux, and that people driving heavier vehicles tend to do so for their occupation and are less likely to be intoxicated. However, counter to this argument are the allegations often made that many truck drivers use drugs to allow them to stay on the road for longer periods, and that this use of drugs is reflected in their driving. There are also arguments that various types of road users behave differently behind the wheel, e.g. that truck drivers bully other drivers in taking right of way and so on. Hence, this paper will examine the statistics to see whether or not there are significant differences between the different types of road user.

FIGURE 2

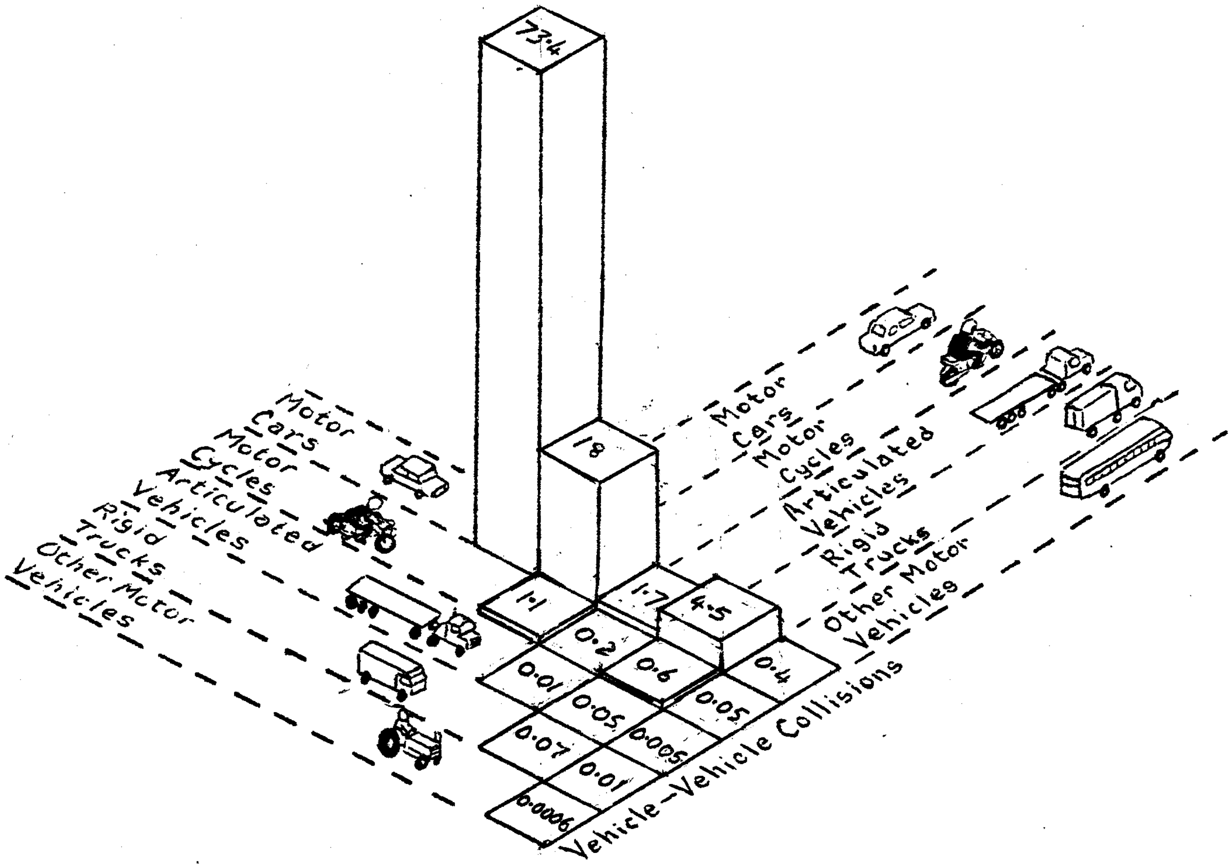

Fig. 2: Expected probability of number of collisions - %

Fig. 2 is a graph of the expected collision ratios between different types of vehicles, expressed in percentages. Factors used to determine these ratios were the average kilometres travelled per year for that type of vehicle, and the numbers registered of that type of vehicle. Motor cars accounted for most of the kilometerage done on the roads, and were expected to account for 73% of all vehicle-vehicle collisions.

FIGURE 3

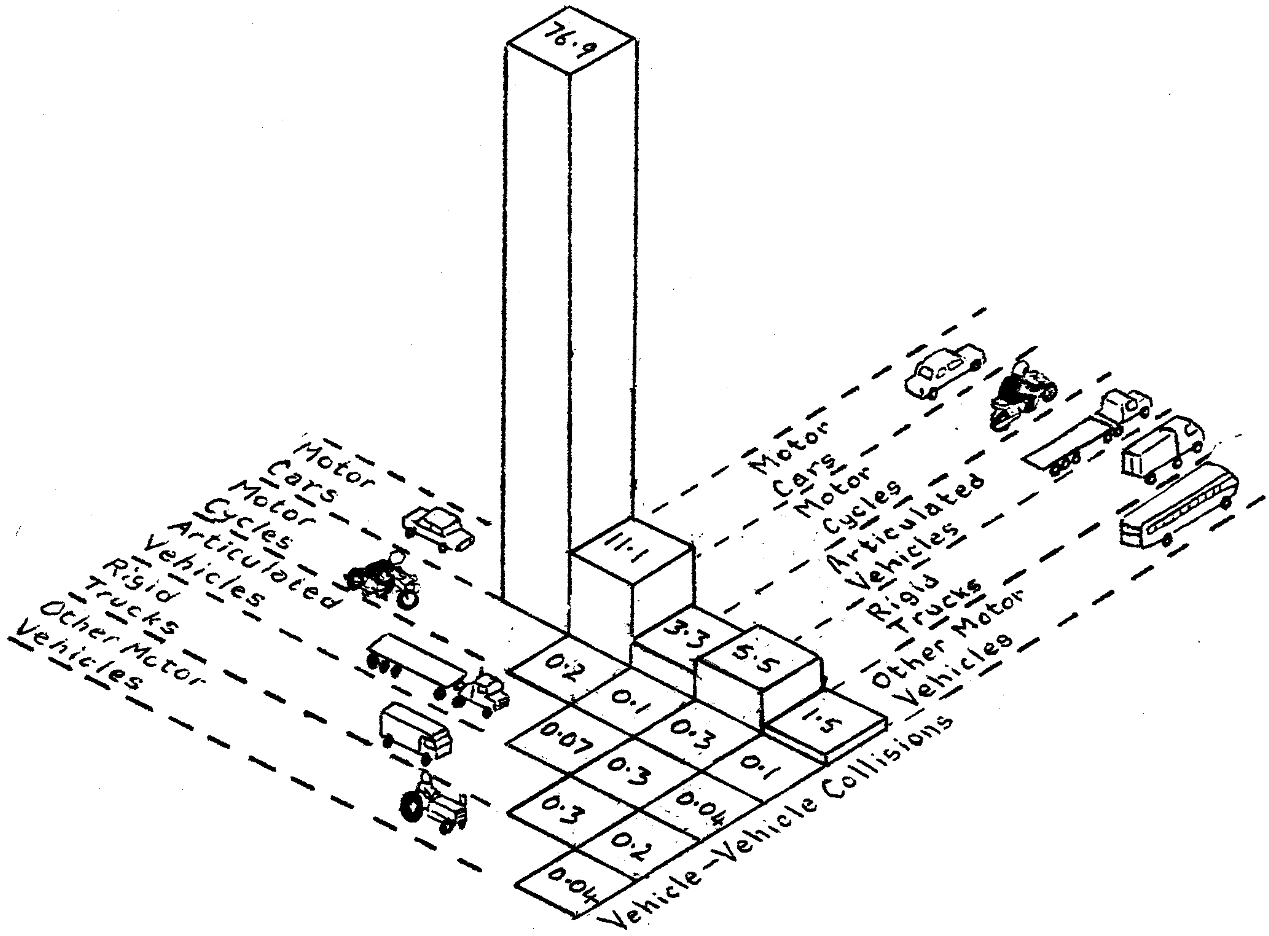

Fig. 3: Actual number of collisions - %

Fig. 3 shows the actual number of vehicle-vehicle collisions, expressed as a percentage of the whole. Motorcars accounted for nearly 77% of the collisions, and this does not appear to be too great a deviation from the expected rate, all things being equal. However, Fig. 3 does not show casualty or death rates, it includes those collisions where no injuries occurred. In trying to identify factors which will lead to a reduction in the road toll these are matters which require our attention.

FIGURE 4

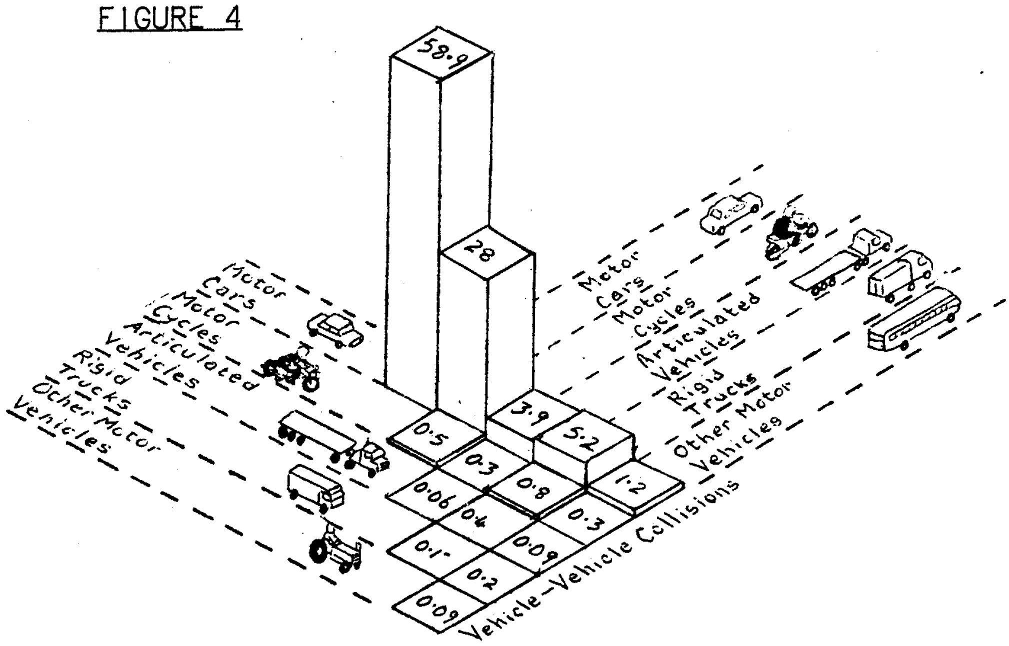

Fig. 4: Number of collisions causing casualties - %

Fig. 4 shows the number of collisions causing casualties expressed as a percentage of the whole. At this point the structure of the vehicles, as opposed to the other factors, takes on a greater significance.

FIGURE 5

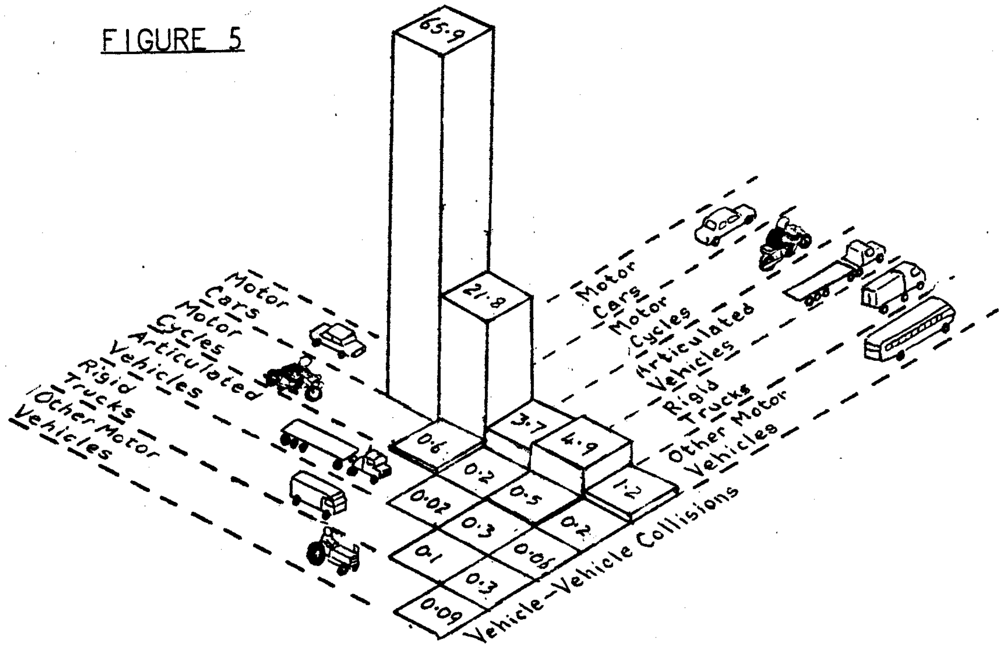

Fig. 5: Number of persons injured - %

Fig. 5 shows the number of persons injured in vehicle-vehicle collisions expressed as a percentage of the whole. Figures on total casualties are often more relevant than figures on collisions causing casualties as the main aim of road safety authorities is to reduce the total number of casualties, the significance of total number of collisions is how they affect this. Figures on collisions causing fatalities often reflect the economics of motoring. For example, looking at the Queensland road toll over a long period, more passengers than drivers were killed each year between 1950 and 1959, but after 1961 this trend was reversed. It would appear that more people were able to afford their own vehicle to drive and thus the ratio of passengers to drivers changed, although deaths in each group still kept rising.

FIGURE 6

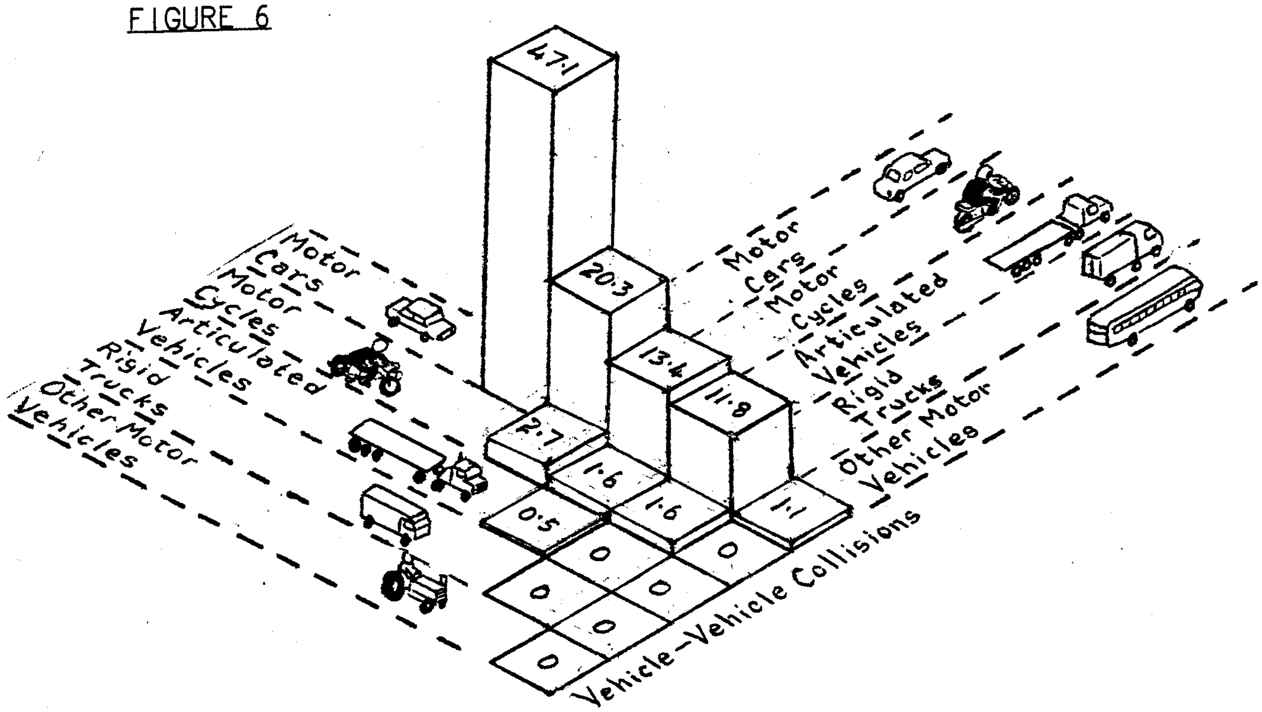

Fig. 6: Number of persons killed - %

Fig. 6 relates directly to the central portion of Fig. 1 which shows the total number of people killed on Queensland roads in vehicle-vehicle collisions in 1984. Fig. 6 expresses these figures as percentages of people killed in vehicle-vehicle collisions.

These graphs show that, as is to be expected, collisions with heavy vehicles result in a greater amount of damage to persons. The most striking example is that of vehicles colliding with articulated vehicles.

Whereas motor car-articulated vehicles account for over 3% of collisions, they are responsible for over 13% of deaths. Articulated vehicles were involved in nearly 4% of all vehicle-vehicle collisions in 1984, but were responsible for over 15½% of the deaths in this type of collision. In contrast, 77% of all vehicle-vehicle collisions were between motorcars alone, but these only accounted for 47% of deaths. Hence, there is more of an onus on articulated vehicle drivers to drive safely, as their machines are more lethal than others. However, this is no cause for complacency on the behalf of motorcar drivers, as their vehicles tend to be used in leisure activities, and too often the consumption of alcohol tends to be included in such activities. Motorcyclists were involved in nearly 12% of collisions, but accounted for 23% of deaths. One would expect a higher death rate because of their lower visibility and because motorcyclists have less protection for the rider than for drivers of other types of vehicles. Motorcyclists must become more aware of the dangers they face, and other drivers must become more aware of the presence of motorcyclists on the road, and their vulnerability.

The comparisons between Fig. 2 and Fig. 3 show little difference between the actual number of collisions and the expected probability of collisions, based on traffic flux only. (Given that collisions are partly a function of traffic flux, it also draws our attention to other types of collisions in Fig. I, and how these can be reduced - e.g. town planners could make more separation of pedestrian flux from vehicle flux.) However, if one were to look at leisure use and include drunk driving as a factor, one would expect those vehicles used in commercial activities to have a lower actual collision rate. Fig. 3 shows the actual collision rate to be higher. One must ask the question; is their driving behaviour evincing no more sense of responsibility when they are employed to drive than when they are not driving for occupational purposes? Are they taking the same attitudes onto the roads, and how much drink driving is done during working hours? Commercial vehicles, because they tend to have a greater load, are more lethal than private vehicles in a collision. More research needs to be done, and possibly greater regulatory activities, in this area.