

USING THE OBSERVER FOR ERGONOMICS RESEARCH

In many countries concern has been growing over the lack of safety for pedestrians when crossing the road. In fact, each year around 50,000 pedestrians are killed or injured in Great Britain alone. Half of these accidents occur on main roads in urban areas and since this accounts for only 10 per cent of the road network, it is appropriate to focus much of the effort to improve pedestrian safety on these roads.

In Great Britain, the Department of Transport has commissioned Halcrow Fox to investigate and test measures that could improve the safety of pedestrians within these areas. This includes giving greater priority to pedestrians at signalized junctions, increasing the visibility of pedestrians to drivers and providing safer crossing points. The effect of these measures would be tested by comparing safety before and after implementation. This is discussed in the following section.

MONITORING METHODS

The effects of changes in safety are usually assessed by comparing the number of accidents that occur during three year periods both before and after the scheme is put in place. Using this method, any measure that has a detrimental effect on safety can only be identified after a considerable period of time has elapsed, possibly resulting in an unacceptable amount of damage and injury. In the same way, it takes time to identify any successful measure, such that its wider application to other locations would be delayed.



Previous research (1) has shown that certain types of pedestrian behavior are associated with a greater level of risk and hence accidents. The relationship between the two is not precise and so any changes in specific types of behavior, e.g. red light violations, can only be indicative of the likely safety benefits. Behavioral-based methods are still appropriate because they can identify those measures that are likely to be successful and those that are not. They can also determine those measures that appear to be very beneficial and hence could be promoted for wider application and full scale trials.

BEHAVIORAL ANALYSIS

A number of locations were selected where changes in layout or signal timings were to be undertaken. A video camera was placed in a building overlooking the site and the scene videotaped, both before and after the measures were implemented. The tapes were then coded with a vertical-interval time code (VITC) for use with the Video Tape Analysis (VTA) System.

It was essential to have accurate timings because the analysis considered the interaction of three factors.

These were:

- pedestrians,
- traffic signals, and
- vehicles.

Pedestrians were divided into five categories (adult, elderly, mobility impaired and accompanied and unaccompanied children) so that the differential effects of the measures could be determined. For each pedestrian, the time they reached the kerf, started to cross the road and finished crossing the road were recorded. This provided estimates of kerfside delay and crossing time.

Only vehicles who appeared to contravene traffic regulations, e.g. continuing when the traffic signals were red, were scored with The Observer. Data were not collected for all vehicles, because the additional data collection costs were not warranted. After the data were collected analysis was performed. Simple analysis included identifying the proportion of pedestrians using the crossing. The nested analysis tool was particularly important. This allowed the number of pedestrians crossing when the signals were green to traffic, before and after implementation of the measures, to be identified.

Data collected from sources other than video could also be combined with The Observer data. The speed of vehicles is often recorded by placing rubber tubes across the road. This records the time (to the nearest second), vehicle type and speed and is outputted in the form of ASCII text. The timing from The Observer's Video Tape Analysis system and speed data output were synchronized and the two data sets merged. The data could be used to investigate whether drivers adjust their speed when pedestrians were waiting to cross the road and whether pedestrians adjust their decisions to cross based on the approach speed of vehicles.

CONCLUSIONS

Behavioral-based investigations have been shown to be an important short term way of monitoring safety. With these methods, the development of cost-effective data collection and analysis tools are required. The Observer was shown to perform well in this respect and assisted in identifying those measures that would be appropriate for further implementation.

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