CPTED Principles for Traffic Safety

In: https://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=1344598 pp. 41-43.

Prof. Dr. Ferenc IRK
Director of the National Institute of Criminology Budapest/Hungary
E-mail: irk@okri.hu

Abstract

Research on the spots where the rate of accidents is the highest as well as research on conflicts clearly supports the earlier assumption that there are places and times where and when human faults are not the exception but many of the people or often most of them behave in a way that goes against the expectations. On these occasions it is only the difference of the path of the vehicles and the time, which is a random factor concerning the participants, that decides whether the human fault will result in an accident or not.

The suitable traffic environment plays a role not only in reducing the number of human faults but also in helping other participants (e.g. those who have the right of way) in the traffic to notice them in due time so that they can do something to prevent an accident. That is main the reason why defensible space and – considering the characteristics of traffic – defensible corridors are necessary.

The purpose of this presentation, with regard to the above, is to summarise those human characteristics (e.g. the fact that stimuli lead to certain actions, priorities are made subjective and the role of optical leading) that should be taken into consideration when designing successful urban environment design principles.

1. Introduction

In the last century a lot of efforts were made in order to reduce the number of traffic accidents as well as the number of crimes. In the beginning, most of these efforts were focused on the person who had broken a rule and were mostly grounded in the belief that strict punishments could change human behaviour. These ideas are still present in contemporary political and everyday thinking occasionally although they clearly proved to be wrong. In the second half of the 20th century, however, victims started to receive more attention. In the past two decades the measures whose purpose was to diminish the fear among the public and at the same time to increase people's sense of security have become more important. The neighbourhood watch movement or the increasing use of CCTV systems and other steps relying on CPTED standards, guidelines and principles were aimed at deterring potential perpetrators and increasing the sense of security among the public at the same time.

Research on the prevention of traffic accidents – and of the crimes related to accidents, caused mainly by negligence - came to the conclusion relatively soon that it is necessary that the system of 3 Es (Education, Engineering, Enforcement) should prevail besides the knowledge of the basic traffic law regulations. Experts made considerable efforts in order to help prevent human faults or at least to mitigate their outcome partly through increasing the safety of the vehicles, partly through optimising the environmental factors.

2. Special safety problems for Central European Countries

In Hungary, just as in the other Central European countries that are scheduled to join the European Union on 1 May 2004, the safety of traffic does not reach the level of West European countries, let alone that of the countries of Northern Europe. Approximately two thirds of the accidents involving injuries take place in residential areas. The same proportion holds true for accidents with serious casualties. Four fifths of the accidents involving minor injuries also take place in residential areas. Hover, more than half of the accidents in which people are killed take place outside residential areas.

These accidents do not only cause harm because people die and suffer injuries but also because life is paralysed around the sites of the accidents, it becomes impossible to plan the movement of people and goods. They often result in hold-ups with twenty-thirty kilometre long lines of vehicles in the vicinity of cities. If we look at the causes we often find that a second's lapse by one participant in the traffic results in a limitation on the movement of several thousand people and vehicles.

In the cities there are certain places and sections of roads where accidents never or hardly ever take place (especially accidents involving injuries). In other areas, sections and intersections, however, there are frequent accidents resulting in congestions paralysing traffic in a huge area. Examining the causes we can see that the cause of chaos in these places is usually an error by some of the drivers or even by most of them in assessing the opportunities for making a progress in the traffic. This is a sign that the environment does not help the people in making the right decisions (i. e. decisions that are adequate to the situation).

Research on the spots where the rate of accidents is the highest as well as research on conflicts clearly supports the earlier assumption that there are places and times where and when human faults are not the exception but many of the people or often most of them behave in a way that goes against the expectations. On these occasions it is only the difference of the path of the vehicles and the time, which is a random factor concerning the participants, that decides whether the human fault will result in an accident or not.

3. Theoretical backgrounds

A consequence of this is the expectation, which originated several decades ago, that the traffic environment should be made suitable for the people and not the other way around. This realisation brought about several positive results, ranging from measures to organise traffic to a definition of the speed-related provision of the so-called visibility triangle.

Several theories have been born concerning what causes wrong decisions and actions inadequate to the situation in high numbers. It is especially worth noting Kurt Lewin's field-theory. The representatives of this school of thought claim that people make decisions after assessing the attraction of their goal and the obstacles in the way of reaching that goal. The more attraction the goal has for one, the more inclined one is to overcome the different obstacles. It is questionable, however, how well the real size of these obstacles and the mental picture one has of them corresponds to each other. Sometimes it happens that the goal has such an attraction that one underestimates or does not even notice the obstacles in the way. In other times the effect is the opposite: the obstacle diverts one from one's original intentions. As a result one either completely abandons one's original goal or chooses a different path to reach the goal.

The design of the environment may provide important help for one to assess the obstacles realistically, to make a decision accordingly and to carry out the action following the decision accordingly. The horizontal and vertical sign system of road traffic, the rules and the guidelines regulating the position of the signs were made in view of these considerations – at least in theory. Their aim is to help to make decisions and choose actions that are adequate to the situation. In the practical application, however, these principles often do not prevail.

The traffic environment must sometimes show the danger greater as it actually is so that as many participants in traffic as possible would comply with the regulations. The often exaggerated readiness to take risks in traffic can be lessened if the people who tend to take higher risks go through an experience, which results in a change in their formerly performance oriented attitude in a direction towards safety. Often, however, the opposite takes place: the traffic environment suggests a greater safety for the drivers than the actual and thereby it encourages them to break the traffic rules.

4. How to influence speeding?

Speed plays an essential role in safety. Therefore in several countries there is a long tradition of using the environment – besides the rules of law - as an instrument to make the drivers choose a safe speed. In many countries special methods for slowing down the speed of vehicles are used near pedestrian crossings, bicycle roads and their crossroads.

The suitable traffic environment plays a role not only in reducing the number of human faults but also in helping other participants (e.g. those who have the right of way) in the traffic to notice them in due time so that they can do something to prevent an accident. That is main the reason why defensible space and – considering the characteristics of traffic – defensible corridors are necessary.

The conditions for a safe environment are different in urban, usually built-up areas and outside residential areas. Increasing traffic safety and general security often require similar interventions based on CPTED-principles.

The preparation of CPTED guidelines is part of situation-oriented accident prevention. In several countries Traffic Investigation Teams, working independently but at the same time as the police, study not only the people and the vehicles when looking for the causes of an accident but the environment as well. In each case they examine the possible changes in the environment that could prevent similar accidents in the future. It is especially true in connection with areas where accidents happen frequently.

5. Joint tasks in the future

There is a need for uniform traffic safety CPTED guidelines for all over Europe based on the experience of the countries where the safety of the environment is the highest. First of all the following areas deserve special attention:

1. The beginning of residential areas in order to achieve a fast change in the drivers' attitude.
2. a) Reducing the impact of driving on optically "straight roads", which tends to make drivers keep or increase their speed.
2. b) Intersections in general.
2. c) Pedestrian crossings – narrowing the road, reducing speed and visibility.
2. d) The areas near traffic lights – also paying attention to the times when the lights are switched off.
2. e) The safety of the environment of bus stops.
2. f) The safety of tram lines, train and tram crossings.
3. The safety of pedestrian areas.

There is a need for collecting and publishing the best instruments and methods in Europe and for a uniform stance on the basis of these because the modern principles of regulation do not prevail in the EU, let alone in the

countries scheduled to join it. (Let me note in order to avoid misunderstanding that these principles are not the same as the minimal requirements and regulations included in different international protocols but they exceed them substantially.) Their common characteristic feature is that they are not regulations imposed on the participants of traffic, sometimes checked and failure to comply with them penalised. They are instruments and methods that regard the typical mistakes of the participants in the traffic as natural and are aimed at preventing the consequences of these mistakes. There is a need for instruments and methods that prevent these mistakes from happening on the one hand and make it possible to prevent the serious consequences of these mistakes.

The purpose of this presentation, with regard to the above, is to summarise those human characteristics (e.g. the fact that stimuli lead to certain actions, priorities are made subjective and the role of optical leading) that should be taken into consideration when designing successful urban environment design principles. There is an urgent need for this also because in the countries that are to join the European Union in the next few years the renovation of thousands of blocks in housing estate prefabricated in Soviet factories between 1960 and 1980 will be started. It makes a difference whether only the fixtures and the heat insulation will be modernised or security and the sense of security will also be improved around these buildings on the basis of CPTED guidelines.

When housing estates are reconstructed the guidelines, the instruments and the methods serving the purpose of crime prevention and traffic safety are to be defined together. Human safety and the safety of property in public areas can be increased by making orientation in mobile and stationary traffic easier. The basic principles of this are yet to be worked out. Special attention has to be paid to ensure that the instruments aimed at increasing public safety and traffic safety (e.g. roadside facilities, trees, lighting as well as the instruments and areas protecting the pedestrians) should not mutually destroy each other’s impact.