Dago ANTOV
"Stratum"
Tallinn

STATE OF THE ART OF THE USE OF TRAFFIC CONFLICTS TECHNIQUES AND OTHER PRE-ACCIDENT CRITERIA IN THE SOVIET UNION, ESPECIALLY IN THE BALTIC REPUBLICS.

1. Traffic accidents statistics

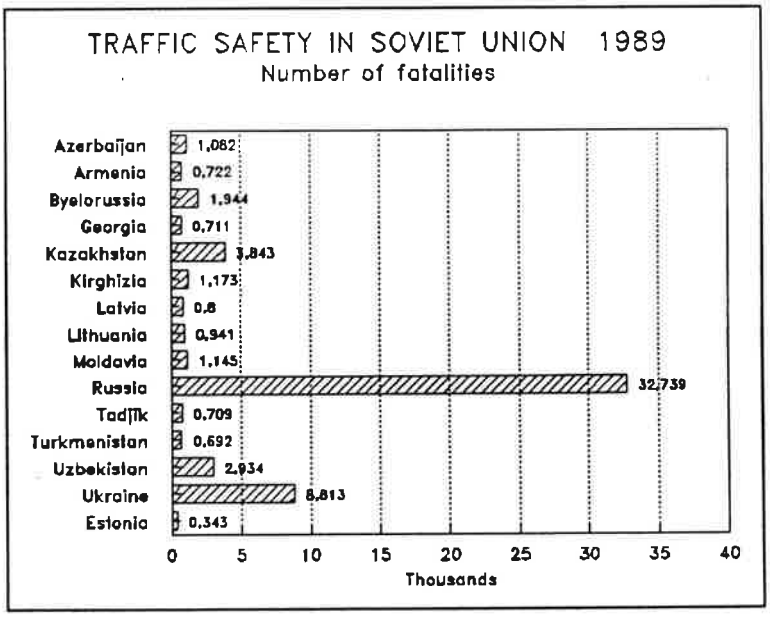
Traffic accidents, taking place on our roads, highways and streets are considered to be the main and formally the only one criteria of traffic safety in the Soviet Union. Traffic accident statistics is carried and maintained by the local departments of Traffic Police. Differently from some western states, it is obligatory for the person who was involved into an accident to inform the police. For example, to get compensation from insurance company, you might need the formal traffic accident registration paper from Traffic Police Department. As a result, about 96% of all traffic accidents has been registered by the police. That means that mostly even slight accidents have been registered, and all the serious and fatal accidents. In principle it is probable a good way to have a very good statistics of traffic accidents.

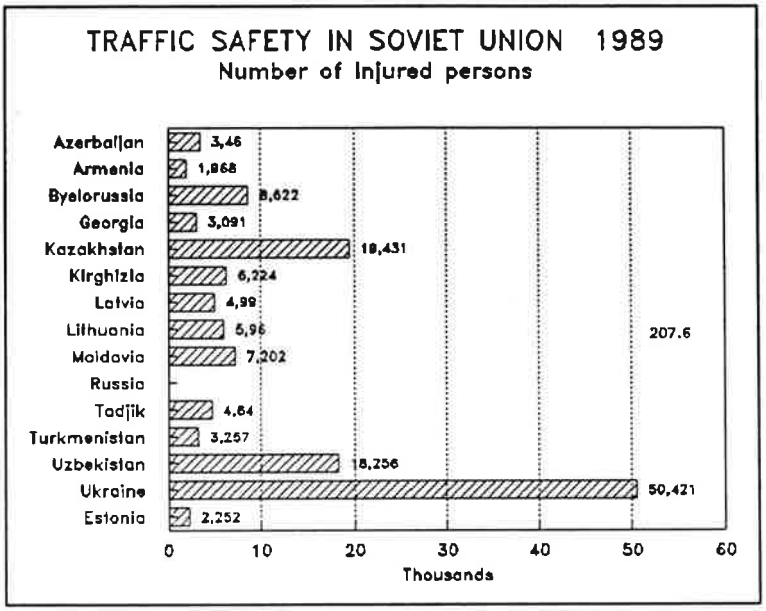
Actually the situation is a little different. By our appraisal some 25% of the traffic accident registration cards have been filled incompletely and 7% of them is impossible to use for traffic safety analysis because of the lack of some general information, like place or date.

Almost all local police departments handle the accident statistics without using any special equipment like computers. Tallinn Traffic Police Department had a computer to handle its yearly statistics only in the last year. Officials, therefore, can prepare only some general information about traffic accidents and the deeper analysis of causality, influencing factors etc. has been left for the future.

One more essential fact have to be taken into consideration. The general accident statistics (number of accidents, killed and injured persons) was secret in the USSR and was available only for some special officials. It has been available only in Estonia. Only 1989 accident data about the Soviet Union has now been issued. That makes now possible to compare data. The number of motor vehicles (especially heavy vehicles) was secret, too, therefore it was impossible to compare the republics, using relative data. Last political changes have caused here change as well.


TRAFFIC SAFETY IN SOVIET UNION 1989
Number of traffic accidents
Azerbaijan
Armenia
Byelorussia
Georgia
Kazakhstan
Kirghizia
Latvia
Lithuania
Moldavia
Russia
Tadjik
Turkmenistan
Uzbekistan
Ukraine
Estonia
3,159
1,883
8,478
2,613
17,736
5,471
4,601
5,481
6,433
190.0
4,059
2,986
16,859
47,856
1,956
0
10
20
30
40
50
60
Thousands


TRAFFIC SAFETY IN SOVIET UNION 1989
Number of fatalities
Azerbaijan
Armenia
Byelorussia
Georgia
Kazakhstan
Kirghizia
Latvia
Lithuania
Moldavia
Russia
Tadjik
Turkmenistan
Uzbekistan
Ukraine
Estonia
1,082
0,722
1,944
0,711
3,843
1,173
0,8
0,941
1,145
32,739
0,709
0,692
2,934
8,813
0,343
0
5
10
15
20
25
30
35
40
Thousands


TRAFFIC SAFETY IN SOVIET UNION 1989
Number of injured persons
Azerbaijan
Armenia
Byelorussia
Georgia
Kazakhstan
Kirghizia
Latvia
Lithuania
Moldavia
Russia
Tadjik
Turkmenistan
Uzbekistan
Ukraine
Estonia
3,46
1,868
8,622
3,091
18,431
6,224
4,99
5,96
7,202
207.6
4,64
3,257
18,256
50,421
2,252
0
10
20
30
40
50
60
Thousands


TRAFFIC SAFETY IN SOVIET UNION 1989
Azerbaijan
Armenia
Byelorussia
Georgia
Kazakhstan
Kirghizia
Latvia
Lithuania
Moldavia
Russia
Tadjik
Turkmenistan
Uzbekistan
Ukraine
Estonia
0,16
5,65
0,22
4,21
0,2
6,14
0,14
2,04
0,24
6,57
0,29
9,16
0,31
3,71
0,26
2,72
0,28
8,72
0,23
5,08
0,16
4,92
0,22
5,03
0,16
4,53
0,17
3,77
0,23
2,06
0,4
0,3
0,2
0,1
0
2
4
6
8
10
12
FATALITIES/1000 INH
FATALITIES/1000 CARS

2. Indirect safety measures in the USSR.

Partly because of reasons mentioned above, partly by wishing to compare the development of traffic safety in the different republics, some indirect safety measures have been used.

Traffic police is responsible for the practical part of traffic management in the Soviet Union. In addition to traffic accident statistics, police is engaged with traffic control, street and road design (all solutions must be coordinated with the traffic police), traffic safety campaigns etc. Consequently, traffic police has a main role in traffic and transportation policies in the Soviet Union and its influence is obvious.

There are some special road and street design institutes, mainly in the big cities. Their main task is to design and plan roads, streets and junctions. Any sort of research is very rare on this level. Only on the level of designing general plans for whole towns are there sometimes some specialists engaged in order to advise and to carry out some transportation research.

Scientific and technical research has been realized mostly at universities and research institutes, where some engineers have found the possibility to carry out long-term projects and to follow the development of traffic research abroad. That system of research has caused at the same time a split between the results of the research projects and practical traffic policies. As a result, a large part of the results of research projects have not been introduced in practice, only a small part of them has been accepted by officials.

Several indirect safety measures were introduced in the Soviet Union before the traffic conflicts technique (TCT) became known.

The method of the road safety coefficients, developed by the Automobile and Road Institute (MADI) in Moscow, had become known in the USSR. The different factors of the design elements have been estimated by coefficients, which have been determined on the basis of road accident statistics. Thus a summary coefficient is been calculated, which is believed to characterize the potential traffic safety value.

The method of safe speed coefficients that is basically similar, has been used as well. The speed coefficient could be calculated as a ratio of actual speed to designed, theoretically calculated speed. The ratio 0.6 has been stated as the limit between safe and unsafe traffic conditions.

For the intersections, (mostly non-signalized) there has been introduced the conflict point method, which is well-known in different countries and in different variations. The manoeuvres: like crossing (5 points), merging (3 points) and diverging (1 point) have been estimated. In some variations, the traffic flow characteristics has been considered, i.e. the angle between the conflicting flows.

3. Development of the traffic conflicts method in the USSR

The original paper of Harris and Perkins on traffic conflicts method became known in the Soviet Union at the seventies. Some projects were started based on their work to develop original and useful methods for safety evaluation. The first studies were carried out in 1979/1980 in the Tallinn Technical University in Estonia. Mainly criteria of Perkins and Harris were used (braking light indication). The author of this paper has been involved in this project. An extensive project, including conflict counts on 13 non-signalized intersections in Tallinn were carried out after that. A scale of seriousness and 12 types of interactions between conflicting vehicles/pedestrians were used. The criteria of a conflict were deceleration or change of direction, ie. a manoeuvre to avoid the collision, but indications were evaluated subjectively, using especially prepared staff. As results were encouraging, a rather good relationship was found between 10-hours conflict data and 3-years accident data, some projects were started using TCT as a tool for safety evaluation, for example TCT was used to evaluate the influence of street markings on safety in Tallinn. At the same time we tried to follow the TCT-s development abroad as much as possible. The TCT staff of the university kept as his main interest the area of urban non-signalized intersections.

In the early eighties some projects using traffic conflict techniques were started in Lithuania (led by professor Shestokas) and in the Automobile and Road Institute, Moscow.

The Lithuanian group (Institute of Civil Engineering, Vilnius) was mainly interested in rural areas and they further developed their own original criteria of so-called "transportation conflicts" by trying to make this method applicable for safety evaluation of rural roads. After the death of professor Shestokas, the work was slowed down and at present Raimondas Nasutavicius works on this area. He has been involved into evaluation of the pedestrians' safety on rural roads. The method of moving observation has been used by the Lithuanian group to indicate conflicts on the road.

At the same time some papers about TCT were published in Moscow. Some post-graduates used TCT in their theses, but there was no larger interest for the subject. The TCT has been strongly criticized by some leading professors in Moscow, mainly because of the subjective criteria and the indirect relationship between accidents and conflicts. In spite these, an active work has been carried out by V.Yeryomin and his group in the field of simulating traffic conflicts. He is trying to develop a traffic simulation model to estimate some conflict criteria and evaluate traffic safety using microcomputers.

There was a decision to join the efforts in the traffic conflicts technique area and to promote exchange of information by establishing a Supporting Group of ICTCT, an informal and independent organ, which is active on the basis of personal initiative and involves TCT-fans from Estonia, Lithuania and Moscow.