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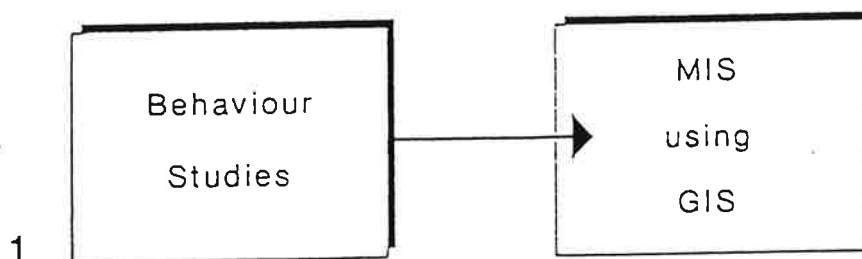
## TRAFFIC SAFETY AND THE USE OF G.I.S.- FACILITIES FOR BEHAVIOUR STUDIES

### 1. Background and problems

Behaviour studies of the road users have to be effectuated to carry out the work which is necessary for Traffic Safety Management. Interesting data in the results of these studies may be kept in a good order. The use of databases is for this purpose suitable.

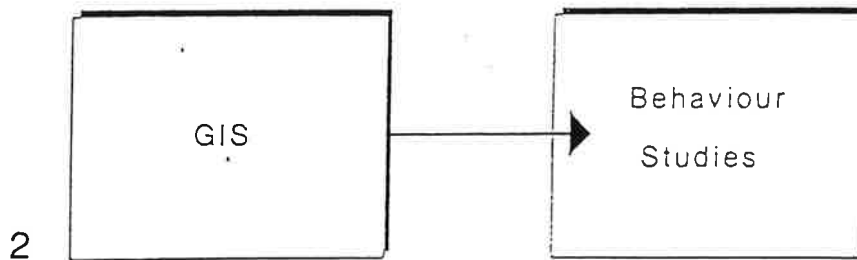
The best way of keeping data for road safety is to put the data in an Integrated Traffic Safety Management Information System (T.S. - M.I.S.) which possesses a relational database.

The connection of behaviour data and road traffic data is evident. Therefore it is of a great interest for scientific research to connect the results of behaviour studies with a Management Information System (M.I.S.) containing a large amount of road and traffic data. Only a Geographic Information System (G.I.S.) is now capable to contain and to handle the necessary information on road characteristics and traffic characteristics. In this view a M.I.S. on the Traffic Safety filed has to have the necessary G.I.S.-facilities. In the future data from behaviour studies should be kept in M.I.S. using G.I.S.-facilities (Fig. 1).



A Geographic Information System is on the other hand the most helpful instrument to deliver in a due time the basic information to carry out the work to be done for effectuating behaviour studies. In this view G.I.S.-facilities are useful for giving

information while setting up and executing behaviour research work on the roads (Fig. 2).



In Belgium, IBM and K.U. have signed in 1989 a contract for the use of the Graphic program Generator (G.P.G.) software of IBM in the environment of the super computer IBM 3090 existing in the University. The project with the duration of two years started in 1990.

The graphic system consisting of terminals and other peripheries has been installed at the Research Unit for Traffic Engineering and Infrastructure Planning. The aim of the project is to use the system on the field of Road Transport Management with a special accent on Road Safety Management.

## 2. Management information systems

Management Information Systems are made to use information (data and knowledge) for decision making.

Tasks of a M.I.S. are:

- to store data and knowledge (rule based expertise),
- to retrieve data and knowledge e.g. for calculations,
- to simulate solutions,
- to visualize the information.

The G.I.S.-facilities for the M.I.S. we need, concern:

- networks inside and outside urban areas;
- small and large size networks;
- links + nodes (intersections + transferia);
- private + public transport;
- vehicular + non-vehicular traffic;
- existing + new-systems for land transport;
- road characteristics influencing the capacity:
  - \* number and width of lanes

- \* curvatures, slopes, intersections
- \* traffic regulation equipment (block systems);
- traffic characteristics influencing the capacity:
  - \* composition of the traffic flow (% heavy vehicles)
  - \* speed, including the distribution of speed in a traffic flow
  - \* traffic distribution over the day, the week, the year;
- characteristics of the environment e.g. zones with traffic restriction;
- normal use and use with restrictions (road works, accidents, etc.);
- influence of the weather conditions;
- capacity change by changing the infrastructure characteristics and as a result of the application of automated systems influencing the traffic flow.

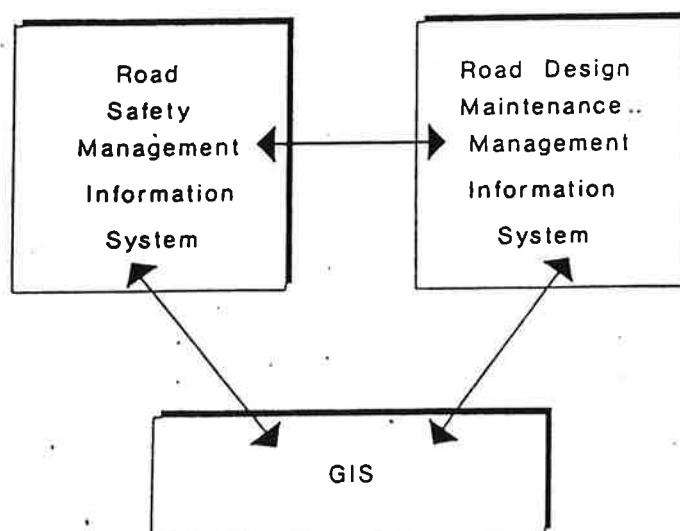
A modern Geographic Information System has also the possibilities of a M.I.S.. Therefore we can only use a G.I.S. since the normal M.I.S. functions can be executed with in a G.I.S. with more or less extended possibilities.

Using extended possibilities we can:

- make a model for traffic production and attraction,
- solve modal split problems,
- provide the traffic assignment work,
- evaluate the safety situation on a road segment which is characterized by the road type and the estimated traffic flow,
- determine the most hazardous connections between traffic centroids.

### 3. Towards collaboration between managers in the field of road transport

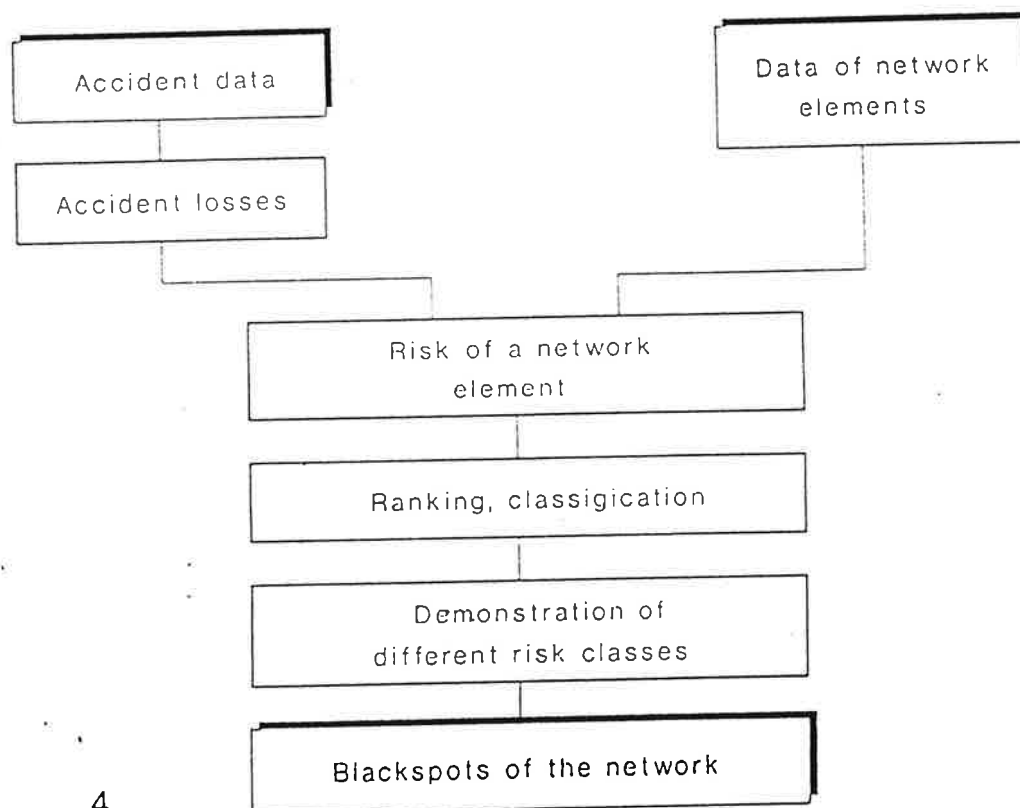
In order to realize a comprehensive management in the Road transport field, an efficient collaboration between several managers is necessary. Data and knowledge concerning traffic safety can not be brought together apart from data and knowledge concerning road design, road maintenance, road operations, etc. To bring all the necessary information together in an integrated system we can use a G.I.S. as a general system, sustaining at the same time a road safety M.I.S. and a Road Design, Road Maintenance M.I.S. (Fig. 3).



Managers should decide in a narrow collaboration which information on a road network, on the use of the network and on the environment has to be put in the system and how the system has to operate so that the treatment of Data and Knowledge as for short as for long term applications is user friendly. In order to create an integrated system, different management systems have to have the possibility to communicate with each other. Managers have to contribute to the realization of necessary interfaces in a cost effective way.

#### 4. Perspectives for improving behaviour studies

To achieve our aims of improving behaviour studies we have to keep in mind that road safety needs countermeasures on the infrastructure domain and on the traffic operation domain.



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Realizing countermeasures is not an isolated activity. Improving behaviour studies means at the moment a good organization of data and knowledge on large field of activities.

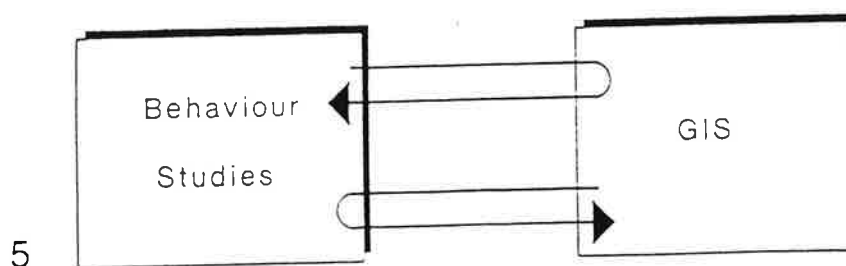
An overview of the general work done before more detailed studies on the behavioural

field can begin in some places (blackspots) is displayed in Figure 4. Given the blackspots are not known, we can find in a network the elements with the same characteristics (road, traffic, etc) and collect data on the behaviour field (conflict data) and in this way, if it is necessary, have more information to prevent accidents on suspect road elements.

## 5. Standardization needs

We need the standardization to assure the possibilities of interconnections (Fig. 5) and to make systems friendly to the users.

To realize the connection with the work done or to be done in the traffic behavioural field, the creation of a forum has to be realized. For the constitution of this forum the cooperation of existing organizations like ICTCT can be helpful.



## 6. Conclusions

The Graphic System - consisting of terminals and other peripheries - installed in the offices of different managers is not only a tool for describing infrastructural data and economic and demographic data but also a tool that can be used for analyzing behavioural activities of the road users on well defined parts of the road network. If the results of behavioural studies have been kept in an G.I.S., managers in different offices can use the behavioural information in an easy way. This may offer more possibilities for improving road safety.

## References

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