

**GENERAL DIRECTORATE OF HIGHWAYS**

**TRAFFIC SAFETY PROJECT**

**PROGRESS REPORT  
THE USE OF THE SWEDISH TRAFFIC  
CONFLICTS TECHNIQUE IN TURKEY  
(Including before and after studies in Pursaklar  
and a pilot study in Çankırı)**

July 2001



## **Foreword**

In 1999 the so-called traffic conflict technique was introduced in Turkey in connection with the ongoing Traffic Safety Project. In the spring of 1999, some seminars were held, training of 14 observers was performed, and before measurements were carried out at some locations on the Pilot Project roads.

The intention was that the technique should be used by the trained KGM staff in the coming years. This, however, has not been done yet.

In the spring of 2001, SweRoad's specialist, Dr. Lars Ekman, returned to Ankara to make some after studies and to give his final comments concerning the use of the technique in Turkey.

This short progress report, which is the last report concerning conflicts technique in the Traffic Safety Project, summarises the results and his findings.

We hope that the use of this technique will contribute to better traffic safety in Turkey.

The author of the report is Dr. Lars Ekman, SweRoad's specialist on the traffic conflicts technique.

Ankara, July 2001

Karl-Olov Hedman  
Team Leader

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Appendix A – CDBase 1.87. Conflict database program

Appendix B - Short manual for CDBasew.exe

Appendix C - The Swedish Traffic Conflict Technique Observer’s manual

## **1 Summary**

The purpose of this report is to describe the use of the Swedish traffic conflicts technique in Turkey and to present some before and after studies carried out on the Pilot Project roads.

## **2 Conflict studies in Turkey**

As part of the Traffic Safety Project, the Swedish traffic conflict technique has been introduced in Turkey. This was done at in the spring of 1999, when 14 persons were trained in the technique (see References). The course participants came from both Ankara and other regions. In addition, a seminar was held for a broader audience.

The technique is presented in previous reports. It offers unique possibilities to carry out quick studies on traffic safety problems at specific locations. The technique is especially suitable for intersections with documented high traffic safety problems.

The intention was that the technique should be used in practice after initial training and introduction. Unfortunately, no studies have been carried out since 1999. There are several reasons for this. One is that the trained observers mention that “no one had sent me out”. Another explanation could be that the observers are lacking access to a speed gun for speed estimation calibration. Speed estimation is one of the key factors for carrying out conflict studies. The speed measuring equipment is actually the only equipment needed, apart from pen and paper.

## **3 Before and after studies in Pursaklar**

Along the Pilot Project roads some intersections were about to be rebuilt. Two of those were studied 1999 as a before study. Now, almost two years later, an after study has been carried out. The after study is designed to test if the introduced countermeasures have improved the traffic safety at these locations.

### **3.1 Pursaklar I**

This intersection is located in the north part of Pursaklar. During the initial phase of the Pilot Project this intersection was considered a blackspot. The main problem was related to turning vehicles on the main road. This was also confirmed by the before study carried out with the traffic conflicts technique in the spring of 1999. The results are shown in Figure 1, 2 and 3.

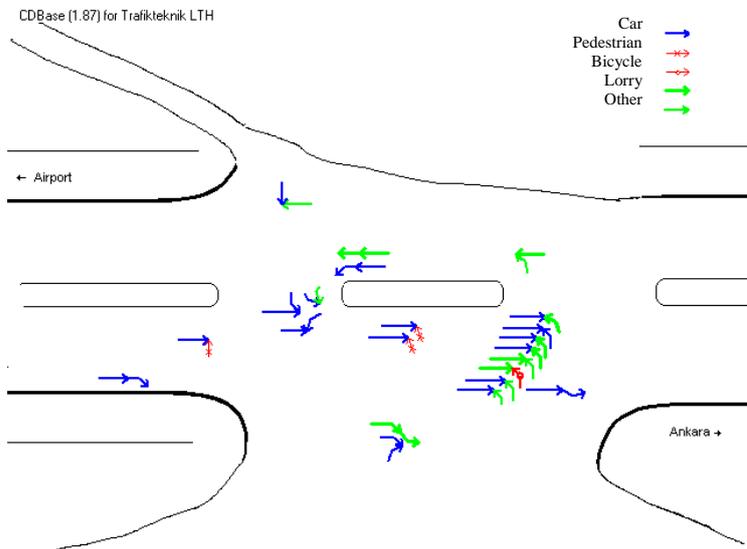


Figure 1. <sup>1</sup>Serious conflicts at Pursaklar I, March 8, 1999 during 7 hours, BEFORE study

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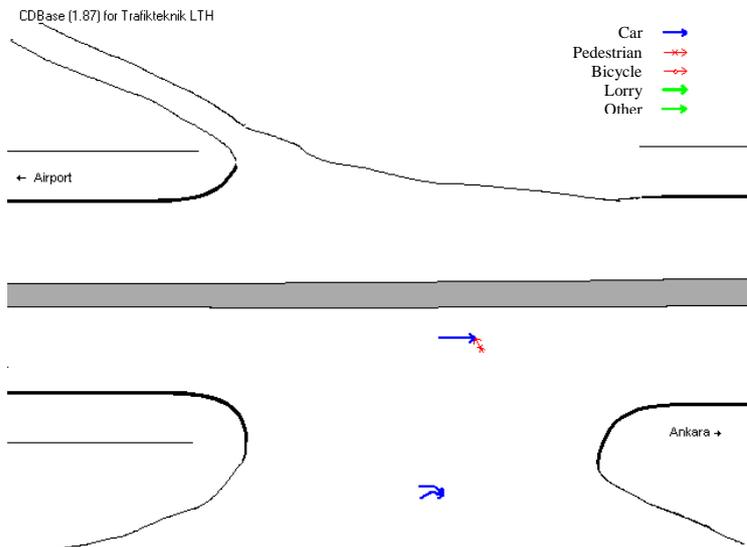


Figure 2. Serious conflicts at Pursaklar I, April 25, 2001 during 7 hours, AFTER study

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<sup>1</sup> Note that one pair of arrows represent one conflict and that the length of the arrow is proportional to the speed of the vehicle it represents.

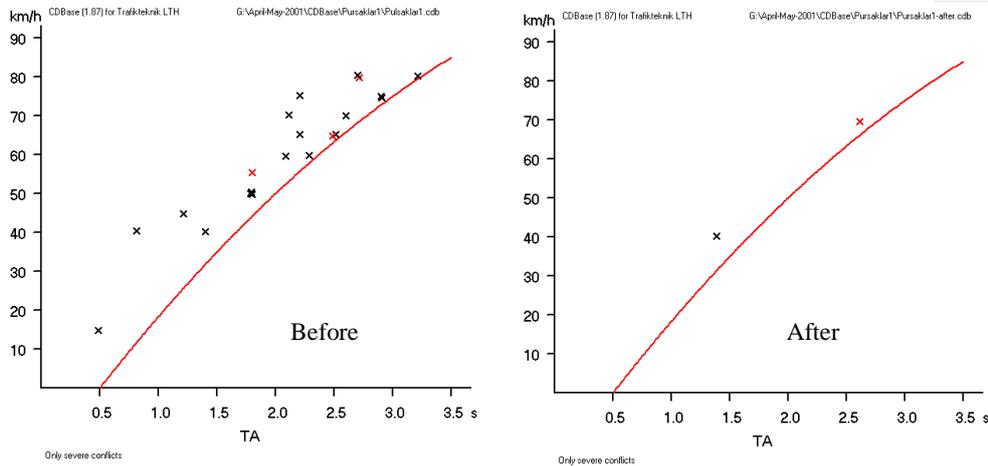


Figure 3. Speed to TA value for Pursaklar I. Before and after rebuilding

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### 3.2 Speed measurement at Pursaklar II

In addition to the conflict study a limited speed measurement was carried out at this intersection. The data was processed with the computer program SpeedBoot.

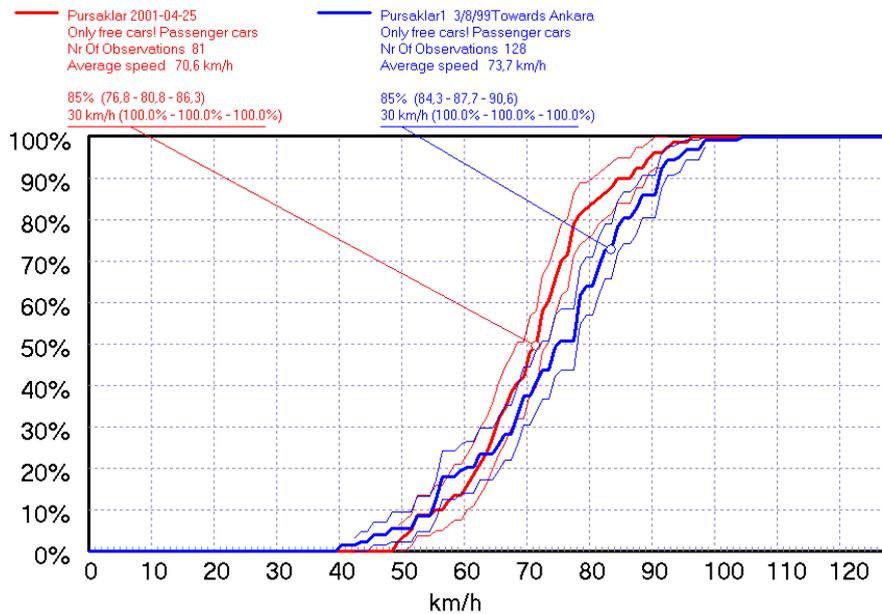


Figure 4. Speed distribution. "Free-Passenger cars" driving towards Ankara, before and after rebuilding

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This measurement shows that the speeds are significantly lower in the after situation compared with the situation in 1999. The reduction is found among the faster cars. This is illustrated by the fact that the 85 percentile of speeds is reduced more than the median, or the average speed. The rebuilding in itself, closing the median, could not explain this speed reduction. The effect of a closure of the mid-barrier, should normally be an increase in speeds. The measured speeds are the “free moving vehicles” not affected by other vehicles, but even those could be affected by the safety intervention.

The explanation for the speed reduction is rather to be found elsewhere. One explanation could be that the speed enforcement on the airport road has resulted in lower speeds. Another explanation could be that during this day speed enforcement has been carried out on this road. It was actually the case, that there was a police control on the road this day. The control was, however, in the other direction. A third explanation could be the substantial rise in petrol prices in Turkey during the last month. A significant increase in petrol price might affect driving style as well as traffic flow. It is hard to tell which explanation is the most significant, but the reduction in the 85<sup>th</sup> percentile from 87km/h to 81km/h represents a substantial reduction in the higher speeds. Despite this reduction, the speeds are still rather high at this location. Since this is within a built-up area the speed limit is 50km/h, but hardly any “free vehicles” stick to this limit.

The two serious conflicts remaining in the after period are related to a crossing pedestrian and an exiting vehicle. The interesting finding is that these conflicts have not increased in the after period, which might have been expected. When it comes to pedestrian safety it is entirely up to the pedestrians to save their own skin. Drivers seem to take no caution to crossing pedestrians. The crossing pedestrians, on the other hand, seem to be well aware of this fact.

### **3.3 Pursaklar II**

This intersection is located just north of Pursaklar, at the new “OPET” petrol station and the shopping centre. During the initial phase of the pilot project this intersection was also considered a black-spot. The main problem was related to vehicles crossing the main road and also, turning vehicles on the main road. This was also confirmed by the before study carried out with the traffic conflicts technique in the spring of 1999. The results are shown in Figure 5, 6 and 7.

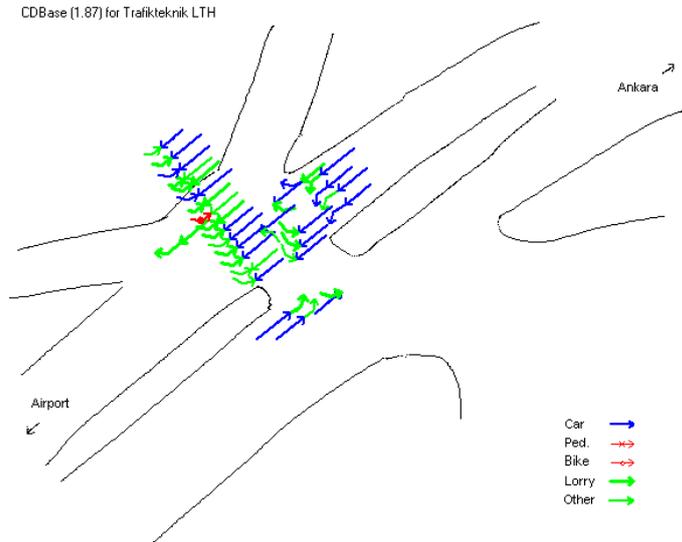


Figure 5. <sup>2</sup>Serious conflicts at Pursaklar II, March 16, 1999 during 6 hours BEFORE situation

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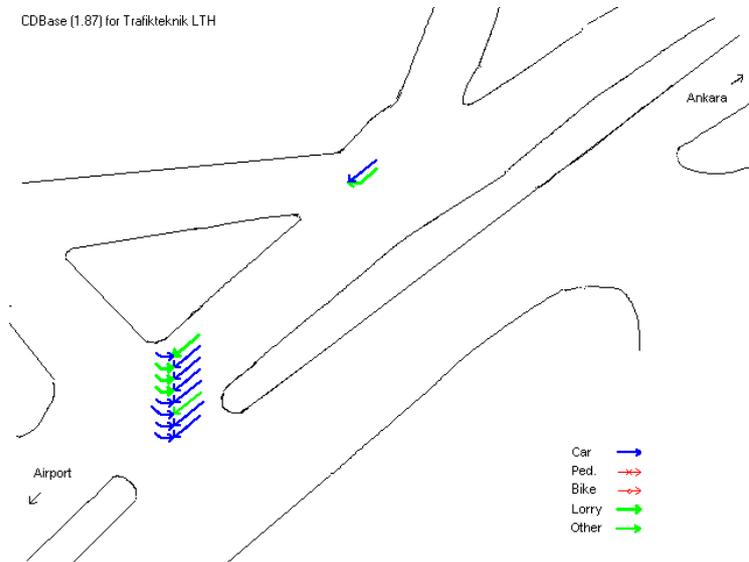
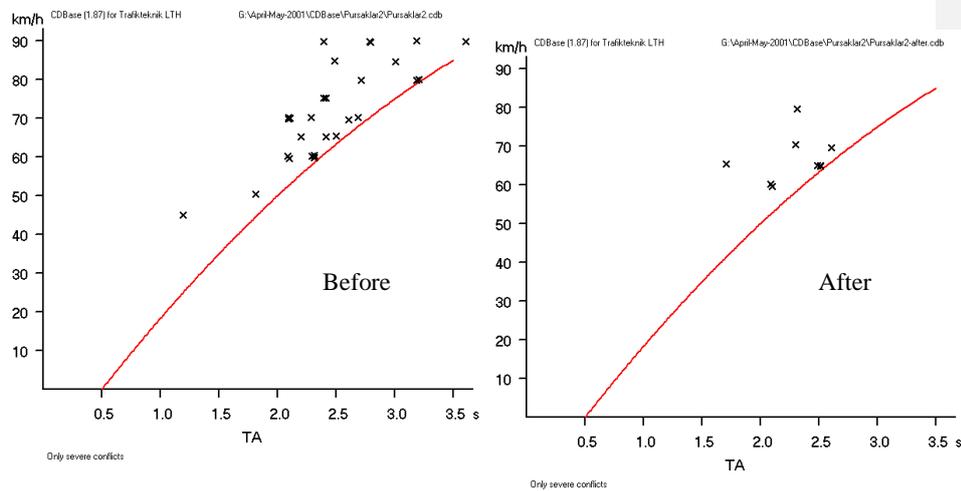


Figure 6. Serious conflicts at Pursaklar II, April 27, 2001, during 6 hours AFTER situation

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<sup>2</sup> Note that one pair of arrows represent one conflict and that the length of the arrow is proportional to the speed of the vehicle it represents.



**Figure 7. Speed to TA value for Pursaklar II, Before and after rebuilding**

At this intersection the number of conflicts has reduced significantly, from 28 serious conflicts in the before period to only 9 in the after period. This means that around two thirds of the serious conflicts have disappeared. Still some serious conflicts remain and they are still happening at high speed. The remaining conflicts are all related to left turning from the side road.

One interesting finding was many unorthodox turning manoeuvres. Vehicles coming from the side road (from the cement factory) used the exit lane to enter the petrol station. A legal maneuver should mean that they had to turn left in the intersection and then drive all the way to Pursaklar and make a U-turn at the traffic signal and then return. This means a detour of one kilometer. This behavior could not be considered safe, but on the other hand no conflicts were noticed.

### 3.4 Pursaklar – traffic signal

The initial intention was to carry out a before and after study also at the intersection which is now signal controlled. This was impossible, however, since the signal was put into use before the before study could take place.

The traffic signal is a vital part of the traffic safety improvements in Pursaklar. Even so, accidents have been reported at this intersection. A one-day conflict study was carried out. Only three serious conflicts were found during the six hours of observation. One was related to a strange maneuver from the east side of Pursaklar to the west. A car was driving in the wrong direction from the bus stop at the east side of the traffic signal; it then came in conflict with a left-turning vehicle.

Another conflict was related to a left-turn and after the turn the vehicle made a sharp right-turn up on the road leading to the Jandarma station.

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Another conflict was related to an overtaking maneuver. Two cars were overtaking a slow lorry at the same time and the result was that one of them had to brake at the very last moment. This is a remaining problem at this stretch of the road. In the up-hill direction the speed differences between heavy loaded trucks or buses and passenger cars create lots of hazardous overtaking manoeuvres.

Several unorthodox turning manoeuvres were noticed during this time. Since left-turning has been made impossible at the intersection called Pursaklar I, the alternative means a detour of some kilometres. Some cars reverse back to the traffic signal to make a U-turn after letting some persons off at the bus-stop. These illegal manoeuvres might create serious traffic safety problems; the problems are probably even bigger during nights. This might be worthwhile to study further. If you could find a way of making the signal controlled intersection become a proper four-leg intersection, some of these problems could be solved. The main obstacle for this is the level problem on the east side of the intersection.

Pedestrians face some severe problems at the main road. Pedestrians cross anywhere along the entire road. The traffic signal offers pedestrians a crossing opportunity, but many pedestrians do not seem to appreciate this facility and cross elsewhere, even against red light.

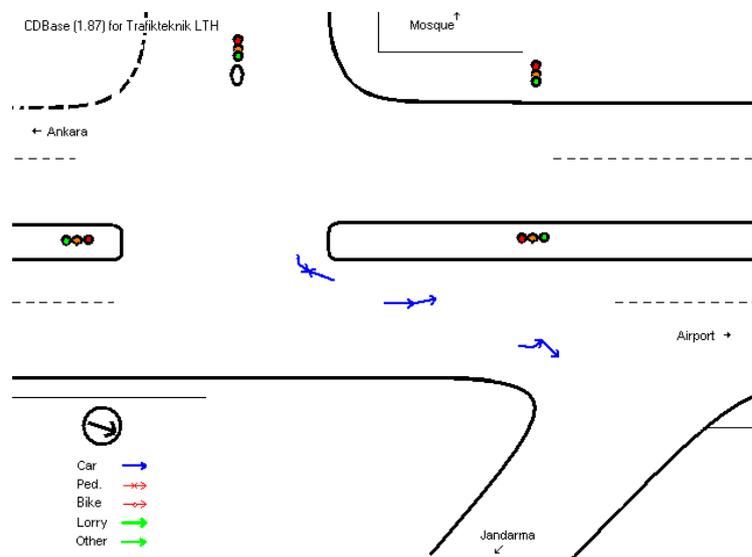
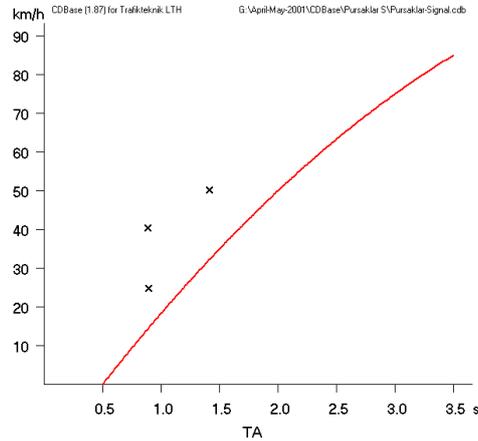


Figure 8. Serious conflicts at the traffic signal controlled intersection in Pursaklar, April 30, 2001 during 6 hours

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**Figure 9. Speed to TA value for at the traffic signal controlled intersection in Pursaklar, April 30, 2001**

### 3.5 Conclusions regarding Pursaklar

The most obvious conclusion regarding the traffic safety situation on the main road through Pursaklar is that great improvements have been made. The number of serious conflicts has been reduced significantly and no new major safety problems seem to have been created.

One problem, only slightly related to safety, is the local traffic crossing the main road. While the main road now is better suited for the through traffic, local traffic has got some difficulties.

## 4 Support to the Turkish conflict observers

### 4.1 Presentation at “Intertraffic Conference in Istanbul”

As part of promotion of traffic safety assessments in general and the promotion of the use of the traffic conflict technique in Turkey in particular, Dr Lars Ekman made a presentation at the Intertraffic Conference in Istanbul on May the 3<sup>rd</sup> 2001. The conference was well-attended by distinguished participants. The conference also gave a good insight into present trends in traffic safety work in Turkey.

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## **4.2 The database program CDBasew**

In order to store and carry out analyses of conflict observations a database program could be used. The program is developed at Lund University and SweRoad has provided KGM with a copy of the program. A seminar was held at KGM to present the program. The program has been used by KGM to analyse the study carried out in Çankırı. A manual was also distributed. This manual is attached to this report as Appendix B.

Personnel from KGM have received training and support with both the computer program and the use of the Swedish traffic conflicts technique. A team of observers is now qualified to carry out and present conflicts studies.

## **5 The conflict study in Çankırı**

In order to investigate the traffic safety problem at some major intersections in Çankırı, on the main road through Çankırı, a conflict study was carried out by the newly trained team from KGM. The team consists of personnel both from KGM Head Quarters and from different regions. In this study, persons from region number 15 (the region that includes the city of Çankırı) attended.

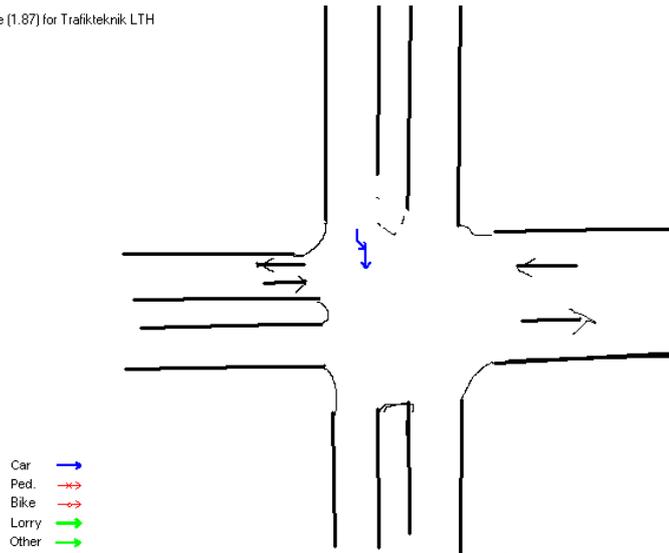
### **5.1 Results from Çankırı**

One important finding was that during the two days of observation the number of serious conflicts was relatively small. One reason for this is that traffic safety problems are not that numerous in a small city like Çankırı. Another explanation could be that the weather during these two days was rather extreme, with heavy rain. The rainy conditions might have influenced the pedestrian flow and behavior. One of the major problems detected, and also expected, is the problems for pedestrians and other unprotected road users.

A team from KGM carried out conflict studies by themselves. The results are illustrated below. Even though the number of conflicts was limited, some observations were made by the observers. These observations and recommendations should be seen as preliminary until a more substantial study has been carried out. Nevertheless these hypotheses must be taken seriously and used as a first problem identification.

## 5.2 Findings from İSTASYON

CDBase (1.87) for Trafikteknik LTH



**Figure 10. Serious conflict at the İSTASYON intersection in ÇANKIRI**

The conflict observers identified the following problems:

- High speeds on the main road.
- The 4-phase signal creates problems for pedestrians since no phase offers a safe crossing; there are no specific pedestrian facilities.
- Hard for pedestrians to see the traffic lights.
- One of the approaching lanes was used rather as a parking area. If this area was closed it should simplify the intersection.
- A general problem in Turkey is that cars tend to stop beyond the traffic lights, thus blocking the intersection.

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### 5.3 Findings from KARATAŞ

CDBase (1.87) for Trafikteknik LTH

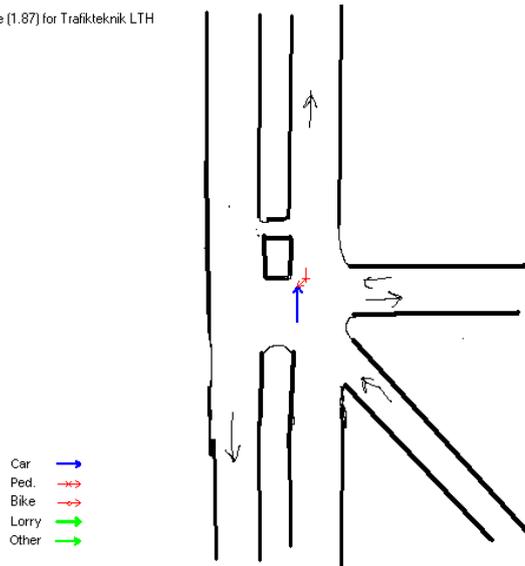


Figure 11. Serious conflict at the KARATAŞ 765-05 intersection in ÇANKIRI

The conflict observers identified the following problems:

- High speeds on the main road.
- Pedestrians have difficulties to see approaching vehicles in time if they have high speed. The sight is hindered by the bend of the road.
- One of the approaching lanes is approaching at a sharp angle. This creates problems since the vehicles approach the intersection at high speed. There is a stop sign but the road users do not seem to care about that. One way to solve this problem might be to physically reduce the speed here. A hump should most probably solve this problem.
- The lane width on the main road is about one and a half lane. This creates high speeds and unstable flow conditions, which creates a difficult situation for crossing pedestrians.

### 5.4 Other intersections studied in ÇANKIRI

Two other intersections were studied in ÇANKIRI. No serious conflicts were found at these sites. One interesting finding was that the only roundabout in ÇANKIRI seemed to work fine and that approaching drivers seemed to give way to circulating flow; thus the intersection seemed to work well both from a safety and a capacity point of view.

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## **6 Recommendation regarding the future use of the Swedish traffic conflicts technique in Turkey**

Traffic safety is an important issue in Turkey and no one wants to waste their resources on useless countermeasures or badly defined problems. Assessment has to be an important issue for the whole traffic safety community in Turkey, as well as in other countries. The traffic conflicts technique offers a good opportunity both for better problem identification at specific intersections and it is a good tool for before and after studies. Since Turkey now have at least one team of trained conflicts observers, it is vital to use and develop this team in order to maintain present knowledge. The team needs ongoing practice in order to remain trained, access to a speed measuring device and maybe most of all support from their superiors. The closing remark is whether Turkey can afford not to use this resource.

## 7 References

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