DEVELOPMENT OF TRAFFIC MONITORING SYSTEM
IN ESTONIA 1997-2002

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1. Estonian state roads in short brief:
   - Main roads 1430 km AADT 3060 vehicles/per day
   - Basic roads 2524 km AADT 1190 vehicles/per day
   - Local roads 12439 km AADT 290 vehicle/per day

AADT near Tallinn:
   - E 20 18 000-23 000 vehicles/per day
   - E 67 13 000-20 000 vehicles/per day

Traffic in surfaced state roads:
   - Main roads 47%
   - Basic roads 31%
   - Local roads 22%

2. History

In 1995 Estonian Road Administration started with its long term development plan to year 2005, to move towards automatic traffic counting system. The aim was to implement ATR (automatic traffic recorder) network project in Estonia.

What we have before: 1960-1970 when Estonia was part of Soviet Union, Estonia had over forty ATR stations with inductive loops and with electromechanical volume recorders. At the end of 1970 the system failed with many equipment and management problems and was shut of. In the middle of nineties Road Administration was in situation that it needed reliable and continues traffic data to manage traffic and road projects and make decisions for future. So the Road Administration started a workgroup with Technical Center of Estonian Roads.

3. Situation study and conclusions

For first step we studied how is the traffic monitoring organised in different European countries. From the study was clear that in every European country the subject was organised slightly
differently. Every country has their own classification schemes and traffic counting methods. No signs of European-unified classification schemes were detected. Standardisation is one of the ITS (Intelligent Transport System) industries well known weakness. We took over the main common structure: Permanent ATR stations network with one WIM (Weight In Motion) station combined with short term traffic monitoring points.

4. **Hardware selection**

When the main structure was clear, an independent company made study about traffic counters around the world and figured out, that traffic recorder equipment made in Europe was two or even three times more expensive than same kind of equipment made in USA. Because of our limited budget we selected simple, but well proved traffic recorders from American company – traffic recorder units with 4 or 2 inductive loops, that were capable to collect classification, speed and volume data, with enough memory to store more then six months data. Also rubber tube classifiers were selected from that company. For short term counting we selected rubber tube counters with capability to record classification (axle numbers and spacing), speed and volume data.

5. **Action**

When the hardware were selected we started to install permanent ATR stations. All installations were done under the supervision of our crew. Before the installations we gathered lot of the information about the inductive loop installations and did not use foreign experts in situ. In two years we installed 48 permanent ATR stations all equipped with main power supply. Good advice for loop installation is: to avoid loop problems (failures) for decades is important to use very good loop cables and if possible make no junctions, just lead the loop cable directly to the ATR cabinet. All junctions under the ground are extremely week links.

6. **What we have**

In two years we have installed 48 permanent ATR stations, all equipped with main power supply. All counters have their own backup batteries which can keep them running two weeks independently in the case of main power loss. ATR stations are not equipped with modems to transfer data, thus is one job to finish, which depends on Road Directorate will to finance this area for long term profit. Today we collect data from ATR stations four times per year and after processing, data goes to Road Data Bank. Data losses are ca 10-15 percent and they are caused mainly by lightning electromagnetical disturbances or data recorders self shutdowns. So the data
transferring and recorders status info-system is next step what we hope to solve in next years. Building a communication system is familiar issue for us, thus we have installed all 50 Estonian road weather stations and their online communication system.

In main roads we have now 29 permanent counting stations (one station in every 50 km section) and in basic roads we have 19 stations (one station in every 40 km section). All main roads have covered with stations in every important section and basic roads have covered in one third of their lengths. In main and in basic roads we have 360 short term counting points, where we count 48 hours in every third year. From the permanent stations we get correlation and growth factors what we use to interpolate short term counting to AADT form. Among the ATR stations we installed in 1998 one WIM (weight in motion) station equipped with piezo sensors, which has informed us about the very serious truck overweight violation problem and growing load factor in Estonian truck traffic. This weight station has helped us to get first time in Estonia the real values of the truck fleet axle loads. This database was ground material for study made by Tallinn Technical University to update the axel loads adjustment curve factors for layers design. The next step is to install more WIM stations to get accurate data of axle loads and help road engineers design the layers and monitor truck load trends. Also it is important tool for road authorities to get objective picture of overload trends.

7. **Advantage of the road tubes for low traffic roads.**

Rubber tubes are very economical solution, specially in our two line roads where the traffic volumes are suitable for bi-directional counting. Main advantage of the two road tube counter is the exact picture of the vehicles axles. For the dimensioning of layers is important to use this truck axle data combined with axel loads samples gathered with WIM scale. The installation of the two road tubes is quick- it takes only 15 minutes to install them to the road and one person can install 10-15 points per day. Doing short term counting from the year 1996, counting thousand points we have only some occasions with vandalism. Trafficant’s don’t react in any way to hardly seeing the tubes over road which is the best reaction for us. When we started we used also the help of the press to inform drivers what is “going on” and I think it helped a lot. We can say that rubber tubes are good choice for the Estonian two line roads and traffic intensity volumes.

8. **Local roads.**

In local roads (12 439 km) traffic countings are made by Road Directorate regional departments. Countings are made with one road tube counters which give us the volume data (number of the axle
pares). Because of the big number of counting points, countings are scheduled at four year. They must count two times per year, each time minimum interval is 24 hours.

9. Closing words

The development of ATR network has been a challenge to our company: to develop and implement a system which is tailored for Estonian needs and what gives us continous and reliable traffic data. We look forward to develop the system in next years and hope that road authorities will understand the importance of reinvestments into such important traffic data gathering tool, to keep it updated continiously.