“The GIS application of the UN/ECE E-Road Census 2005: a tool for transport analysis and planning”

INSTITUT D’ESTUDIS TERRITORIALS

A consortium between the Department of Regional Policy and Public Works of Catalonia and the Pompeu Fabra University

Address: Pg Circumval·lació, 8 08003 Barcelona (Spain)
Phone: +34 93 5422633
Fax: +34 93 5422599
Website: www.ietcat.org

Contact person: Jordi Martín
Research associate
e-mail: jordi.martin@ietcat.org

Recommendations to Governments:

- Coverage of the Census
- Purpose of the Census
- Scope of the census
- Comparability with the results of previous Census
- Categories of vehicles to be counted
- Values to be calculated
- Design of the counts
- Characteristics of E-Roads
- Preparation and publication of Census Data

Preparation and publication of data recommendations to Governments:

- Characteristics of E-Roads (Tables 1&2)
- Number and nature of counting posts (Table 3)
- Motor traffic distribution by vehicle categories: total, night, holiday & peak hour traffic (Tables 4&4b)
- Length and usage of roads (Table 5)
- Motor traffic density maps (Table 6)
- Motor traffic density data at counting posts on E-Roads (Table 7)

Recommendations concerning Traffic Density Maps:

- Counting posts to be shown on the maps
- Predefined scale maps according window size
- Average Annual Daily Traffic representation ("traffic buffers": width and interval classes)
- Representation of E-Road categories: motorways, express roads and normal roads
- E-Road and counting posts numbers
- Names of important towns and localities
What is a GIS?

- GIS is an electronic tool designed for capturing, storing, analysing and presenting geocoded information (geographic, social, economic, political, transport, environmental, etc.)
- GIS uses the computer to pose and answer geographic questions by arranging and displaying data about “places” in a variety of ways, such as maps, charts and tables
- GIS is the modern extension (electronic mapping) of the ancient mapmaking tradition
The GIS application of the UN/ECE R-Road Census 2005: a tool for transport analysis and planning

**E-Road Network GIS**

**Specifications**
- Digital graph of the network
- Electronic Databases
- Other cartographic variables
- Traffic width per road section
- E-Road Network

**Analysis**
- Cartographic production
- Analysis and modelling

**Background**
- Country Maps
- Statistical data submitted by countries

**Conclusions**

Analyses and planning
Automation a geographic application for censuses

- Census previous to 1995:
  - Manually input data
  - Maps created using basic CAD software
- Census post to 1995:
  - In GIS all data are digitally geo-referenced
    - Facilitating:
      - The process of updating and harmonization Census data
      - The geographical analysis and display of the different Census data (tables, charts and maps)
    - Allowing:
      - A faster publication of the E-Road Census
      - A more sophisticated presentation of data and maps (improvement of statistical reports and cartographic production)
  - GIS is “incremental”
    - It can always be fed with new geocoded information, thus allowing for newer and deeper analyses
    - For instance, the 2000 Inventory of Main Standards and Parameters of the E-Road Network has been easily integrated into the GIS database developed for the Traffic Census
    - Variables like design speed or average width of either traffic lanes, central reserves or emergency stopping strips can now be charted and mapped in a very straightforward way
GIS Analysis: Thematic Maps

The GIS application of the UN/ECE R-Road Census 2005: a tool for transport analysis and planning

Background
Specifications
Analysis
Conclusions

GIS Analysis: Thematic Maps

Type of Road

motorways
roads
GIS Analysis: Thematic Maps

Number of carriageways:
- Two
- One
- Non available
GIS Analysis: Thematic Maps

Number of lanes:
- 2, 2+1, 2+2
- 3, 3+2, 3+3
- 4, 4+4
- 5
- 6 or more
- non available
GIS Analysis: Thematic Maps

Percentage of heavy motor vehicles

1 - 25 %
25 - 50 %
50 - 75 %
75 - 100 %
Traffic network: orthogonal in Germany, concentric in France
### GIS Analysis: Thematic Maps

Length of frontier: | Pyrenees | Alps | km
---|---|---|---
**Year 2000** | 619 | 1435 | km
Annual average daily motor traffic on frontier border: | 12,986 | 49,742 | vehicles/day by year
Daily number of vehicles by year and frontier length: | 20,98 | 34,66 | vehicles/day/year/km
**Year 1995** | 8,616 | 31,673 | vehicles/day by year
Annual average daily motor traffic on frontier border: | 13,92 | 22,07 | vehicles/day/year/km
Daily number of vehicles by year and frontier length: | 9,17 | 15,19 | vehicles/day/year/km
**Year 1990** | 5,675 | 19,805 | vehicles/day by year
Annual average daily motor traffic on frontier border: | 9,17 | 15,19 | vehicles/day/year/km
Daily number of vehicles by year and frontier length: | 3,634 | 18,656 | vehicles/day by year
**Year 1985** | 5,87 | 13,01 | vehicles/day/year/km
GIS Analysis: Thematic Maps

### All Netherlands
- Length of frontier: 920 km
- Annual average daily motor traffic on frontier border: 27,621 vehicles/day
- Daily number of vehicles by year and frontier length: 60,05 vehicles/day

### All Spain
- Length of frontier: 1,758 km
- Annual average daily motor traffic on frontier border: 12,986 vehicles/day
- Daily number of vehicles by year and frontier length: 9,835 vehicles/day

### Netherlands vs. Belgium
- Length of frontier: 395 km
- Annual average daily motor traffic on frontier border: 34,117 vehicles/day
- Daily number of vehicles by year and frontier length: 86,45 vehicles/day

### Spain vs. France
- Length of frontier: 619 km
- Annual average daily motor traffic on frontier border: 12,986 vehicles/day
- Daily number of vehicles by year and frontier length: 20,98 vehicles/day

### Netherlands vs. Germany
- Length of frontier: 525 km
- Annual average daily motor traffic on frontier border: 21,095 vehicles/day
- Daily number of vehicles by year and frontier length: 40,18 vehicles/day

### Spain vs. Portugal
- Length of frontier: 1,139 km
- Annual average daily motor traffic on frontier border: 6,683 vehicles/day
- Daily number of vehicles by year and frontier length: 6,04 vehicles/day
GIS Analysis: Thematic Maps
GIS Analysis: Database analysis

E-Road Length (km) Traffic change over 1995 (%)
E30 6303 18.33

Type of road Length (km) Traffic change over 1995 (%)
MOTORWAY 1702 19.82
ROAD 4601 16.64

Country Length (km)
Belarus MOTORWAY 597
ROAD 480

Ireland MOTORWAY 161
ROAD 137

Germany MOTORWAY 540
ROAD 9

Netherlands MOTORWAY 211
ROAD 9

Poland MOTORWAY 654
ROAD 547

United Kingdom MOTORWAY 654
ROAD 599

Russian Fed. MOTORWAY 3485
ROAD 3371

GIS Analysis: Database analysis

Analysis

Conclusions
Conclusions of the GIS analysis

• Traffic maps reflect the topography and the political and administrative organization of European countries

• Traffic maps are a reference of the population distribution and the levels of economy activity

• Traffic maps are useful to understand a complex reality, the European mobility

• Traffic maps are useful to improve the orientation of transportation plans and projects

• Traffic maps are useful to give an objective basis to define priorities and assign European budgets to them
### Background

- The initiation of GIS capabilities at the PC level within UN/ECE by using GIS software in order to visualize and study all the information contained in the GIS.
- The project allowed the electronic dissemination of graphic and alphanumerical data (CD Rom & Map viewer).
- It is also forecasted to incorporate the GIS produced items on the Census, such as maps, statistical databases and reports into the UN/ECE’s web on the Internet.

### Specifications

- Managing a very heterogeneous volume of information due to the huge number of information sources.
- Information requests are sent to UN/ECE in an excessively long time interval. This, means not being able to upgrade the network within the planned time frame.
- Do not fill all the fields of the database does not help to improve the system.

### Analysis

- Homogenize the formats of data delivery using a single system of file management.
- Establish strict parameters in the delivery of information by countries to the United Nations.
- Fill all the fields of the database that UN/ECE request.

### Conclusions

**Benefits**

- Information requests are sent to UN/ECE in an excessively long time interval. This, means not being able to upgrade the network within the planned time frame.
- Do not fill all the fields of the database does not help to improve the system.

**Inconvenient**

- The GIS application of the UN/ECE R-Road Census 2005: a tool for transport analysis and planning. 

**Proposed solutions**

- Establish strict parameters in the delivery of information by countries to the United Nations.
- Fill all the fields of the database that UN/ECE request.
Suggestions to 2010 E-Road Census 2010

- … establish a real commitment with all UN/ECE’s members
- … obtain homogeneous data
- … in an appropriated time period

PRODUCE A REAL MOTOR TRAFFIC MAP, WITHOUT GAPS
"The GIS application of the UN/ECE R-Road Census 2005: a tool for transport analysis and planning"
The GIS application of the UN/ECE R-Road Census 2005: a tool for transport analysis and planning
Thanks for your attention !!

Jordi Martín
Research associate
jordi.martin@ietcat.org

INSTITUT D’ESTUDIS TERRITORIALS
www.ietcat.org

Pg. Circumval·lació, 8
08003 Barcelona (Spain)
📞 +34 93 5422633
✉️ +34 93 5422599