ROADIDEA

The Effects of Severe Weather Conditions on Road Safety in Hungary

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1. Road traffic and safety situation in Hungary

Table 1.

Year	Number of Fatal+Serious accidents (F+S)	Killed persons	Level of motorization (Vehicles/10^3 inhabitants)	Traffic performance (Vehicle.km 10^9) (P)
1990	13923	2432	240	24,0
1995	9152	1589	275	27,5
2000	7452	1200	284	28,4
2005	8149	1278	345	34,5
2010*	6500	900	398	39,8

*estimated

(Persons killed: persons died within 30 days as a result of the accident, persons seriously injured: persons sustained injuries healing beyond 8 days.)

1. Road traffic and safety situation in Hungary /2

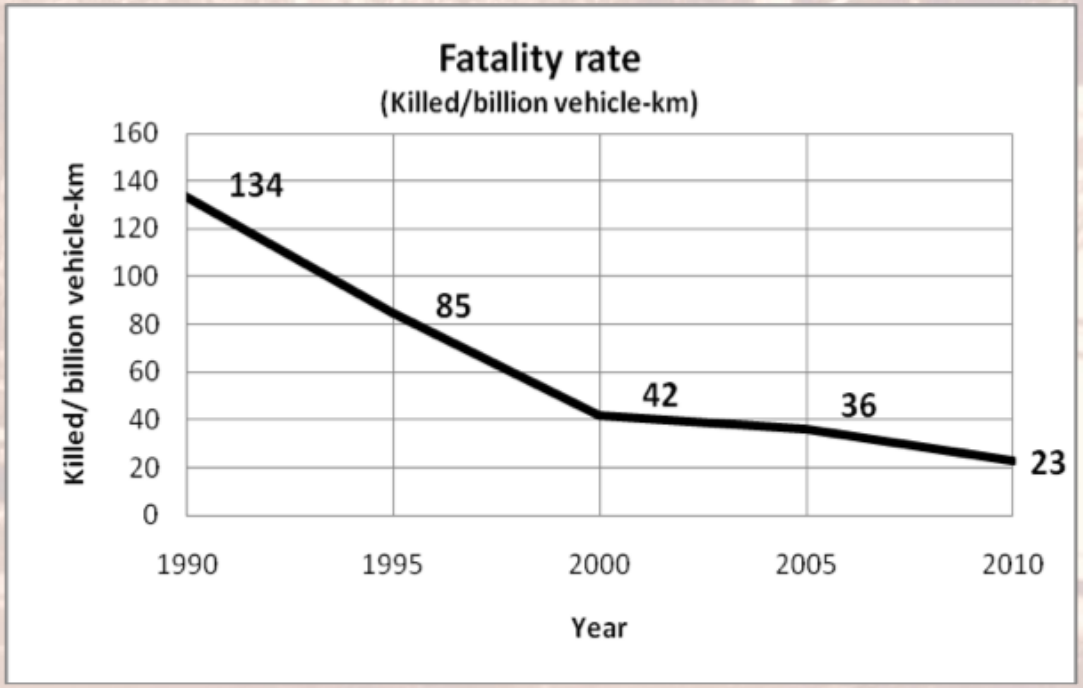


Figure 1

2. Main characteristics of the Hungarian climate circumstances

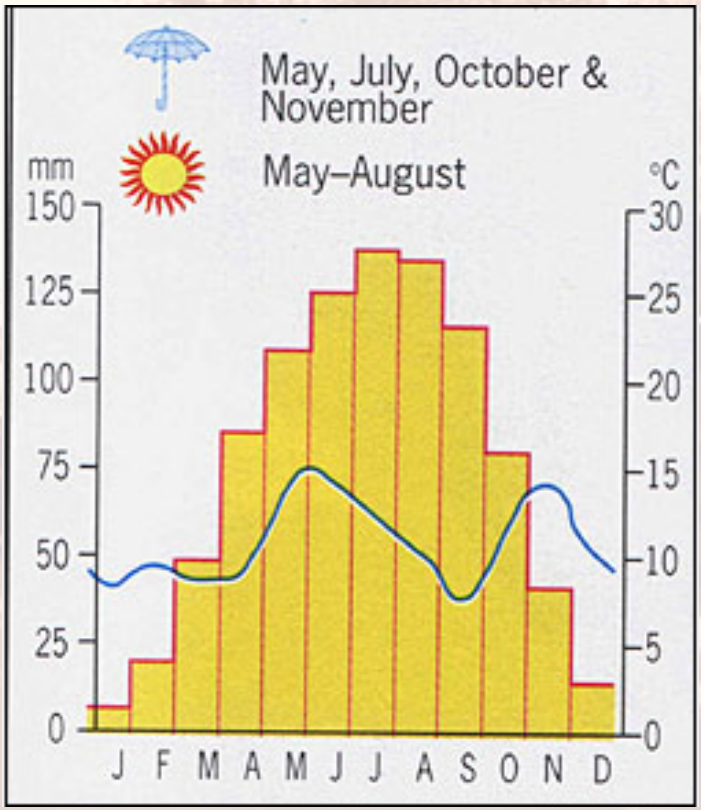


Figure 2

Average temperatures (C°) and rainfall (mm) in Budapest by month of the year

3. Accidents at severe weather conditions

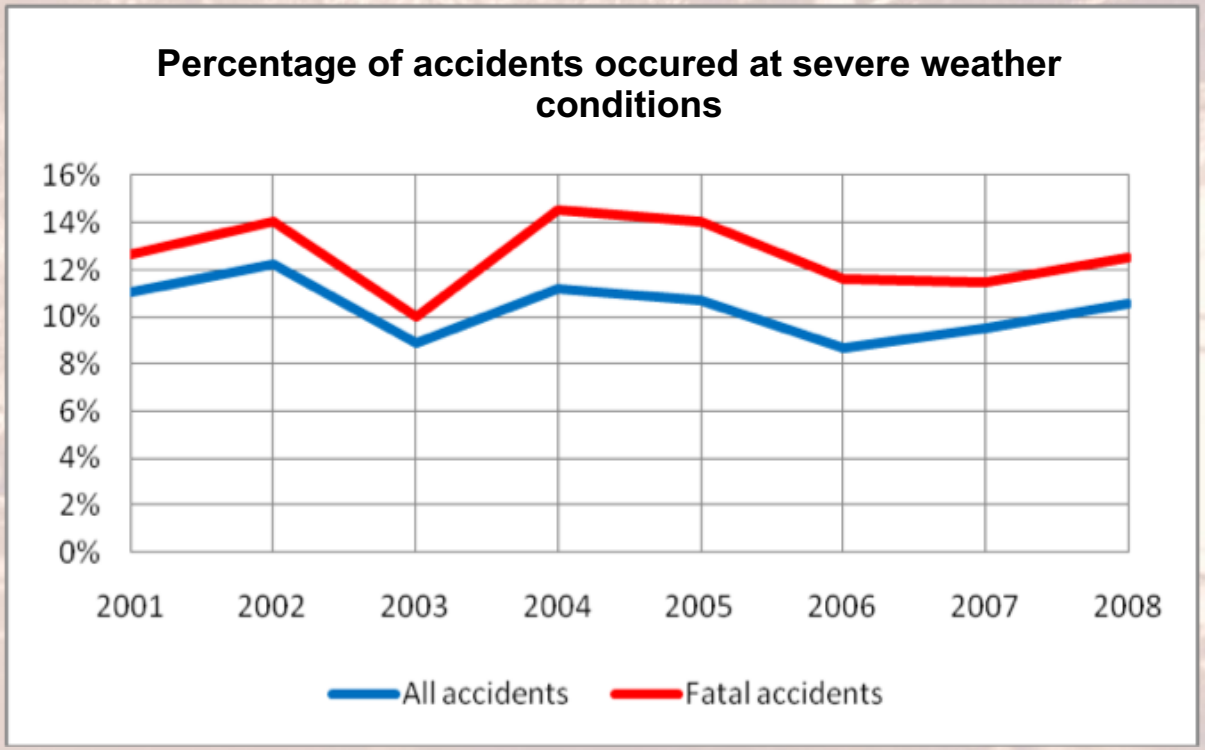


Figure 3

3.1. Foggy weather and accidents

Main aims of warning systems:

- traffic control instructions for road users
- information on local weather conditions in order to change the drivers' behaviour and to prevent accidents

3.2. Number and severity of accidents*

160000 accidents between 2001-2008
roughly 10% occurred under adverse weather conditions (rain, snow, fog, storm, shower)

only 1,6% occurred in foggy weather

5,6% of all accidents were fatal
8,4% of accidents occurring in foggy weather were fatal

Not the number but the severity of accidents occurring in foggy weather gives reasons for installation of fog warning system

* personal injury accidents

3.3. Date of accidents occurred in foggy weather

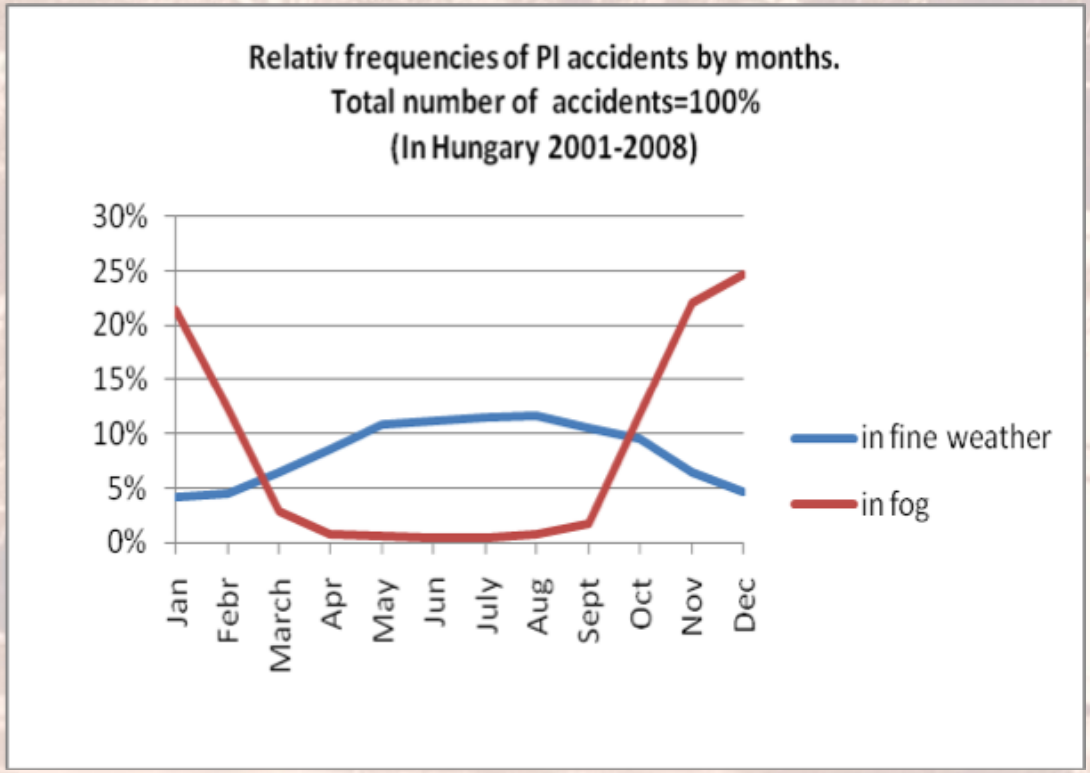


Figure 4

accidents in fine weather → seasonality of traffic volume

accidents in fog → frequency of foggy periods (mainly in December and January)

3.4. Accidents by the hours of day

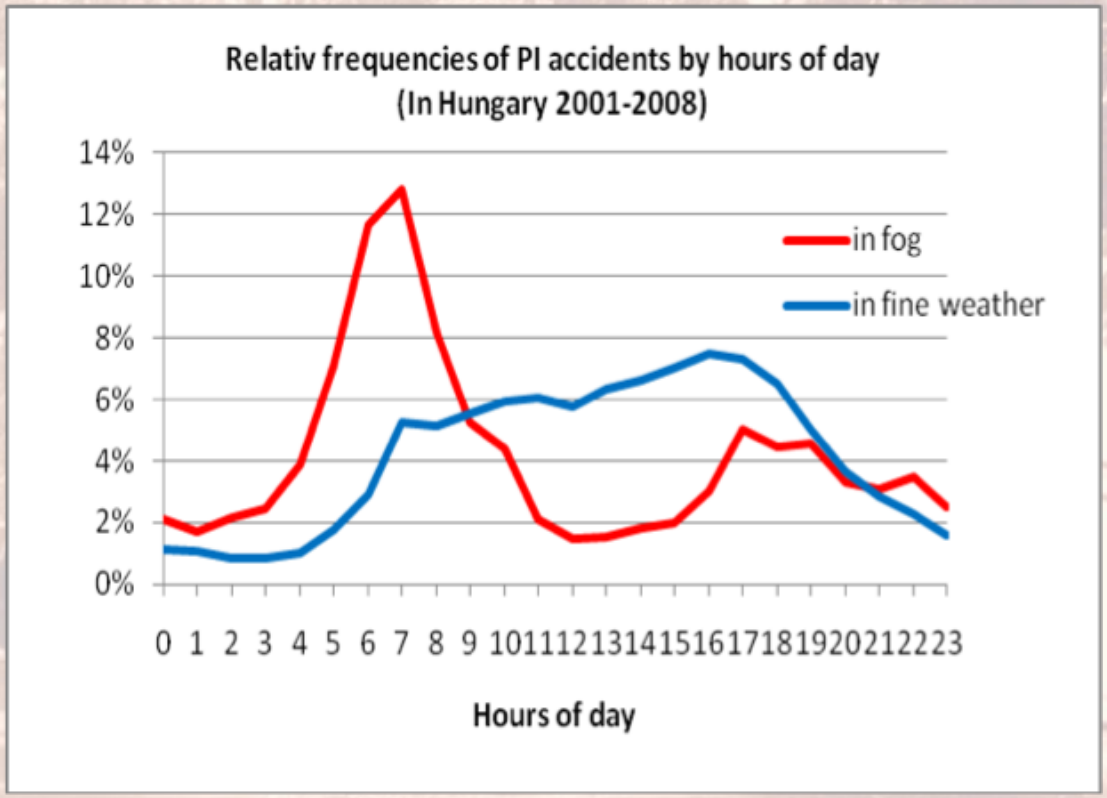


Figure 5

accidents in favourable weather conditions: daily seasonality of traffic (peak: 4,00-6,00 p.m.)

accidents in foggy weather: mainly in the morning "rush hour"(~7,00a.m.) smaller peak in the afternoon.

3.5. Types of accidents occurred in foggy weather

Table 2

Accident type	relative frequency (%) (Accidents/all accidents)	
	in foggy weather	in fine weather
Rear-end collisions	11%	12%
Head-on collisions	**17%**	7%
Single-vehicle crashes	**29%**	16%
Accidents at junctions	9%	19%
Others	*34%*	*46%*

(Based on the analysis of 8 years data = 160.000 accidents)

Head-on collisions and single-vehicle crashes are closely correlated with speed and visibility distance.

Selection of safe speed is fundamental.

3.6. Accidents by causers

Table 3

Accident causer	Relative frequency (%) (Accidents/all accidents)	
	in foggy weather	in fine weather
motorbike	0,4%	5%
passenger car	**72%**	60%
truck	**12%**	8%
bicycle	4%	11%
pedestrian	5%	8%
Others	*6,6%*	*8%*

3.7. Accidents inside/outside built-up areas

Table 4

Accidents on roads outside built-up areas (In Hungary 2001-2008)	Relative frequency % (Accidents/all accidents)	
	in foggy weather	in fine weather
Motorways	5%	7%
Main roads	48%	48%
Secondary roads	38%	33%
Others	*9%*	*12%*

68% of all accidents inside built-up areas

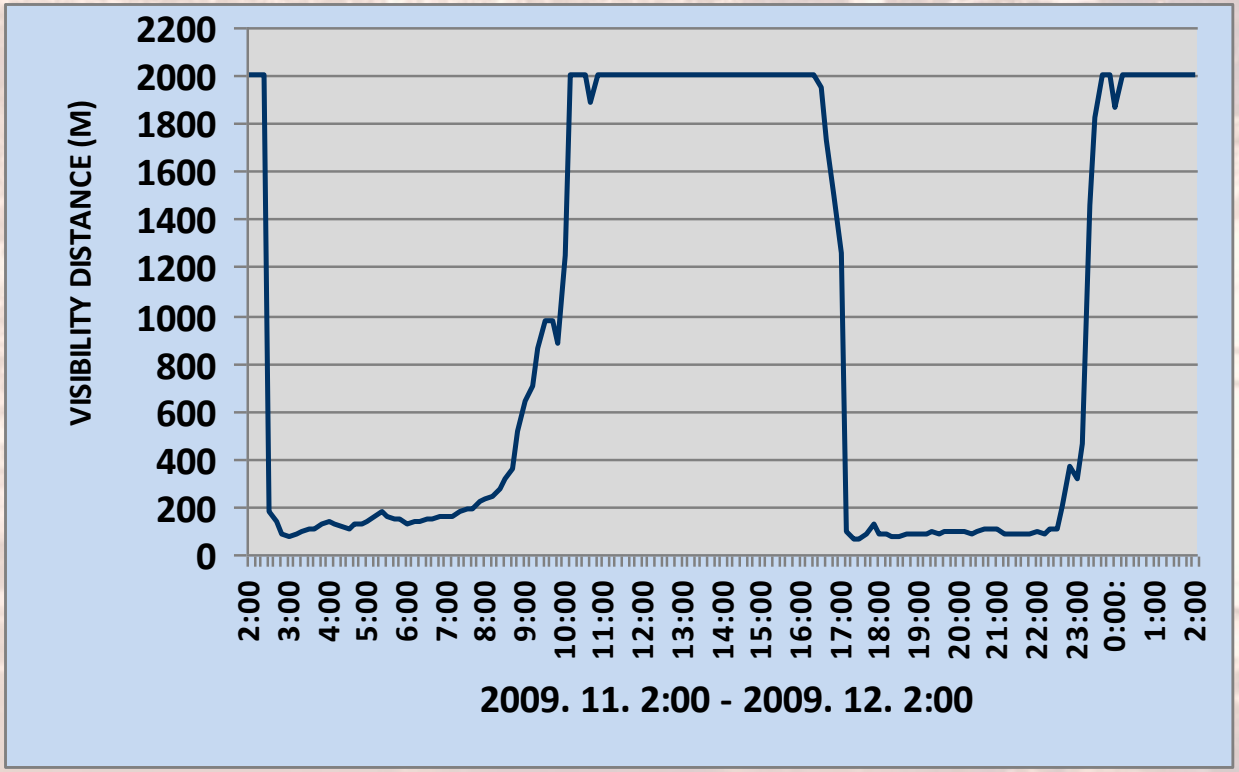
32% of all accidents outside built-up areas

62% of accidents in foggy weather occurred outside built-up areas

4. Case study for the usage of meteorological data on a Hungarian motorway

- Length of the motorway network: 1000 km
- Traffic control supported by road weather stations under development
- Fog warning system will be part of the traffic control in 2010
- 26 *Vaisala* visibility distance measurement devices are working on M7 motorway (on each 6 kilometres)

4. Case study for the usage of meteorological data on a Hungarian motorway /2



24 hours measurements of visibility distances (M7 motorway 107+500 km)

5. Tasks for the future in the field and estimation of the safety potential

The experience gained in the ROADIDEA project will be used in the development of the traffic control system on M7 motorway.

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Thank you
for your attention !