



**XXIVth World
Road Congress
Mexico 2011**
Mexico City 2011.

Linear settlements, vulnerable road users and the implications for urban land use and development in different countries

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The System Approach to safer roads

False settlement policies and endless linear settlements may be...



...the most crucial disaster for road safety in emerging countries, here in Vietnam (R+R 347)



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Endless linear settlements in Romania



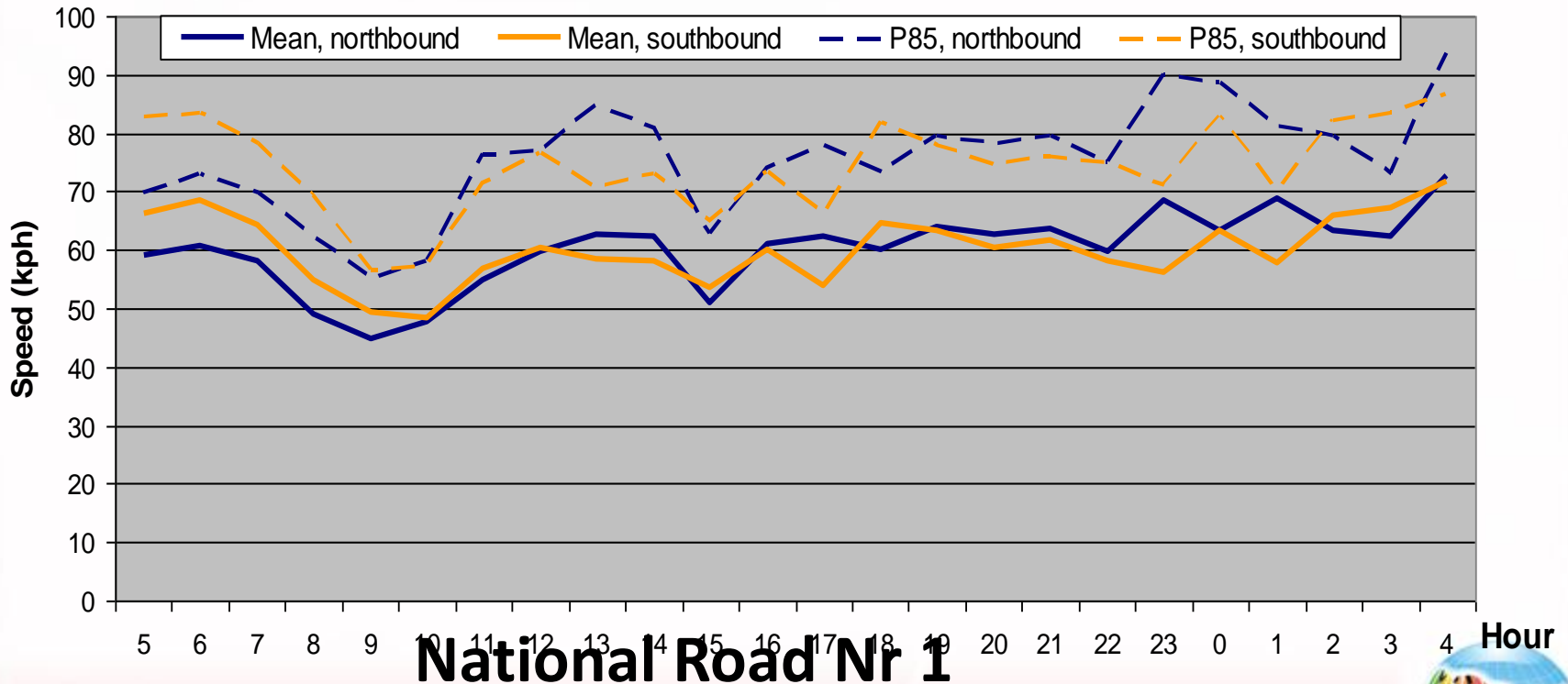
National Road Nr 1 (R&R 347)



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typical speeds in linear settlements in Romania

Dumbraveni - Spot 3, speed variation, only fast lanes
(6211 observations, August 13-14, 2004)

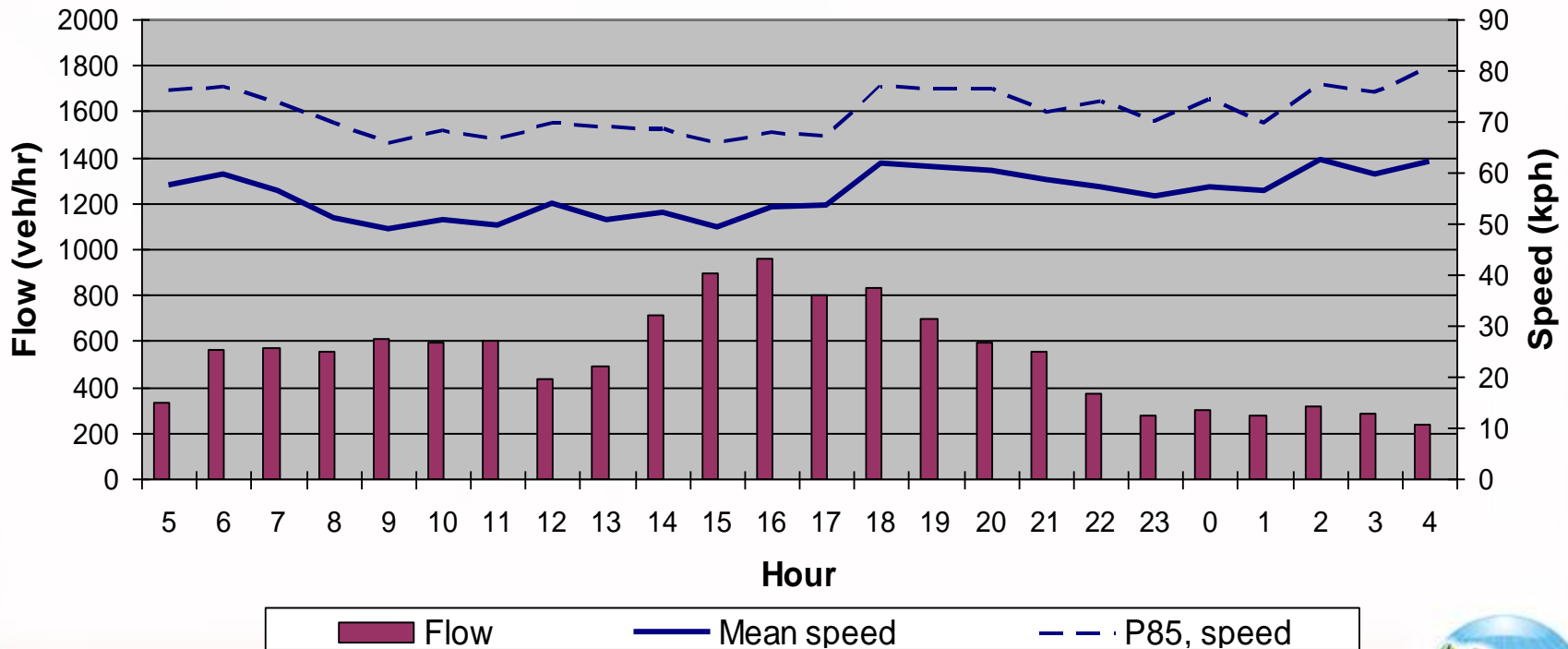


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typical speeds in linear settlements in Romania

Dumbraveni - Spot 1, speed and flow variation

(12887 observations, August 11-12, 2004)



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Endless linear settlements without sidewalks



More than 50 % of all accidents victims in Romania are pedestrians! Especially children are overwhelmed to calculate their time gaps for crossing traffic streams from both sides



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will prevent false design policies that do not respect the needs of vulnerable road users



Romania is suffering from 1 fatality per 2 km after widening from 7m to 12 m also in the villages; speeding was the result



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pedestrian crossings are the typical problems



National Road Nr 1 Romania



The System Approach to safer roads Has to prevent the uncontrolled access to properties along highways



which is starting regularly by farming markets,
here in Togo (R&R 347)



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The situation seems not to be as bad in Mexico, but we find such structures here too (right picture)

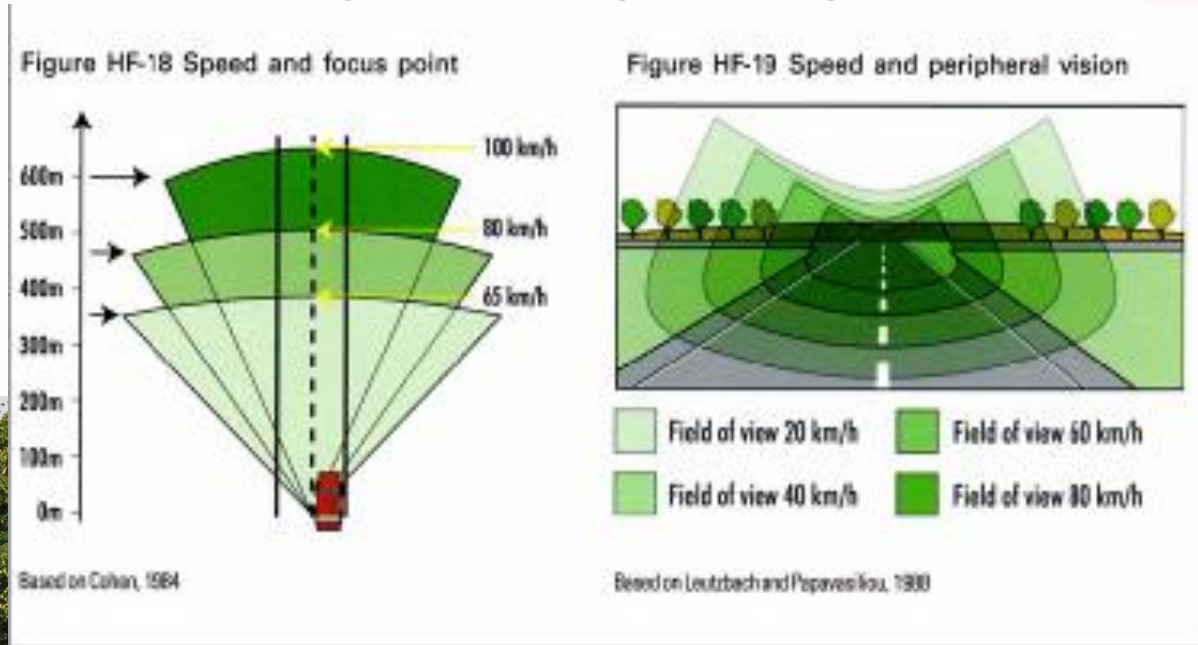


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**Urbanization
along a
Mexican
highway
south of
Puebla**



The System Approach to safer roads needs in the first step the repair by



**Speed enforcement by
the road itself**



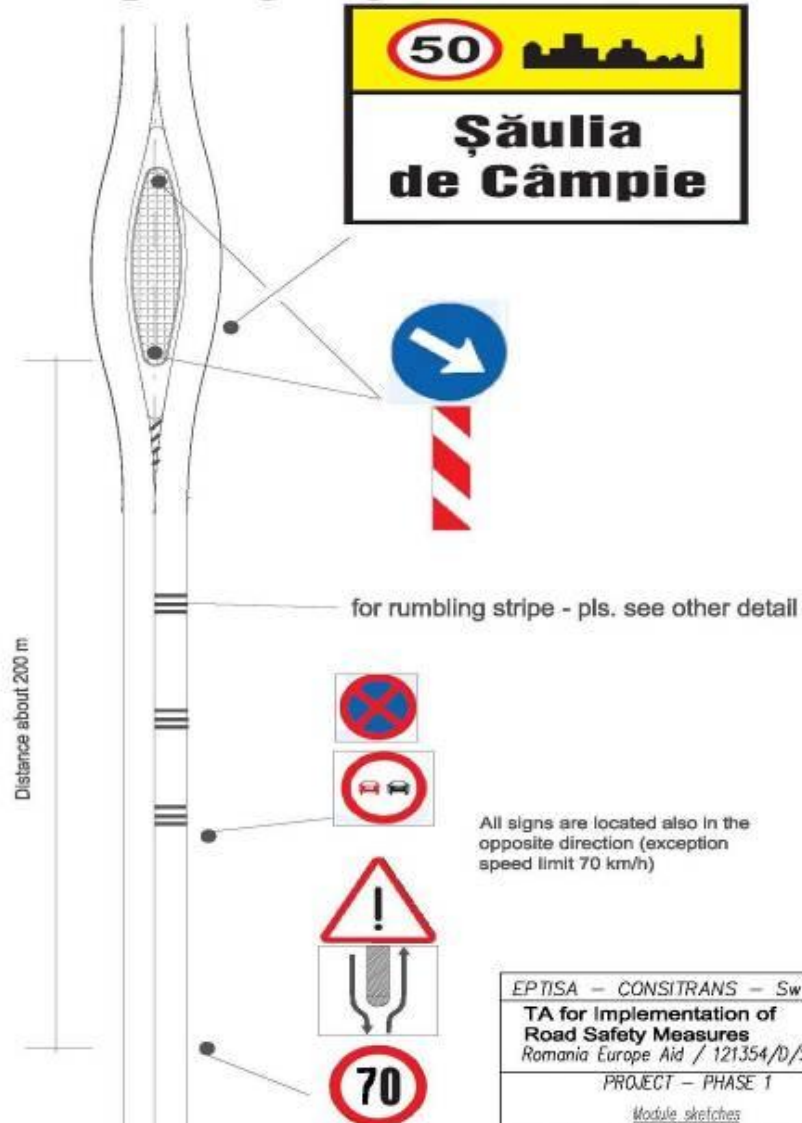
The System Approach to safer roads in Mexico

**High effort
is made to reduce
the speed by
humps (tope)
Well indicated by
traffic signing**



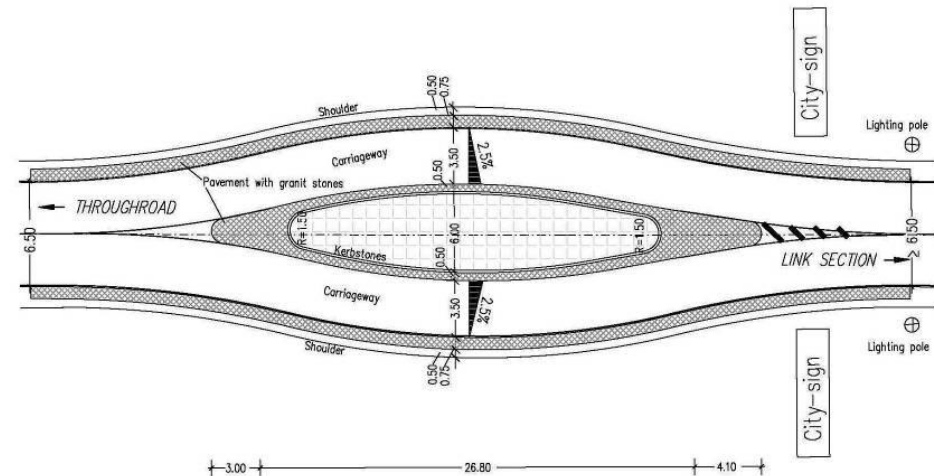
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Proper signing of the entrances



Traffic islands at the entrances of villages and towns

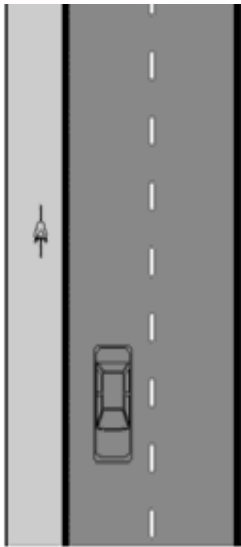
Entrance Island Type B



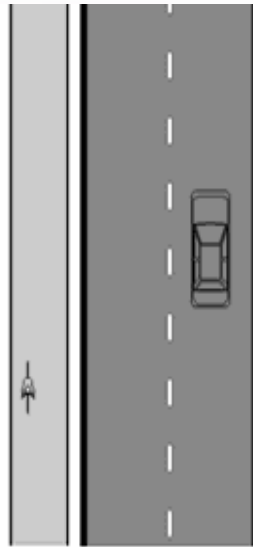
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needs the repair by

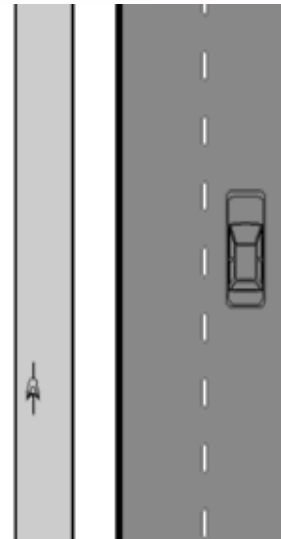
the separation of the vulnerable road users from the fast traffic



A - Pedestrian-bicycle path separated by kerbstone



B - Pedestrian-bicycle path separated by narrow strip



C - Fully separated path for bicyclists, pedestrians + slow agriculture carts

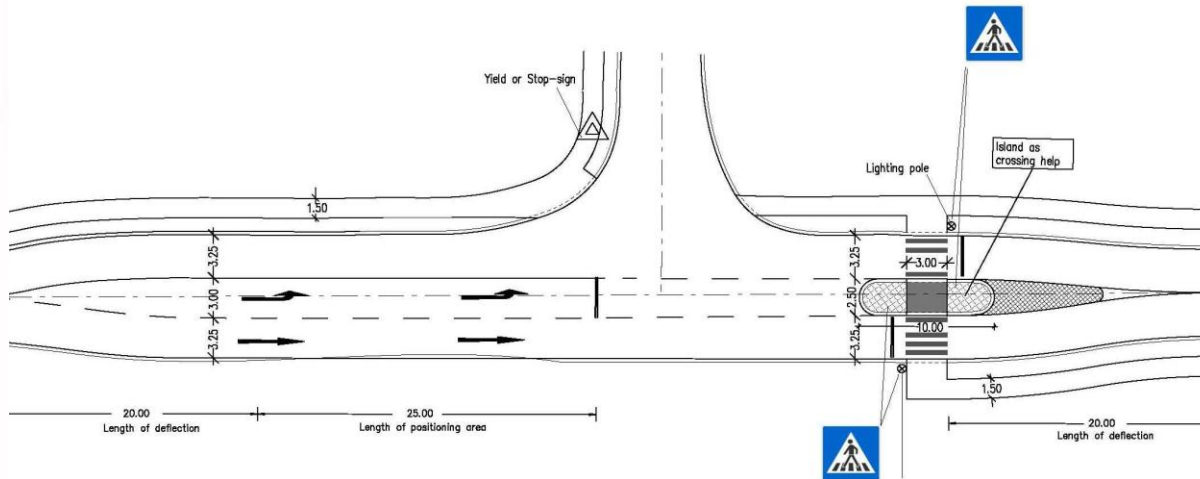


D - Pedestrian-bicycle - agriculture path independent of road

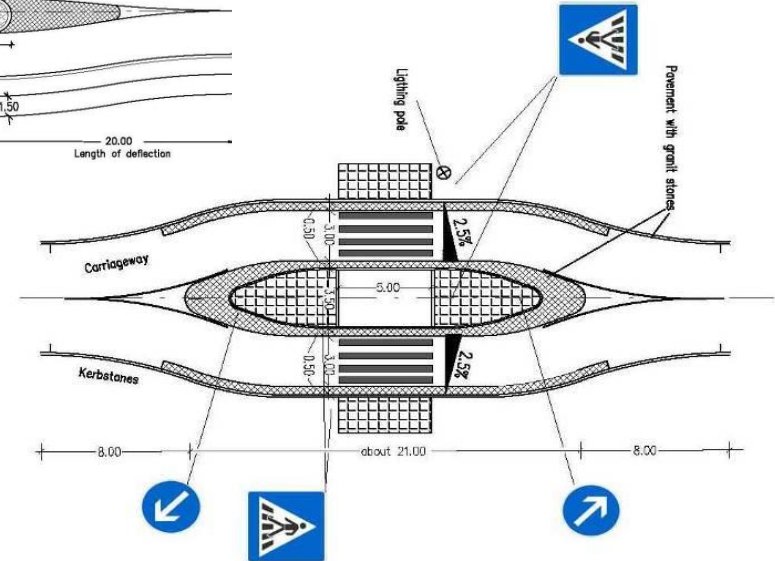


The System Approach to safer roads needs the repair by.....

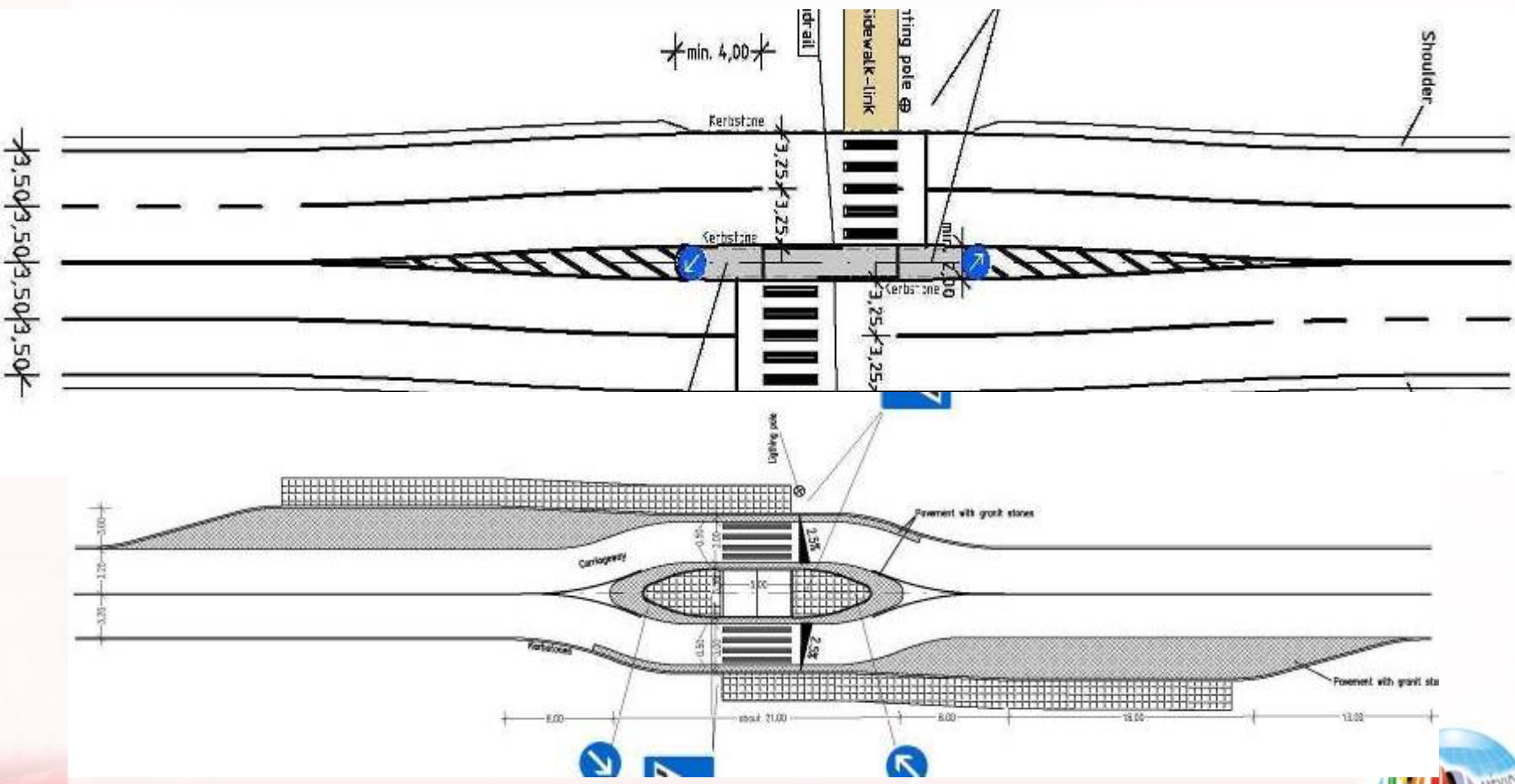
2-lane road with left turn and pedestrian crossing



... safe pedestrian crossings

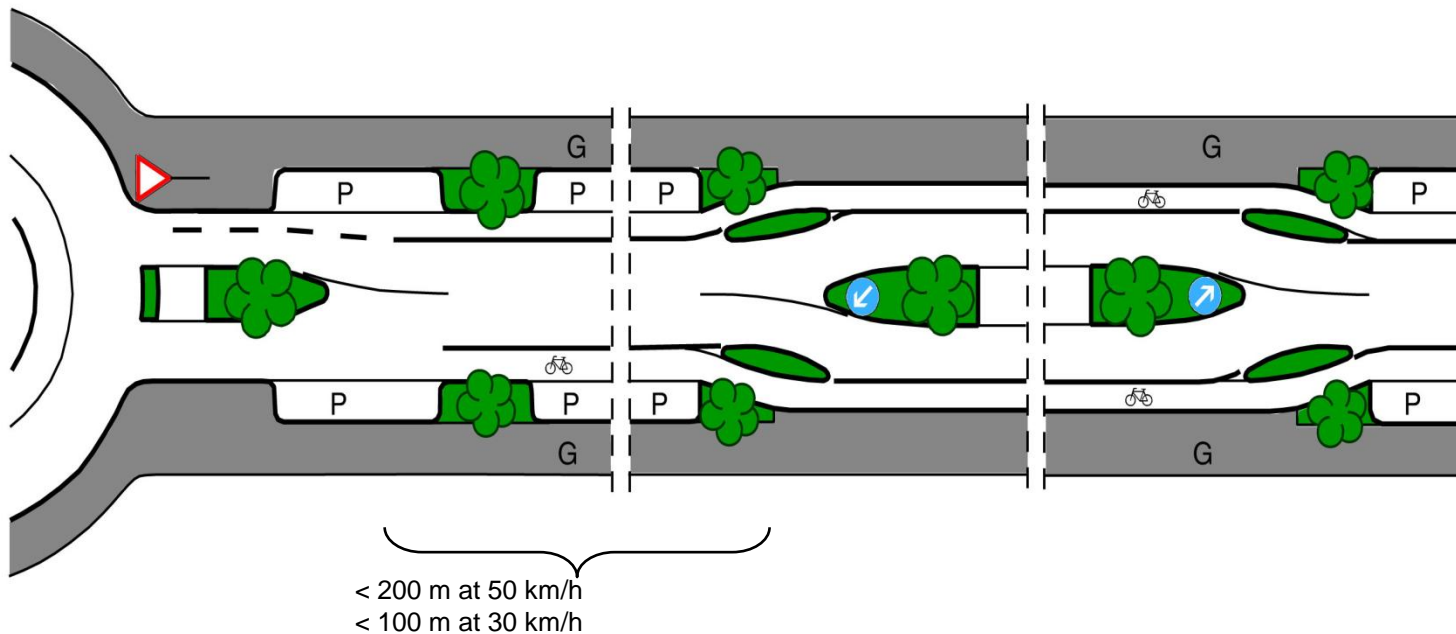


The System Approach to safer roads needs the repair by safe crossings



The System Approach to safer roads needs the repair by

Systematic Traffic Calming along the settled road sections



The System Approach to safer roads needs the repair by safe crossings

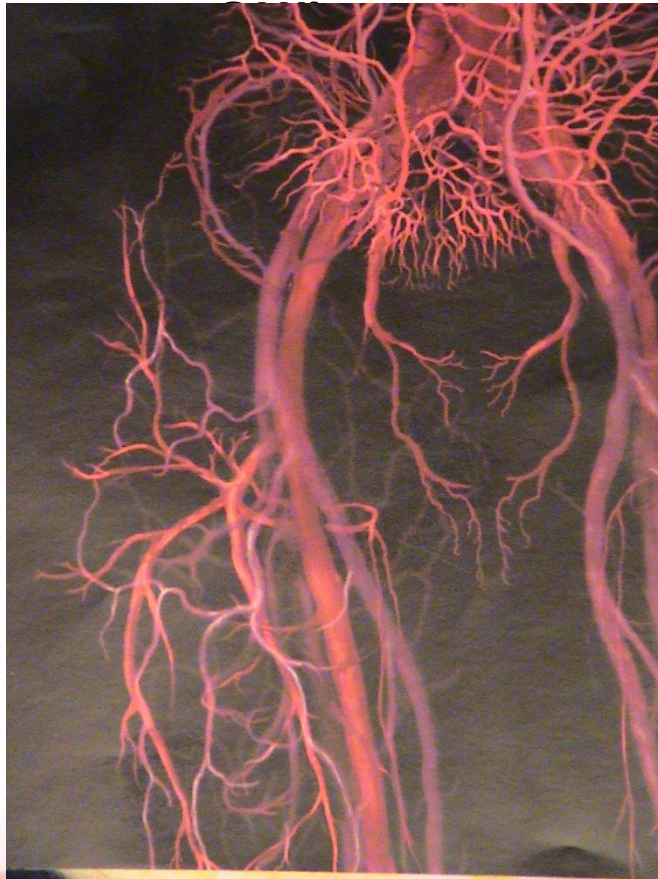
Our compliments to the hosting country for this solution: Separation of the local traffic and pedestrian bridges with ramps



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needs a better understanding of road networks:

**An efficient and safe road network is organized like
blood system:**



It is a hierarchy of

- **Main arteries**
- **Distributors**
- **and capillaries to access the single cells in the muscles and organs.**



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Volume and speed:

The blood moves much faster in the Main Arteries

- main arteries to legs and arm 5.8 cm/s

than in the Organs

- arterioles 0.28 cm/s
- capillaries 0,05 cm/s

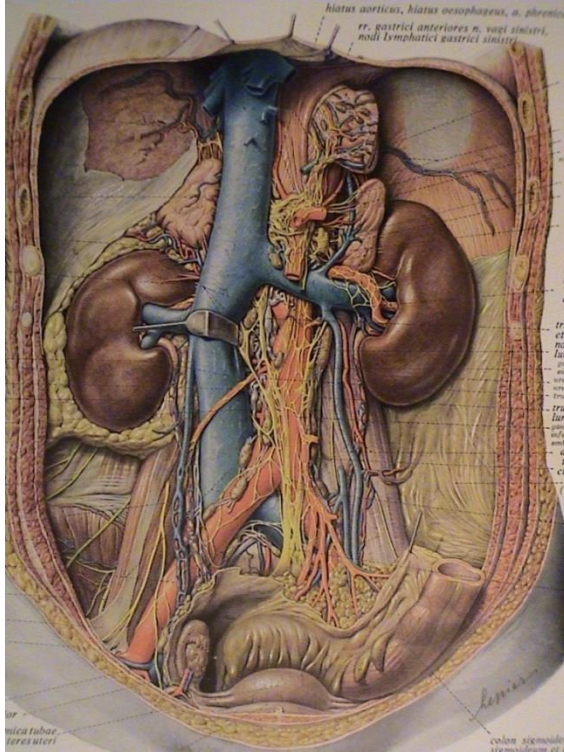
So it is with the road network:

For our economies the traffic volume and the speed along our main arteries along far distances has to be higher than in our towns and cities



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The main blood vessels never provide their surrounding tissue and the organs directly!



.... And the national trunk roads shouldn't



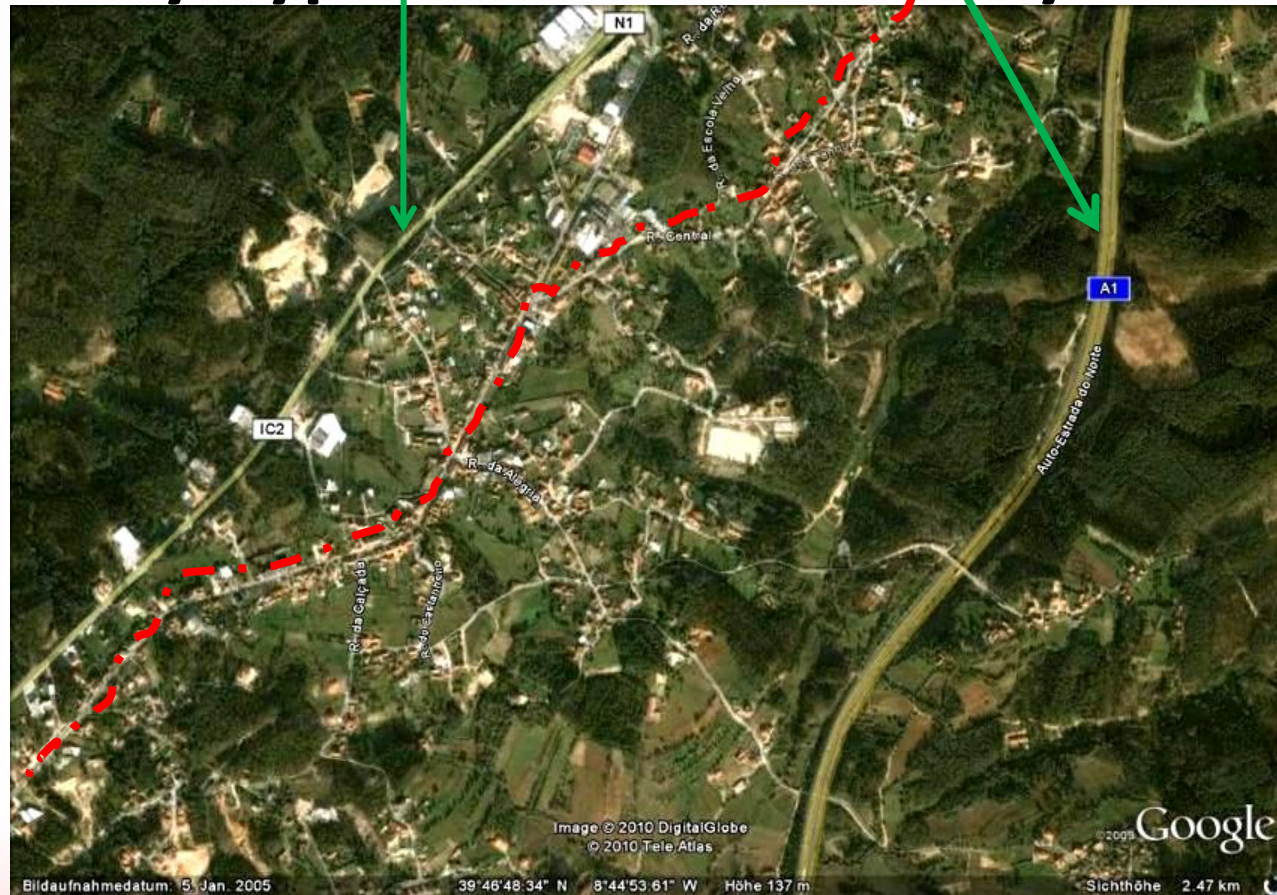
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we find linear settlements in Belgium from earlier Decades



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Portugal solved the linear settlement problem by bypasses and motorways



The System Approach to safer roads ...

....needs different design principles and standards for different functions of interurban and urban roads.

Mixed functions like those in linear settlements or along urbanized highways are the reason for the dramatic losses of lives among vulnerable road users in many low and middle income countries.

TC C.1.2 had a special focus on the design of urban roads.

Ms. Marion Dörfel will come to this topic now

