Challenges of pavement rehabilitation in Central and Eastern Europe (CEE) region

Wyzwania rehabilitacji nawierzchni w Europie Środkowo-Wschodniej

Dariusz Sybilski
IBDiM
(Road & Bridge Research Institute)
Need for roads

- Freedom of movement of people, goods and capital is one of the major founding principles of the European Union. An efficient transport system is a necessary condition for the proper functioning of a market economy. Regional accessibility, whether for person flows or goods flows, is particularly important because it is a prerequisite for trade and therefore economic development (Wanda Debauche, PIARC C19)
CEE specific challenges

- Climate
- Road traffic growth
- Existing pavements
Climate

PG 58-28

PG 58-34
Road traffic

AADT 2000

AADT, vehicles/day

%
Road traffic

AADT 1990-2000

Years

1990-1995

1995-2000
Road traffic

AADT 1990-2000, International roads

Year


14000 12000 10000 8000 6000 4000 2000 0

AADT, vehicle/day
Road traffic

AADT 1995-2000

Growth factor

Motorbikes  Personal cars  Light trucks  Trucks  Articulated trucks  Buses  Agriculture vehicles
Road traffic

- Conclusions
  - the growth is steady in the period 1990-2000
  - the most aggressive vehicle category of articulated trucks (including Super Singles) exhibits the highest growth in this period – the number of these vehicles almost doubled
Existing pavements:
Case study - permanent deformation (R. Elliot)

- L1: 5,3 cm
- L2: 3,3 cm
- L3: 7,3 cm
- L4/5: 8,2 cm
Existing pavements:
Case study - Hot recycling in place DK8

Modulus (creep 40°C)  |  Layer’s thickness
----------------------|---------------------
5.19 MPa  |  6.5 cm
6.38 MPa  |  4.0 cm
0.97 MPa  |  5.0 cm
21.68 MPa |  3.0 cm
5.50 MPa  |  5.5 cm
Existing pavements

- Environmental aspect:
  - Road tar frequently used in the past
  - Need for detection
  - Need for application of appropriate technique with regard to environmental and financial point of view
Need for strengthening

Cracking
Eveness
Rutting
Surface
Skid resistance

A  B  C  D
Need for strengthening

- 1 % of national roads in Poland prepared for 115 kN axle load
- 4800 km to be strengthen by 2015 to meet EU standards (30% of national roads network)
Need for strengthening
New materials and techniques

- Open market
- New products
- System of Technical Approvals for non-standardised products
- Road&Bridge Research Institute appointed by the Ministry in the area of roads and bridges
- 1350 Technical Approvals since 1998
New materials and techniques

- Technical Approval does not take responsibility from designer, investor, contractor
- Technical Approval is not a product’s quality certificate
- Innovations might bring confusion and problems
Technical Approvals
Aprobaty Techniczne

- PIARC?
- HRA?
- SBS?
- SMA?
- EVA?
- ?
New materials and techniques

- Stone Mastic Asphalt SMA
- Gap graded asphalt mixtures (BBTM)
- Thin asphalt layers
- High stiffness asphalt mixtures
- Polymer-modified binders
- Geosynthetics
- Hot and cold recycling
Need for pavement structure and materials

- to combat rutting resistance and low-temperature cracking resistance
- to provide long fatigue life and bearing capacity
Pavement design, modeling and material testing

- New tools available
  - Mechanistic pavement design
  - Visco-elastic-plastic pavement modeling
  - Performance related laboratory material testing
- Need for practical applications
Conclusions

- CEE region of expected potential great development of economy and transport infrastructure
- Demand for rehabilitation of existing and construction of new roads
- The best available techniques and materials should be applied, even at higher costs but providing longer life and meeting the technical requirements and demands of the society
- Recycling of asphalt pavements is a set of important techniques