

Rijeka – Zagreb
Motorway Plc.

Meeting the Environmental Challenges

Bojan Vivoda

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Croatian motorway network

1.263,7 km of motorways
(285,3 km in 1995)

– 82,7 km of tunnels

4 management companies

- 1 national motorway company (HAC) +
- 3 concession companies (BINA Istra, ARZ, AZM)

11 *green bridges*
Crossings for wild
animals



Rijeka - Zagreb Motorway

1970's - The Zagreb – Rijeka motorway first sections were constructed

1997 - Motorway Rijeka – Zagreb plc. established as a concession company

2008 - completion of 146 km dual carriageway motorway Rijeka - Zagreb

August 2007, concession extension:

- Rijeka bypass to the Slovenia border
- Orehovica to Križišće junction with access roads



ISO 14001

Proactive approach & Learning Company

Environmental management goals:

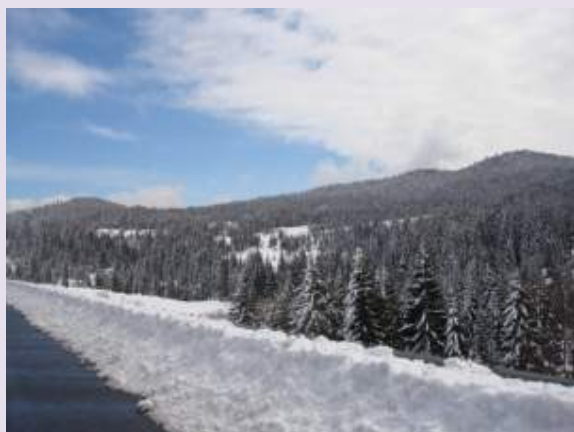
- Environmental risk control (aspects)
- Implementation laws and standards
- Reduction consumption of resources
- Reduction of waste and emissions
- Safe and environmentally friendly waste management



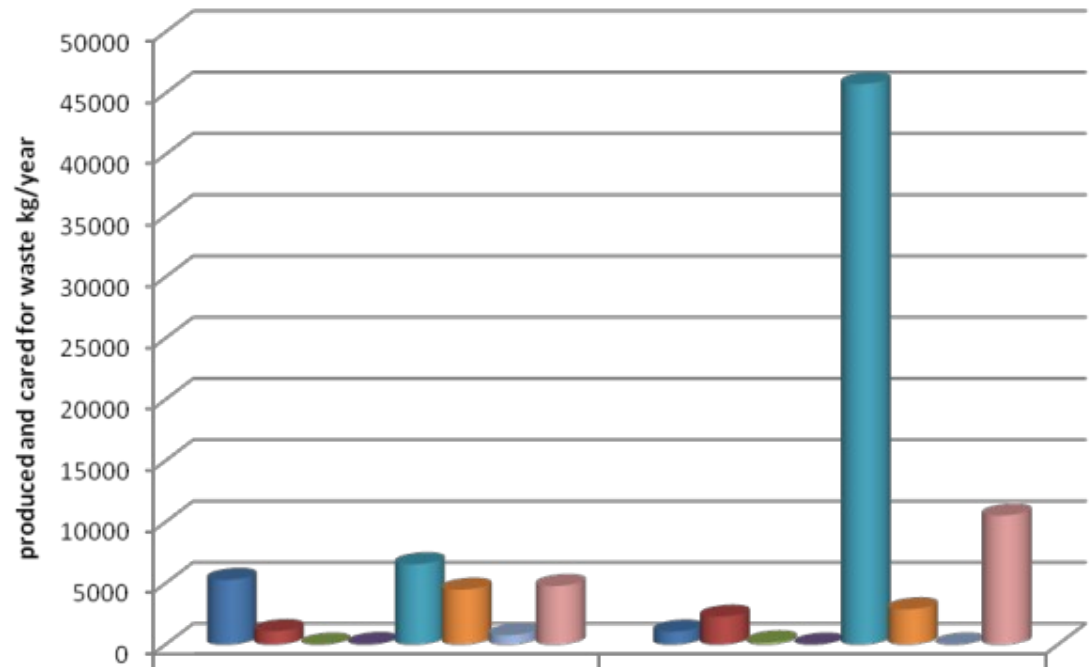
Resources

item	unit	2005	2006	2007	2008
NaCl *	T	14.034	8.322	8.604	6.567
CaCl ₂ *	T	215	129	128	75
diesel - maintenance	L	318.297	236.678	251.027	388.997
oil heat - maintenance	L	128.125	107.037	101.612	182.250
petrol - others	L	n/a	6.051	6.757	9.136
diesel - others	L	n/a	174.953	198.456	192.353
electricity	kWh	n/a	8.041.810	11.798.013	n/a

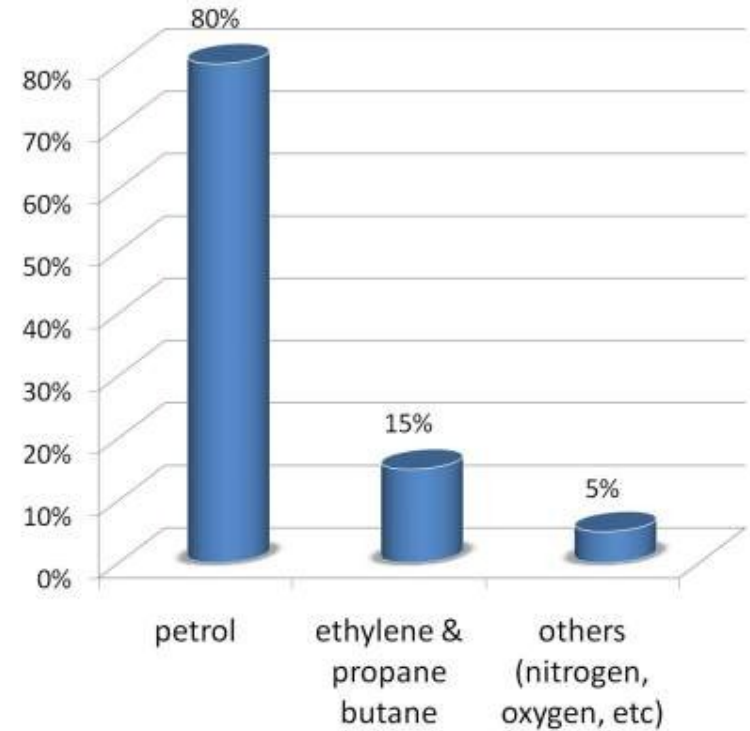
* Controlled usage of gritting salts and other resources according to ***Operational program of the winter maintenance works***



Waste



Hazardous Substances



Escort of hazardous freight carrying vehicles through 2006, 2007 &

Water

- Closed drainage system (~ 90 km)
- App. 10% of the total construction works value on the Construction Project is invested in construction of closed drainage system
- Regular inspection and maintenance



Air quality

- Monitoring of emission from stationary sources
- Air quality monitoring in Gorski kotar (NO_x , SO_x , H_2S , O_3 , PN_{10})
- Air quality monitoring during tunnel excavation



Noise Protection

- App. 5 km of noise barriers constructed up to date.
- Noise barriers are placed on parts where noise exceeds 50 decibel.
- Innovative noise barriers on Rijeka By-Pass with closed frame construction and solar panels.



Emergency

- 52 fireman & 9 fire vehicles
- 5 traffic control centers (Rupa, Čavle, Bosiljevo, Delnice, Lučko)
- Regular fireman training and fire drill
- Emergency intervention in case of environmental accidents 0-24





Construction

- Special technical requirements in tender
- Environmental plan
- Environmental Auditing of contractors - (operational control)

- Environment recovery



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Projects in 2009



- Demerje (Zagreb West) toll station

- non-cash toll
- environmental benefit
- improved traffic flow



- Rijeka By-pass
 - protection of Zvir water well
 - sound barriers
 - solar panels



Wildlife protection

- Green bridge
- Cooperation with veterinarian and forestry faculty
- Fence maintenance
- Monitoring of traffic accidents with animals



Wildlife protection

- 68.5 km of motoreway through a wildlife core area in Gorski kotar (Croatia)
- 43 viaducts and tunnels
- 1 green bridge (Dedin, 100 m wide).
- 1/4 of the total highway length consists of possible crossing structures.
- Large carnivores, brown bear, grey wolf and Eurasian lynx expressed positive selection for tunnels and viaducts, whilst avoiding small underpasses or bridges.
- The green bridge, constructed as a measure to mitigate the negative effects of the studied highway, served its purpose acceptably.
- The motorway in Gorski kotar does not seem to be a barrier.



Protected Areas



National park Risnjak

• HR2000447

River Kupa wellspring

• HR2000448

River Kupa

• HR2000642

Sunger's grove

• HR2000649

Vražji prolaz & Zeleni vir & Kupica

• HR2000650

Šuma Debela lipa - Veliki Rebar

• HR2000651

Kamačnik

• HR2000655

Bijela Vodica - Crni Lug

• HR2000662

Lepenica & lake Bajer

• HR2000663

Velika & Mala Belica

• HR2001000



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Nature Protected Areas





Thank you for your attention!

web: www.arz.hr
e-mail:
bvivoda@arz.hr