

Support for Implementing Measures for the South East Core
Regional Transport Network Multi Annual Plan
(EuropeAid/125783/C/SER/MULTI)

A practical example for an RSA - report

(RSA part 4)
by

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Consortium:
White Young Green Int. Ltd (WYG) as Leading Partner
TRADEMCO S.A.
VIENNA CONSULT
TRL Ltd

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Example from the RSA pilots

Road Safety Audit Report

Road M2

Section from km 1034+613 - km 1035+490

Conducted in Montenegro in the
beginning of April 2009

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General project details

Project description: National road M2 (E 65/80), between km
1034+613 - km 1035+490

Client: Traffic directorate of the Republic Montenegro

Designer: Urbisproject Novi Sad

Design phase/Audit phase: Detailed design

Date of creation: 2006

Audited documents: - Layout drawing (sc. 1:500 - drawing
No. 7.2), Longitudinal sections (sc. 1:500/50 - drawing No.
7.5), Typical cross section (sc. 1:50/10 - drawing No. 7.61),
Signalization plan (sc. 1:500 - drawing No. 7.8.1), Cross
sections for sector (sc. 1:100 - drawing No. 7.7)

Inspection of the section: yes (30/03/2009)

Peculiarities: Earlier planning phases have not been audited

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Specific project details

Description: National road M2 (E 65/80), between km
1034+613 - km 1035+490

Type of project: Rehabilitation

Length: 877 m

Cross section: Typical width of cross section 7,1 m (2-lane)
Typical width of lane 3,25 m
Typical Bordering lane 0,30 m
Typical Shoulders 1,00 m

Traffic volume: no information

Design speed: $V = 50$ km/h (mountainous area)

Legal speed: $V = 50$ km/h

Guidelines: The Audit was performed on the basis
of different European guidelines, actual recommendation for a
safe road design and the SEETO - Road Safety Audit Manual

Construction costs: no information

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Audit results - Problems

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Audit results

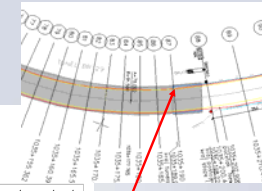
Problems:

Function, design and operating elements


- (1) The road is located in a difficult topographical area. Fixed obstacles nearby the carriageway are unavoidable, sufficient passive safety installations are necessary.

Cross section

- (2) In some subsection the auditors have doubts that sufficient measures has been foreseen on cutting slopes to prevent falling material (e.g. falling rocks). Therefore the client should check with support of a geologist if and where additional safety provisions like steel meshes are necessary.
- (3) Regarding the drainage of the road the RSA has identified problems at km 1035+190 (beginning of tunnel 29). At the right hand side the water could be not evacuated in a sufficient way because the interrupted open drainage gutter at the tunnel entrance.





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Audit results

Traffic Signing, Marking, Lighting

- (4) At the beginning of the section (km 1034+620) a right curve sign is foreseen. This sign is according the signalisation plan in the tunnel and should be replaced outside the tunnel. The location of the sign was chosen according the traffic regulation, nevertheless some drivers could be confused because the sign shows an right hand curve when driving actually a left hand curve. Therefore the RSA propose to install a double curve sign at the beginning of the left hand curve.
- (5) For the tunnel section we recommend to use catays reflectors on the top of the curves and additional red/white sign plates at the entrances to the tunnel for a better visibility for the driver.
- (6) With the start of the left hand curve at km 1034+982 till km 1035 +100 we recommend to install additional curve chevron signs to give the driver a better orientation.

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Audit results

Civil engineering structures

(7) According to the layout drawings and cross profiles No. 28 – 37 are steel guardrails foreseen at the bridge section in a right way. The bridge design drawings are not audited, the client should check if the bridge design includes sufficient guardrails.

Passive safety installations

(8) In general the design documentation should improved with all starting and end points of passive safety installation, some information are missing in the layout drawings or are there are contradictions between layout drawings and cross profiles.

(9) The guardrail section witch is starting at km 1034+727,500 at the right hand side should be lengthen until the station of the cross profile No. 40.

(10) The guardrail section witch is ending at km 1034+887 at the right hand side should be lengthen for some 5 m to close the "window".

(11) The new jersey section witch is ending at km 1035+070 at the right hand side should be lengthening for some 5 m to close the "window".

(12) The new jersey section witch is ending at km 1035+358 at the right hand side should be lengthening until the tunnel No. 31 to close the "window".

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Audit results - Remarks

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Audit results

Function, design and operating elements

(13) Because of the difficult topography the design and legal speed is 50 km/h. If there will be arise problems with speeding (e.g. reported in accident records) a stationary or mobile speed enforcement could be necessary.

Cross section

(14) It is recommended to start every kerb section with an soft start at level 0 to avoid sharp edges of kerbstones, this is error forgiving in the case of hitting.

Markings

(15) The shown markings in the layouts are obviously complete – but the auditors recommend the usage of cold plastic marking because of the better retroreflection at night.

General remarks

(16) For future project it is recommended to use European Guideline for passive safety installations and for tunnel design because the norm witch are current in use in Montenegro are obsolete. This would be an important step to improve the road safety. For guardrail post are error forgiving sigma post recommend instead of the double T profile.

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