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Connecta

Technical Assistance to Connectivity in the Western Balkans

Preparation of Road Safety Inspection and Audit
Plans for the Core/Comprehensive Road Network
in Western Balkans and Pilot them

Preparation of Road Safety Inspection and Audit Plans for the Core/Comprehensive Road Network in Western Balkans and Pilot them

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TA to Connectivity in the Western Balkans

EuropeAid/137850/IH/SER/MULTI

Sub-Project

Code: CONNECTA-TRA-CRM-REG-01

Area: Connectivity Transport Reform Measures

Preparation of Road Safety Inspection and Audit Plans for core/comprehensive road network in Western Balkans (WB6) and Pilots

**FINAL REPORT
(Consolidated)**

30 July 2018

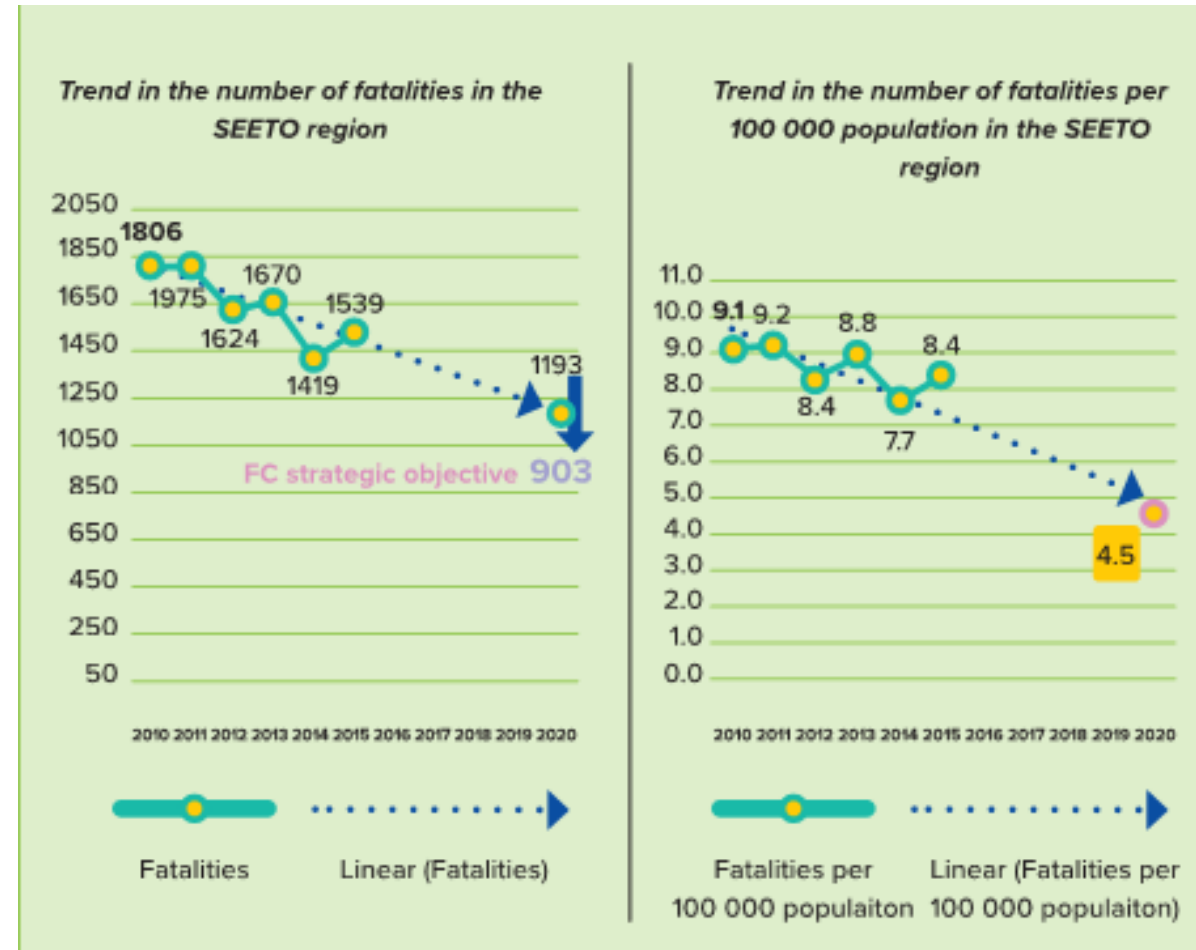


Background - Road safety in the region

SEETO Regional Participants

- Almost 84 road deaths per million population in 2016 compared to the EU28 at just over 50 road deaths per million of population
- More than 1,500 were killed and almost 55,000 were injured in the SEETO Regional Participants according in 2016
- Road safety reform progress around the WB6 varies but is generally low
- The EU Directive 2008/96/EC is not (or only partly) transposed in national legislations.

Trend in the number of fatalities



Background - Road safety in the region

Road safety status and support

- SEETO Regional Participants should, as part of the accession process, implement the EU directive
- Many SEETO Regional Participants will implement and improve the road network in coming years, thus road safety audits should be established as soon as possible
- Previous road safety project supported with a focus on Road Safety Audit and Inspection and Regional Road Safety Strategy
- Later support to implement road safety audits and to prepare guidelines in road safety inspections – both included training.

Road Safety Declaration in Ljubljana

A Road Safety Declaration was endorsed by Transport Ministers/representatives of the Western Balkans. Declaration suggests actions to:

- Strengthening road safety management
- Promote safer infrastructure
- Promote the protection of road users
- Promote the use of safer vehicles
- Enhance cooperation and exchange of experience.

Objective of study

Road Safety Sub-project

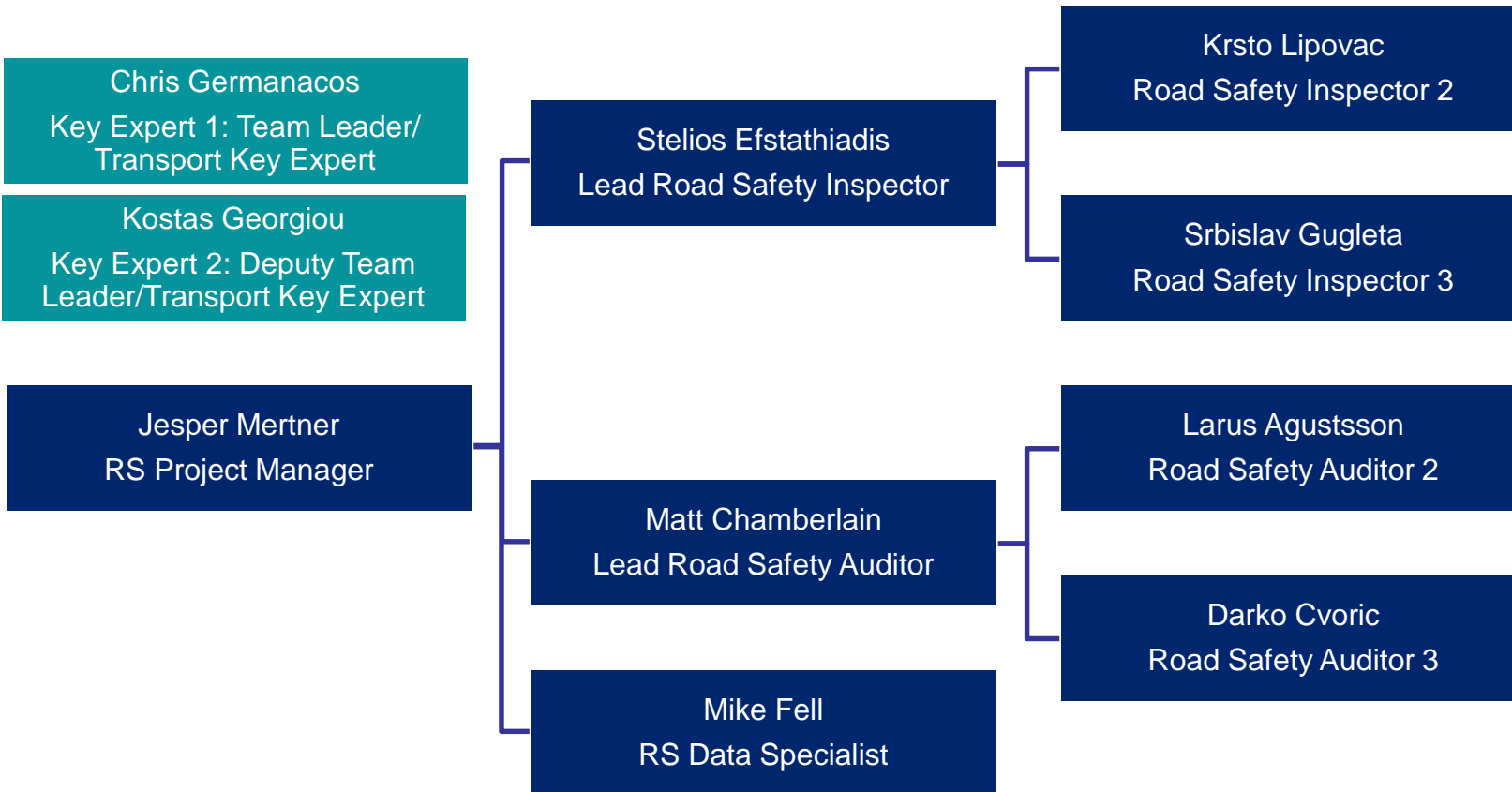


Prepare short-term plans (2018-2020) for road safety inspections and audits for the Core and Comprehensive Road Network in the Western Balkans. Deliver a part of these plans, as pilots

Specific objectives:

- Prepare three-year RSI plan for the core and comprehensive network and pilot RSIs on high accident sections
- Help to ensure that road safety audits are carried out according to the Directive 2008/96/EC on all projects on the core and comprehensive network and undertake sample audits
- Support Regional Participants in establishment of a national system for continuous road crash data collection (by 2018).

CONNECTA Road Safety Sub-project team



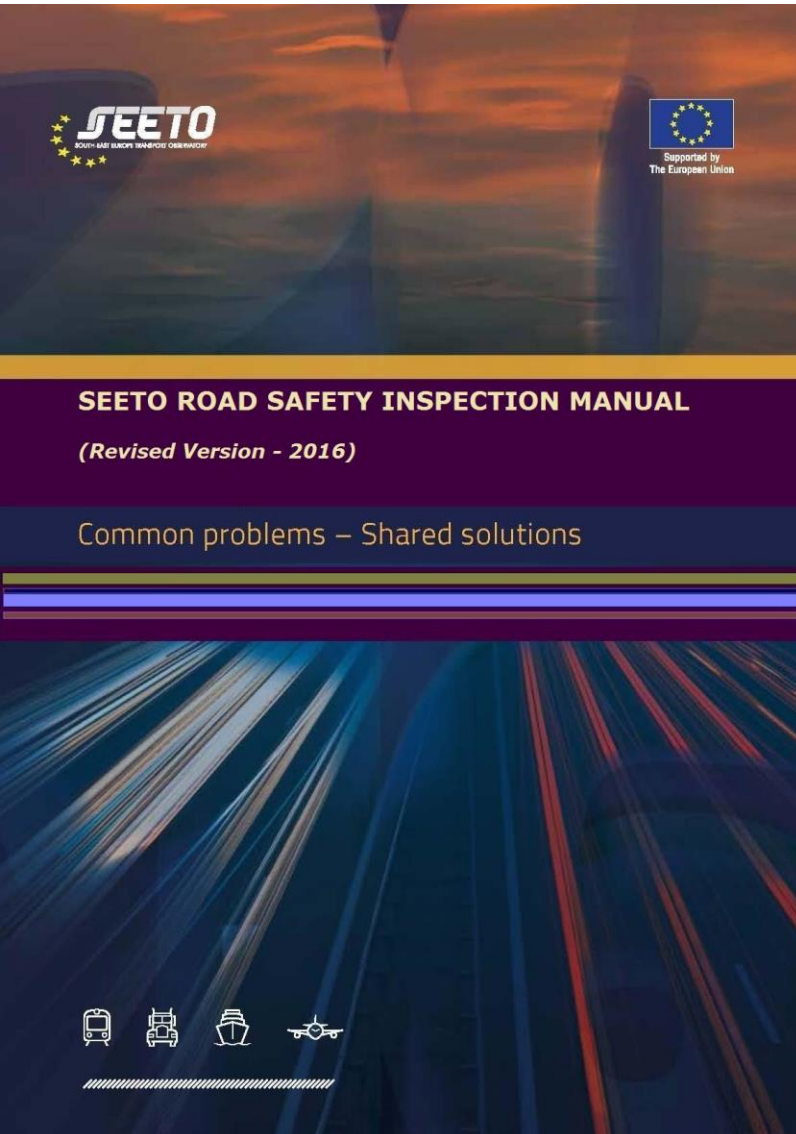
Local experts

- Amna Redzepagic, covering BiH
- Jovan Hristoski, covering MKD
- Emiljano Zhuleku, covering ALB and KOS
- Dusan Savkovic, covering SRB and MNE



COMPONENT 1: ROAD SAFETY INSPECTION

Road Safety Inspection activities



- Map existing core and comprehensive road network in Western Balkans
- Compile a list of all Road Safety Inspections that have been implemented during the last 3 years (2014-2016)
 - Including those done by EuroRAP/iRAP inspection methodology
- Prepare a three-year Plan (2018-2020) for road safety inspection for the core and comprehensive road network
- Undertake pilot road safety inspections on the core and comprehensive road network:
 - On 10% (approx. 550 km (actually 580 km were carried out))
 - On those considered highest risk portion of the network based on fatal crash data
 - Using SEETO's road safety inspection guidelines.

Corridors and Routes on SEETO road network

Corridor/Route	Section
Corridor Vc (400 km):	CRO border/Bosanski Samac (BIH) – Sarajevo (BIH) – Doljani/CRO border
Corridor VIII (657 km):	Tirane/ Durres/ Vlore (ALB) – Skopje (MKD) – Deve Bair/BG border
Corridor X (726 km):	CRO border /Batrovci –Belgrade (SRB) – Skopje (MKD) – Bogrodica/GR border
Corridor X B (185 km):	HU border/ Horgos—Novi Belgrade (SRB)
Corridor X C (110 km):	Nis (SRB) —Gradina/BG border
Corridor X D (117 km):	Veles (MKD) —Medzitlija/ GR border
Route 1 (147 km):	CRO border/Neum Northwest – Neum (BIH) –Bar (MNE)
Route 2a (228 km):	CRO border/Gradiska – Banja Luka (BIH) – Lasva (BIH)
Route 2b (395 km):	Sarajevo (BIH) – Podgorica (MNE) – Vore (ALB)
Route 2c (125 km):	Fier (ALB) —Kakavija/GR border
Route 3 (185 km):	Sarajevo (BIH) —Uzice (SRB)
Route 4 (601 km):	Romanian border/Vatin – Belgrade (SRB) – Podgorica (MNE) – Bar (MNE)
Route 5 (213 km):	Cacak (SRB) – Krusevac (SRB) – Paracin (SRB) – Vrska Cuka/BG border
Route 6a (259 km):	Ribarevina (MNE) – Ribarice (SRB) – Pristina (KOS) – Skopje (MKD)
Route 6b (205 km):	Pristina (KOS) –Peje/Pec (KOS) – Kolasin (MNE)
Route 7 (314 km):	Lezhe (ALB) – Pristina (KOS) – Doljevac (SRB)
Route 8 (78 km):	Podmolje (MKD) – Bitola MKD)
Route 9a (305 km):	Novi Sad (SRB) – Ruma (SRB) – Loznica (SRB)/Zvornik (BIH) – Tuzla (BiH) – Doboj (BiH) – Banja Luka (BiH)
Route 10 (142 km):	Miladinovci (MKD) – Stip (MKD) – Novo Selo (MKD)

Existing core and comprehensive road network in Western Balkans

SEETO comprehensive and core network: 5,462 km:

- Core road network: 3,522 km
- Comprehensive road network: 1,940 km
- Corridors: 2,198 km
- Routes: 3,264 km.



Road Safety Inspections implemented during the last 3 years (2014-2016)

	All sections	SEETO Network	Corridors/Routes	Past 3 years	
				RSI	iRAP
Albania	Muriqan(MNE border) - Koplik	Core	Route 1	Yes	
	Koplik - Skhoder	Core	Route 1		
	Skhoder - F. Kruje	Core	Route 1	Yes	
	F. Kruje - Lezhe	Core	Route 1		
	Hani i Hotit (MNE border) - Fush Kruje	Comprehensive	Route 2b		
	Fush Kruje - Vore	Comprehensive	Route 2b	Yes	
	Rrogozhine - Fier	Core	Route 2c	Yes	
	Fier - Tepelene	Core	Route 2c		
	Tepelene - Kakavia (GR border)	Core	Route 2c	Yes	
	Morine Vermice (KOS border) - Lezhe	Core	Route 7	Yes	
	Qaf Thane (MKD border) - Elbasan	Core	Corridor VIII	Yes	
	Elbasan - Tirane	Core	Corridor VIII	Yes	
	Tirane - Durres	Core	Corridor VIII		
	Durres - Vlore	Core	Corridor VIII		
	Fier - Vlore	Core	Corridor VIII		
	Bosnia and Herzegovina	Neum west - Neum South	Core	Route 1	
Gradiska (CRO border) - Banja Luka - Jajce Jug		Core	Route 2a		
Jajce Jug - Donji Vakuf		Core	Route 2a		
Donji Vakuf - Lasva		Core	Route 2a		
Sarajevo - Hum (MNE border)		Comprehensive	Route 2b		
Sarajevo - Lapisnica		Comprehensive	Route 3		
Lapisnica - Ljubogosta		Comprehensive	Route 3	Yes	
Ljubogosta - Podromanija		Comprehensive	Route 3		
Podromanija - Rogatica		Comprehensive	Route 3	Yes	
Rogatica - Vardiste (SRB border)		Comprehensive	Route 3		
Banja Luka - Doboju - Karakaj (SRB border)		Comprehensive	Route 9a		
Bosanski Samac (CRO border) - Matuzici		Core	Corridor Vc		
Matuzici - Ozimica		Core	Corridor Vc		
Ozimica - Topcic Polje		Core	Corridor Vc		
Topcic Polje - Sarajevo - Jablanica		Core	Corridor Vc		
Jablanica - Potoci		Core	Corridor Vc		
Potoci - Doljani (CRO border)	Core	Corridor Vc			

Road Safety Inspections implemented during the last 3 years (2014-2016)

	All sections	SEETO Network	Corridors/Routes	Past 3 years	
				RSI	iRAP
The former Yugoslav Republic of Macedonia	Djeneral Jankovic (KOS border) - Skopje	Core	Route 6a		Yes
	Podmolje - Bitola	Comprehensive	Route 8		Yes
	Miladinovci - Stip - Novo Selo (BG border)	Comprehensive	Route 10		Yes
	Kafasan (ALB border) – Skopje	Core	Corridor VIII		Yes
	Skopje - Stracin	Core	Corridor VIII		Yes
	Stracin - Kriva Palanka	Core	Corridor VIII		Yes
	Kriva Palanka - Deve Bair (BG border)	Core	Corridor VIII		Yes
	Tabanovce (SRB border) - Skopje - Bogorodica (GR border)	Core	Corridor X		Yes
	Veles - Prilep	Comprehensive	Corridor Xd		Yes
	Prilep - Bitola	Comprehensive	Corridor Xd		Yes
	Bitola - Medzitlija (GR border)	Comprehensive	Corridor Xd		Yes
	Kosovo*	Brnjak (SRB border) - Veternik	Comprehensive	Route 6a	
Veternik - Lipljan		Core	Route 6a		
Lipljan - Hani i Elezit (MKD border)		Core	Route 6a		
Kuqishte (MNE border) - Kijeve/Kijevo		Comprehensive	Route 6b		
Kijeve/Kijevo - Gjurgjice/Djurdjice		Comprehensive	Route 6b		
Gjurgjice/Djurdjice - Fushe Kosove/Kosovo Polje		Comprehensive	Route 6b		
Vermice/Vrbnica (ALB border) - Merdare (SRB border)		Core	Route 7		
Debeli Brijeg (CRO border) - Sukobin (ALB border)		Core	Route 1		
Montenegro	Scepan Polje (BIH border) - Bozaj (ALB border)	Comprehensive	Route 2b		
	Dobrakovo (SRB border) - Mioska	Core	Route 4		
	Mioska - Podgorica	Core	Route 4		
	Podgorica - Bar	Core	Route 4		
	Ribarevine - Dracenovac (SRB border)	Comprehensive	Route 6a		
	Kolasin - Kula (KOS border)	Comprehensive	Route 6b		

* This designation is without prejudice to positions on status and is in line with UNSCR 1244/1999 and the ICJ Opinion on the Kosovo declaration of independence.

Road Safety Inspections implemented during the last 3 years (2014-2016)

	All sections	SEETO Network	Corridors/Routes	Past 3 years	
				RSI	iRAP
Serbia	Uzice - Kotroman (BIH)	Comprehensive	Route 3		
	Vatin (RO border) - Belgrade - Orlovaca	Core	Route 4		
	Orlovaca-Stepojevac	Core	Route 4		
	Stepojevac-Celije	Core	Route 4		
	Celije - Knezevici	Core	Route 4		
	Knezevici - Kokin Brod	Core	Route 4	Yes	
	Kokin Brod - Gostun (MNE border)	Core	Route 4		
	Cacak/Preljina - Mrcajevci	Comprehensive	Route 5		
	Mrcajevci - Vrnjci	Comprehensive	Route 5		
	Vrnjci - Kamidzora	Comprehensive	Route 5		
	Kamidzora- Paracin - Vrska Cuka (BG border)	Comprehensive	Route 5		
	Spiljani (MNE border) - Brnjak (KOS border)	Comprehensive	Route 6a		
	Nis - Merosina	Core	Route 7	Yes	
	Merosina - Merdare (KOS border)	Core	Route 7		
	Novi Sad/Petrovaradin - Sremska Kamenica	Comprehensive	Route 9a		
	Sremska Kamenica - Irig	Comprehensive	Route 9a	Yes	
	Irig - Ruma	Comprehensive	Route 9a		
	Ruma - Klenak	Comprehensive	Route 9a	Yes	
	Klenak - Loznica - Mali Zvornik (BIH border)	Comprehensive	Route 9a		
	Batrovci (CRO border) - Kuzmin	Core	Corridor X		
	Kuzmin - Sremska Mitrovica	Core	Corridor X	Yes	
	Sremska Mitrovica - Beograd/Dobanovci	Core	Corridor X		
	Beograd/Dobanovci - Bubanj Potok	Core	Corridor X		
	Bubanj Potok - Mali Pozarevac	Core	Corridor X		
	Mali Pozarevac - Presevo (MKD border)	Core	Corridor X		
	Horgos (HU border) - Feketic	Core	Corridor Xb		
	Feketic-Sirig	Core	Corridor Xb		
	Sirig - Beograd/Dobanovci	Core	Corridor Xb		
	Nis - Gradina (BG border)	Core	Corridor Xc		

Three-year Plan (2018-2020) for road safety inspection for the core and comprehensive road network

- Road network that has not been inspected during the last three years:
 - Prepare iRAP maps, according to the star rating methodology
 - Perform detailed road safety inspections for the road sections that have the worst performance according to the iRAP star rating methodology
 - Perform RSI for 20% of the Regional Participant's core and comprehensive road network annually
 - within 5 years the whole network will have been inspected
 - If funds are short, do iRAP and the RSI will focus only on worse performing road sections.

Three-year Plan (2018-2020) for road safety inspection for the core and comprehensive road network

	All sections	SEETO Network	Corridors / Routes	Past RSI	Past/ current iRAP	Connecta pilot RSI	Missing RSI
Albania	Muriqan(MNE border) - Koplik	Core	Route 1	√			
	Koplik - Skhoder	Core	Route 1			√	
	Skhoder - F. Kruje	Core	Route 1	√			
	F. Kruje - Lezhe	Core	Route 1			√	
	Hani i Hotit (MNE border) - Fush Kruje	Comprehensive	Route 2b				√
	Fush Kruje - Vore	Comprehensive	Route 2b	√			
	Rrogozhine - Fier	Core	Route 2c	√			
	Fier - Tepelene	Core	Route 2c				√
	Tepelene - Kakavia (GR border)	Core	Route 2c	√			
	Morine Vermice (KOS border) - Lezhe	Core	Route 7	√			
	Qaf Thane (MKD border) - Elbasan	Core	Corridor VIII	√			
	Elbasan - Tirane	Core	Corridor VIII	√			
	Tirane - Durres	Core	Corridor VIII			√	
	Durres - Vlore	Core	Corridor VIII				√
	Fier - Vlore	Core	Corridor VIII			√	
Bosnia and Herzegovina	Neum west - Neum South	Core	Route 1				√
	Gradiska (CRO border) - Banja Luka - Jajce Jug	Core	Route 2a				√
	Jajce Jug - Donji Vakuf	Core	Route 2a			√	
	Donji Vakuf - Lasva	Core	Route 2a				√
	Sarajevo - Hum (MNE border)	Comprehensive	Route 2b				√
	Sarajevo - Lapisnica	Comprehensive	Route 3				√
	Lapisnica - Ljubogosta	Comprehensive	Route 3	√			
	Ljubogosta - Podromanija	Comprehensive	Route 3				√
	Podromanija - Rogatica	Comprehensive	Route 3	√			
	Rogatica - Vardiste (SRB border)	Comprehensive	Route 3				√
	Banja Luka - Doboj - Karakaj (SRB border)	Comprehensive	Route 9a				√
	Bosanski Samac (CRO border) - Matuzici	Core	Corridor Vc				√
	Matuzici - Ozimica	Core	Corridor Vc			√	
	Ozimica - Topcic Polje	Core	Corridor Vc			√	
	Topcic Polje - Sarajevo - Jablanica	Core	Corridor Vc				√
Jablanica - Potoci	Core	Corridor Vc			√		
Potoci - Doljani (CRO border)	Core	Corridor Vc				√	

Three-year Plan (2018-2020) for road safety inspection for the core and comprehensive road network

	All sections	SEETO Network	Corridors / Routes	Past RSI	Past/ current iRAP	Connecta pilot RSI	Missing RSI
The former Yugoslav Republic of Macedonia	Djeneral Jankovic (KOS border) - Skopje	Core	Route 6a		√		√
	Podmolje - Bitola	Comprehensive	Route 8		√		√
	Miladinovci - Stip - Novo Selo (BG border)	Comprehensive	Route 10		√		√
	Kafasan (ALB border) - Skopje	Core	Corridor VIII		√		√
	Skopje - Stracin	Core	Corridor VIII		√		√
	Stracin - Kriva Palanka	Core	Corridor VIII		√	√	
	Kriva Palanka - Deve Bair (BG border)	Core	Corridor VIII		√		√
	Tabanovce (SRB border) - Skopje - Bogorodica (GR border)	Core	Corridor X		√		√
	Veles - Prilep	Comprehensive	Corridor Xd		√		√
	Prilep - Bitola	Comprehensive	Corridor Xd		√	√	
	Bitola - Medzitlija (GR border)	Comprehensive	Corridor Xd		√		√
Kosovo	Brnjak (SRB border) - Veternik	Comprehensive	Route 6a				√
	Veternik - Lipljan	Core	Route 6a			√	
	Lipljan - Hani i Elezit (MKD border)	Core	Route 6a				√
	Kuqishte (MNE border) - Kijeve/Kijevo	Comprehensive	Route 6b				√
	Kijeve/Kijevo - Gjurgjice/Djurdjice	Comprehensive	Route 6b			√	
	Gjurgjice/Djurdjice - Fushe Kosove/Kosovo Polje	Comprehensive	Route 6b			√	
	Vermice/Vrbnica (ALB border) - Merdare (SRB border)	Core	Route 7				√
Montenegro	Debeli Brijeg (CRO border) - Sukobin (ALB border)	Core	Route 1				√
	Scepan Polje (BIH border) - Bozaj (ALB border)	Comprehensive	Route 2b				√
	Dobrakovo (SRB border) - Mioska	Core	Route 4				√
	Mioska - Podgorica	Core	Route 4			√	
	Podgorica - Bar	Core	Route 4				√
	Ribarevine - Dracenovac (SRB border)	Comprehensive	Route 6a				√
	Kolasin - Kula (KOS border)	Comprehensive	Route 6b				√

Three-year Plan (2018-2020) for road safety inspection for the core and comprehensive road network

	All sections	SEETO Network	Corridors / Routes	Past RSI	Past/ current iRAP	Connecta pilot RSI	Missing RSI
Serbia	Uzice - Kotroman (BIH)	Comprehensive	Route 3				√
	Vatin (RO border) - Belgrade - Orlovaca	Core	Route 4				√
	Orlovaca-Stepojevac	Core	Route 4			√	
	Stepojevac-Celije	Core	Route 4			√	
	Celije - Knezevici	Core	Route 4				√
	Knezevici - Kokin Brod	Core	Route 4	√			
	Kokin Brod - Gostun (MNE border)	Core	Route 4				√
	Cacak/Preljina - Mrcajevci	Comprehensive	Route 5			√	
	Mrcajevci - Vrnjci	Comprehensive	Route 5				√
	Vrnjci - Kamidzora	Comprehensive	Route 5			√	
	Kamidzora- Paracin - Vrska Cuka (BG border)	Comprehensive	Route 5				√
	Spiljani (MNE border) - Brnjak (KOS border)	Comprehensive	Route 6a				√
	Nis - Merosina	Core	Route 7	√			
	Merosina - Merdare (KOS border)	Core	Route 7				√
	Novi Sad/Petrovaradin - Sremska Kamenica	Comprehensive	Route 9a			√	
	Sremska Kamenica - Irig	Comprehensive	Route 9a	√			
	Irig - Ruma	Comprehensive	Route 9a				√
	Ruma - Klenak	Comprehensive	Route 9a	√			
	Klenak - Loznica - Mali Zvornik (BIH border)	Comprehensive	Route 9a				√
	Batrovci (CRO border) - Kuzmin	Core	Corridor X				√
	Kuzmin - Sremska Mitrovica	Core	Corridor X	√			
	Sremska Mitrovica - Beograd/Dobanovci	Core	Corridor X				√
	Beograd/Dobanovci - Bujanj Potok	Core	Corridor X			√	
	Bujanj Potok - Mali Pozarevac	Core	Corridor X			√	
	Mali Pozarevac - Presevo (MKD border)	Core	Corridor X				√
	Horgos (HU border) - Feketic	Core	Corridor Xb				√
	Feketic-Sirig	Core	Corridor Xb			√	
	Sirig - Beograd/Dobanovci	Core	Corridor Xb				√
	Nis - Gradina (BG border)	Core	Corridor Xc				√

Three-year Plan (2018-2020) for road safety inspection for the core and comprehensive road network

Cost estimates

- Risk Map: total cost is between 20€ and 30€ per km
 - The total cost incorporates associated costs (i.e. QA, mapping according to standards, etc.)
- iRAP: total cost is between 100€ and 120€ per km
 - The total cost incorporates associated costs (i.e. iRAP system, labour, reporting, etc.).
- Road safety inspection: The total cost is between 300€ to 350€ per km
 - The total cost incorporates associated costs (i.e. equipment, labour, per diems, reporting, etc.)
- The above indicative cost ranges are based on the assumption that inspections are to be conducted by private consultants and with a team of international and local experts.

Three-year Plan (2018-2020) for road safety inspection for the core and comprehensive road network – by corridor/route

Corridors/ Routes	SEETO Network	All sections	Regional Participant	EuroRAP Risk Map	iRAP	Traditional RSI	EuroRAP Risk Map Total (€)	iRAP Total (€)	Traditional RSI Total (€)
Corridor Vc	Core	Bosanski Samac (CRO border) - Matuzici	BIH	2,000	8,800	26,000	10,000	34,122	100,815
	Core	Matuzici - Ozimica	BIH	738	-	-			
	Core	Ozimica - Topcic Polje	BIH	600	-	-			
	Core	Topcic Polje - Sarajevo - Jablanica	BIH	4,205	18,502	54,665			
	Core	Jablanica - Potoci	BIH	908	-	-			
	Core	Potoci - Doljani (CRO border)	BIH	1,550	6,820	20,150			
Corridor VIII	Core	Qaf Thane (MKD border) - Elbasan	ALB	2,025	-	-	14,590	-	125,775
	Core	Elbasan - Tirane	ALB	625	-	-			
	Core	Tirane - Durres	ALB	750	-	-			
	Core	Durres - Vlore	ALB	2,975	-	38,675			
	Core	Fier - Vlore	ALB	840	-	-			
	Core	Kafasan (ALB border) - Skopje	MKD	4,750	-	61,750			
	Core	Skopje - Stracin	MKD	1,550	-	20,150			
	Core	Stracin - Kriva Palanka	MKD	675	-	-			
Corridor X	Core	Kriva Palanka - Deve Bair (BG border)	MKD	400	-	5,200	17,103	47,487	199,128
	Core	Tabanovce (SRB border) - Skopje - Bogorodica (GR border)	MKD	4,525	-	58,825			
	Core	Batrovci (CRO border) - Kuzmin	SRB	853	3,751	11,083			
	Core	Kuzmin - Sremska Mitrovica	SRB	533	-	-			
	Core	Sremska Mitrovica - Beograd/Dobanovci	SRB	1,190	5,236	15,470			
	Core	Beograd/Dobanovci - Bujanj Potok	SRB	738	-	-			
	Core	Bujanj Potok - Mali Pozarevac	SRB	515	-	-			
Corridor Xb	Core	Mali Pozarevac - Presevo (MKD border)	SRB	8,750	38,500	113,750	4,625	17,919	52,943
	Core	Horgos (HU border) - Feketic	SRB	1,800	7,920	23,400			
	Core	Feketic-Sirig	SRB	553	-	-			
Corridor Xc	Core	Sirig - Beograd/Dobanovci	SRB	2,273	9,999	29,543	2,750	12,100	35,750
	Core	Nis - Gradina (BG border)	SRB	2,750	12,100	35,750			
Corridor Xd	Comprehensive	Veles - Prilep	MKD	1,525	-	19,825	2,925	-	24,375
	Comprehensive	Prilep - Bitola	MKD	1,050	-	-			
	Comprehensive	Bitola - Medzitlija (GR border)	MKD	350	-	4,550			

Three-year Plan (2018-2020) for road safety inspection for the core and comprehensive road network – by corridor/route

Corridors/ Routes	SEETO Network	All sections	Regional Participant	EuroRAP Risk Map	iRAP	Traditional RSI	EuroRAP Risk Map Total (€)	iRAP Total (€)	Traditional RSI Total (€)
Route 1	Core	Muriqan (MNE border) - Koplik	ALB	800	-	-	12,690	35,420	104,650
	Core	Koplik - Skhoder	ALB	325	-	-			
	Core	Skhoder - F. Kruje	ALB	1,793	-	-			
	Core	F. Kruje - Lezhe	ALB	898	-	-			
	Core	Neum west - Neum South	BIH	125	550	1,625			
	Core	Debeli Brijeg (CRO border) - Sukobin (ALB border)	MNE	3,050	13,420	39,650			
Route 2a	Core	Gradiska (CRO border) - Banja Luka - Jajce Jug	BIH	3,175	13,970	41,275	9,300	27,610	116,350
	Core	Jajce Jug - Donji Vakuf	BIH	825	-	-			
	Core	Donji Vakuf - Lasva	BIH	1,700	7,480	22,100			
Route 2b	Comprehensive	Hani i Hotit (MNE border) - Fush Kruje	ALB	2,675	-	34,775	4,625	16,456	48,620
	Comprehensive	Fush Kruje - Vore	ALB	350	-	-			
	Comprehensive	Sarajevo - Hum (MNE border)	BIH	2,425	10,670	31,525			
	Comprehensive	Scepan Polje (BIH border) - Bozaj (ALB border)	MNE	3,850	16,940	50,050			
Route 2c	Core	Rrogozhine - Fier	ALB	1,125	-	-	4,625	0	26,650
	Core	Fier - Tepelene	ALB	2,050	-	26,650			
	Core	Tepelene - Kakavia (GR border)	ALB	1,450	-	-			
Route 3	Comprehensive	Sarajevo - Lapisnica	BIH	63	275	813	4,625	16,456	48,620
	Comprehensive	Lapisnica - Ljubogosta	BIH	170	-	-			
	Comprehensive	Ljubogosta - Podromanija	BIH	688	3,025	8,938			
	Comprehensive	Podromanija - Rogatica	BIH	715	-	-			
	Comprehensive	Rogatica - Vardiste (SRB border)	BIH	1,640	7,216	21,320			
	Comprehensive	Uzice - Kotroman (BIH)	SRB	1,350	5,940	17,550			
Route 4	Core	Dobrakovo (SRB border) – Mioska	MNE	2,025	8,910	26,325	15,030	51,040	150,800
	Core	Mioska – Podgorica	MNE	1,350	-	-			
	Core	Podgorica – Bar	MNE	1,250	5,500	16,250			
	Core	Vatin (RO border) - Belgrade – Orlovaca	SRB	2,925	12,870	38,025			
	Core	Orlovaca-Stepojevac	SRB	553	-	-			
	Core	Stepojevac-Celije	SRB	553	-	-			
	Core	Celije – Knezevici	SRB	3,650	16,060	47,450			
	Core	Knezevici - Kokin Brod	SRB	975	-	-			
Core	Kokin Brod - Gostun (MNE border)	SRB	1,750	7,700	22,750				

Three-year Plan (2018-2020) for road safety inspection for the core and comprehensive road network – by corridor/route

Corridors/ Routes	SEETO Network	All sections	Regional Participant	EuroRAP Risk Map	iRAP	Traditional RSI	EuroRAP Risk Map Total (€)	iRAP Total (€)	Traditional RSI Total (€)
Route 5	Comprehensive	Cacak/Preljina - Mrcajevci	SRB	308	-	-	5,328	19,800	58,500
	Comprehensive	Mrcajevci - Vrnjci	SRB	1,100	4,840	14,300			
	Comprehensive	Vrnjci - Kamidzora	SRB	520	-	-			
	Comprehensive	Kamidzora- Paracin - Vrska Cuka (BG border)	SRB	3,400	14,960	44,200			
Route 6a	Core	Djeneral Jankovic (KOS border) - Skopje	MKD	400	-	5,200	6,475	11,814	81,705
	Comprehensive	Brnjak (SRB border) - Veternik	KOS	1,800	-	23,400			
	Core	Veternik - Lipljan	KOS	190	-	-			
	Core	Lipljan - Hani i Elezit (MKD border)	KOS	1,400	-	18,200			
	Comprehensive	Ribarevine - Dracenovac (SRB border)	MNE	1,985	8,734	25,805			
	Comprehensive	Spiljani (MNE border) - Brnjak (KOS border)	SRB	700	3,080	9,100			
Route 6b	Comprehensive	Kuqishte (MNE border) - Kijeve/Kijevo	KOS	1,675	-	21,775	5,125	10,890	53,950
	Comprehensive	Kijeve/Kijevo - Gjurgjice/Djurdjice	KOS	275	-	-			
	Comprehensive	Gjurgjice/Djurdjice - Fushe Kosove/Kosovo Polje	KOS	700	-	-			
	Comprehensive	Kolasin - Kula (KOS border)	MNE	2,475	10,890	32,175			
Route 7	Core	Morine Vermice (KOS border) - Lezhe	ALB	2,775	-	-	7,850	7,810	63,700
	Core	Vermice/Vrbnica (ALB border) - Merdare (SRB border)	KOS	3,125	-	40,625			
	Core	Nis - Merosina	SRB	175	-	-			
	Core	Merosina - Merdare (KOS border)	SRB	1,775	7,810	23,075			
Route 8	Comprehensive	Podmolje - Bitola	MKD	1,950	-	25,350	1,950	0	25,350
Route 9a	Comprehensive	Banja Luka - Doboj - Karakaj (SRB border)	BIH	4,950	21,780	64,350	8,598	31,570	93,275
	Comprehensive	Novi Sad/Petrovaradin - Sremska Kamenica	SRB	195	-	-			
	Comprehensive	Sremska Kamenica - Irig	SRB	353	-	-			
	Comprehensive	Irig - Ruma	SRB	225	990	2,925			
	Comprehensive	Ruma - Klenak	SRB	875	-	-			
	Comprehensive	Klenak - Loznica - Mali Zvornik (BIH border)	SRB	2,000	8,800	26,000			
Route 10	Comprehensive	Miladinovci - Stip - Novo Selo (BG border)	MKD	3,550	-	46,150	3,550	0	46,150
			Total:	137,138	324,038	1,408,485	137,138	324,038	1,408,485

Three-year Plan (2018-2020) for road safety inspection for complementing inspections on core and comprehensive SEETO road network

		Year 1	Year 2	Year 3	Year 4	Total
Albania	EuroRAP	21,500				21,500
	iRAP					0
	'traditional' RSI	33,000	33,000	34,000		100,000
Bosnia and Herzegovina	EuroRAP	26,500				26,500
	iRAP	99,000				99,000
	'traditional' RSI		135,000	100,000	58,000	293,000
Macedonia	EuroRAP	9,000				9,000
	iRAP					0
	'traditional' RSI	34,000	35,000	35,000		104,000
Kosovo	EuroRAP	21,000				21,000
	iRAP					0
	'traditional' RSI	110,000	85,000	52,000		247,000
Montenegro	EuroRAP	16,000				16,000
	iRAP	64,500				64,500
	'traditional' RSI		95,000	65,000	30,000	190,000
Serbia	EuroRAP	43,500				43,500
	iRAP	160,500				160,500
	'traditional' RSI		210,000	165,000	99,000	474,000
Total	EuroRAP	137,500				137,500
	iRAP	324,000				324,000
	'traditional' RSI	177,000	593,000	451,000	187,000	1,408,000

Pilot road safety inspections

Result

- A total of 580 km Road Safety Inspections carried out in the WB6 Regional Participants
- 24 individual pilot reports prepared.

RSI reporting

	Corridor	Name	Section Start Node	Section End Node
ALB	E762 SH1	Shkoder-Koplik	Road Start Tuzit	Start of By Pass Koplik
ALB	E762	F. Kruje - Lezhe	Overpassing F. Kruje	r/a in Lezha exit
ALB	SH 2	Tirane - Durres	Overpassing Kamez	I/C of By Pass Shkozet
ALB	E 853	Fier - Vlore	I/C to Aulona Road	I/C to rd Sinan Ferhati
BiH	Route 2a	E-661 (M5)	Jajce Jug	Donji Vakuf
BiH	Corridor Vc	E-73 (M 17)	Karuše	Ozimica
BiH	Corridor Vc	E-73 (M 17)	Ozimica	Topčić Polje
BiH	Corridor Vc	E-73 (M 17)	Jablanica	Potoci
MKD	A3		Bitola	Prilep
MKD	A2		Stracin	Kriva Palanka
MKD	R-106		Prilep	Drenovo
MKD	R-106		Drenovo	Rosoman
KOS	R6b		Fushe Kosove	Gjurgjice/ R7-R6b I/C
KOS	R6b		Gjurgjice/ R7-R6b I/C	Kijeve
KOS	R6a		Veternik/N-2 N-25.2 I/C	Lipjan/N-2 & N-25 r/a
MNE	Route 4		Podgorica	Mioska
SRB	Route 4	IB22	Orlovaca	Stepojevac
SRB	Route 4	IB22	Stepojevac	Celije
SRB	Route 5	IB23	Vrnjci(Ugljarevo)	Kamidzora
SRB	Route 5	IB22	Preljina	Mrcajevci
SRB	Route 9	IB21	Petrovaradin	Sremska Kamenica
SRB	Corridor X	A1	Bubanj Potok	Mali Pozarevac
SRB	Corridor X	A1	Beograd (Dobanovci)	Bubanj Potok
SRB	Corridor Xb	A1	Feketic	Sirig

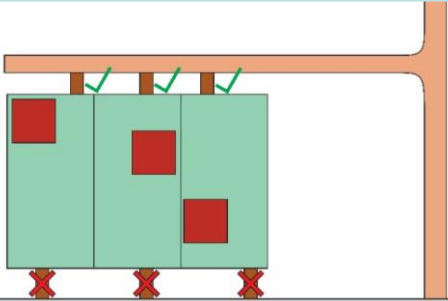
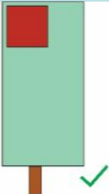
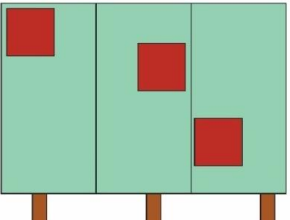
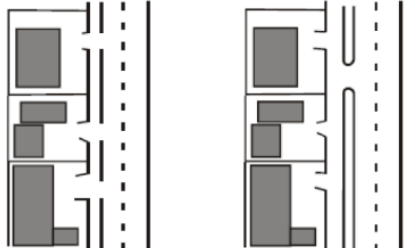
Pilot road safety inspections

Accesses and conflicts

Typical critical deficits

- Both long distance travel and local trips - speed conflicts and demand for overtaking
- Many accesses (houses and commercial businesses next to the road).
 - High number of accesses gives higher risk of crashes
 - Accesses where left turns are allowed (especially from the main carriageway) contribute to many conflicts and increased risk of crashes
- Unpaved areas near the road which have unregulated / unchanneled exits and entries to the main carriageway
 - Vehicles need to decelerate before exiting or accelerate after entering the traffic on the road.
 - Manoeuvres interrupt other drivers, create traffic conflicts and could result in road crashes.

Examples of measures/recommendations

	<p><i>Close accesses and redirect vehicles to regular intersection</i></p>
	<p><i>Rearrange the accesses</i></p>
	<p><i>Merge and/or construction of a traffic island</i></p>
<p>Less safe design Safer design</p> 	<p><i>Merge and provide one access to main road</i></p>

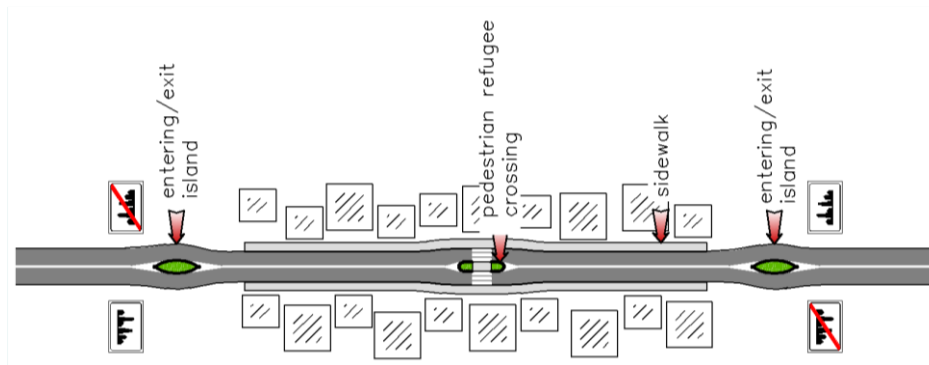
Pilot road safety inspections

Build up areas

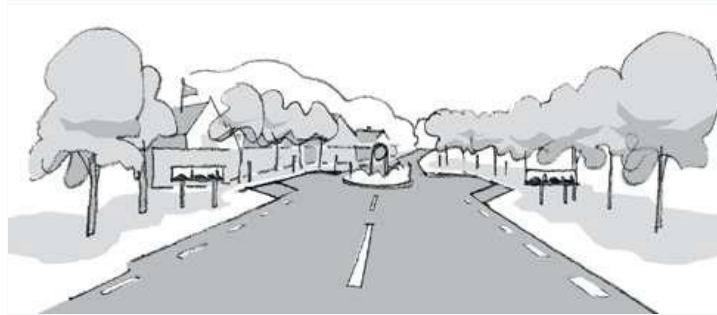
Typical critical deficits

- Conflicts between vehicles and pedestrians
 - Activities around the road generate demand for pedestrian movement by the road and crossing the road at places with a speed limit and operation speed of more than 50 kph
- The absence of adequate pedestrian facilities at urban segments, near bus stops, etc.
 - Could force pedestrians to use the carriageway for walking along the road
 - Could increase risk and cause crashes involving pedestrians
- Parked vehicles (legal or illegal) in the settlements
 - Reduce sight distance, reduce space for pedestrians, take driver's attention away and could make confused traffic situations and cause road crashes
- Inadequate pedestrian facilities on urban subsections, near bus stops, near houses and commercial plots
 - Could force pedestrians to use carriageway for walking along the road
 - Could increase risk and cause road crashes with pedestrians
- Insufficient space and inappropriate design of bus stops, with missing information signs in advance
 - Could create unexpected situations in the traffic and cause crashes
 - Could make bus deceleration and acceleration difficult and unsafe
- Street lighting not adequate in some villages, at schools and bus stops.

Examples of measures/recommendations



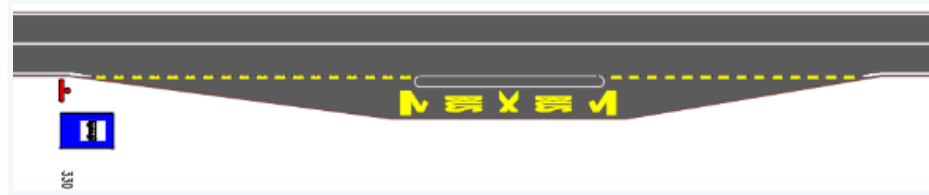
Gates and speed management, refugees, sidewalks in build-up areas



Example of gate - entering/exiting island to/from built-up areas



Example of lighting at pedestrian crossing which makes it possible to see the pedestrian



Example of safe bus stop – should also include safe facilities for crossing pedestrians

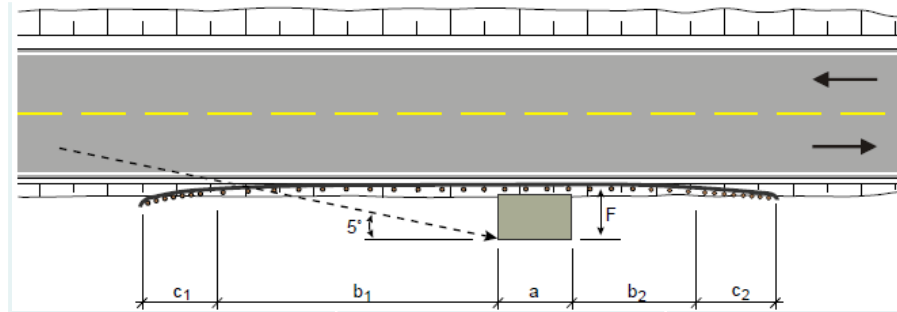
Pilot road safety inspections

Sharp curves and lack of safety zone

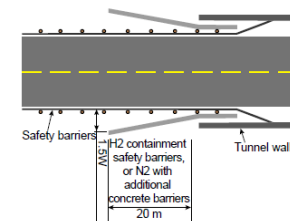
Typical critical deficits

- Damaged, not maintained or not safe guardrails with unsafe ends, gaps and unsafe connections
- Road safety barriers are missing
 - E.g. where needed to protect vehicles from hitting fixed objects or from running off the road at dangerous places (i.e. high slopes)
- Guardrails installed to protect culverts or hard objects near the road with inadequate length
 - Too short guardrails cannot protect fixed objects and would not stop vehicles which run off the road.
- Unsafe barrier ends (terminals)
- Legal and illegal advertising signs (billboards), placed in the safety zone of the road, taking driver's attention away
 - Advertisement billboards may reduce sight distance, especially near the intersections
 - Could increase risk of road crashes near advertisement billboards
- Sharp curves without chevron signs to inform and advice drivers.

Examples of measures/recommendations



Required length of guardrail, relevant to the object to be protected



Example of energy absorbing terminals

Example of location of safety barriers at tunnel portals



Example of transition between concrete barrier and guardrail



Installation of chevrons in curves

TA to Connectivity in the Western Balkans
EuropeAid/137850/IH/SER/MULTI

Sub-Project
Code: CONNECTA-TRA-CRM-REG-01
Area: Connectivity Transport Reform Measures

Preparation of Road Safety Inspection and Audit Plans for core/comprehensive road network in Western Balkans and Pilots

Stage Two Road Safety Audit – Reconstr
Gjirokastra

section one: Jajce and Pilots



Technical Assistance to connectivity in the Western Balkans
EuropeAid/137850/IH/SER/MULTI



This project is funded by The European Union

Stage Two Montenegro I
Reconstruction
Section 3: Lepi Sazani

TA to Connectivity in the Western Balkans
EuropeAid/137850/IH/SER/MULTI

Sub-Project
Code: CONNECTA-TRA-CRM-REG-01
Area: Connectivity Transport Reform Measures

Preparation of Road Safety Inspection and Audit Plans for core/comprehensive road network in Western Balkans and Pilots

Technical Assistance to connectivity in the Western Balkans
EuropeAid/137850/IH/SER/MULTI

05 February 2018



This project is funded by The European Union



This project is funded by The European Union

Stage 2 Road Safety Audit – Two
Leniska and Belgrade

TA to Connectivity in the Western Balkans
EuropeAid/137850/IH/SER/MULTI

Sub-Project
Code: CONNECTA-TRA-CRM-REG-01
Area: Connectivity Transport Reform Measures

Preparation of Road Safety Inspection and Audit Plans for core/comprehensive road network in Western Balkans (WB6) and Pilots

Technical Assistance to connectivity in the Western Balkans
EuropeAid/137850/IH/SER/MULTI

Stage One Road Safety Audit
E80 Niš-Pločnik, Serbia

20 December 2017



This project is funded by The European Union



COMPONENT 2: ROAD SAFETY AUDIT

Road Safety Audit activities

- Compile a list of all expected rehabilitation and new construction road projects on the core and comprehensive road network that are currently at the concept or preliminary design stage. The list should include the following details for every project:
 - Engineering Scope and estimated cost
 - Current preparation stage of every project (e.g. concept, preliminary design, detailed design or bidding stage)
 - Planned implementation schedule
 - Financing sources
- Prepare a plan to undertake road safety audits, at various stages as per the Directive 2008/96/EC and SEETO's Road Safety Audit Handbook (COWI, 2014) for the list of projects prepared. Such plan should include:
 - The Audit stages that are required
 - The required Auditors inputs
 - Indicative costs to audit these projects by consulting firms
- Undertake Road Safety Audits for a sample of 6 projects (one in every SEETO member).

List of Rehabilitation and Construction Projects

Information collected

The list should include the following details for every project:

- Engineering scope and estimated cost
- Current preparation stage of every project (e.g. concept, preliminary design, detailed design or bidding stage)
- Planned implementation schedule
- Financing sources.

Information contained in each column:

- **Type of Road:**
 - Whether main or motorway
- **Design Stage:**
 - Concept, Preliminary, Detailed, Bidding
- **Works Type:**
 - Rehabilitation, upgrade or new construction
- **Start/End:**
 - Construction timeline
- **Total Cost:**
 - Total Construction Costs
- **Budget:**
 - Cost of works met by state
- **WB:**
 - Cost met by the World Bank or other IFIs
- **Funding Source:**
 - Funded by state or IFIs.

Route	Section Start	Section End	Length (km)	SEETO Network	Type of Road	Design Stage	Works Type:	Start:	End:	Total cost (M€)	Budget (M€)	WB (M€)	Funding source
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Road Safety Audit Plan for identified projects

Three year plan (2018/19-2020/21)

Plan for road safety audits, including

- Audit stages required for each project
- Required Auditors inputs and indicative costs
- According to Directive 2008/96/EC and SEETO's Road Safety Audit Guidelines
- Roads in the plan are on the core and comprehensive network
- If they become TEN-T then RSA is mandatory according to EU Directive 2008/96/EC
- RSA should be done on both upgrading projects and new projects.

Indicative costs and recourses

Audit Stage	Estimated Cost (Euros) may vary due to scheme size	Time Estimate (person days) may vary due to scheme size
Stage One – Prelim Design	10,200	17 (7 TL, 10 TM)
Stage Two – Detailed Design	12,000	20 (8 TL, 12 TM)
Stage Three – Pre-Opening	9,000	15 (5 TL, 10 TM)
Stage Four – Early Operation	9,000	15 (5 TL, 10 TM)

Albania – Plan for Road Safety Audits

Route	Section Start	Section End	Design Stage	Length (km)	START:	END:	Stage One RSA	Stage Two RSA	Stage Three RSA	Stage Four RSA	Total Cost RSA Inputs (Euros)	Total Person Days RSAs
Corridor VIII	Tirana	Vore	Detailed	16	2017	2021	Not Req	2018	2021	2021	30,000	50
Corridor VIII	Vore	Durres	Detailed	22	2017	2021	Not Req	2018	2021	2021	30,000	50
Corridor VIII	Durres	Rrogozhine		37	2017	2021	Not Req	TBC	2021	2021	18,000	30
Corridor VIII	Rrogozhine	Lushnje	Detailed	20	2017	2021	Not Req	2018	2021	2021	30,000	50
Corridor VIII	Lushnje	Fier		22	2017	2021	Not Req	TBC	2021	2021	18,000	30
Corridor VIII	Fier	Vlore	Detailed	39	2017	2021	Not Req	2018	2021	2021	30,000	50
Corridor VIII	Elbasan	Librazhd	Detailed	25	2017	2021	Not Req	2018	2021	2021	30,000	50
Corridor VIII	Librazhd	Perrenjas	Detailed	34	2017	2021	Not Req	2018	2021	2021	30,000	50
Corridor VIII	Tirana	Elbasan	Detailed	32	2017	2021	Not Req	2018	2021	2021	30,000	50
Route 1	Shkoder	Lezhe	Detailed	42	2017	2021	Not Req	2018	2021	2021	30,000	50
Route 1	Lezhe	Milot	Detailed	13	2017	2021	Not Req	2018	2021	2021	30,000	50
Route 1	Mamurras	Fushe Kruje	Detailed	14	2017	2021	Not Req	2018	2021	2021	30,000	50
Route 1	Fushe Kruje	Vore	Detailed	13	2017	2021	Not Req	2018	2021	2021	30,000	50
Route 2b	Hani i Hotit	Shkoder		35	2017	2021	Not Req	2018	2021	2021	30,000	50
Route 2c	Fier	Tepelene	Detailed	71	2017	2021	Not Req	2018	2021	2021	30,000	50
Route 2c	Tepelene	Gjirokaster	Detailed	23	2017	2021	Not Req	2018*	2021	2021	18,000	50
Route 2c	Gjirokaster	Kakavija	Detailed	31	2017	2021	Not Req	2018	2021	2021	30,000	50
Route 7	Milot	Mamurras		14	2017	2021	Not Req	2018	2021	2021	30,000	50
Route 7	Milot	Rreshen		25.9	2017	2021	Not Req	2018	2021	2021	30,000	50
Route 7	Rreshen	Kalimash		60.2	2017	2021	Not Req	2018	2021	2021	30,000	50
Route 7	Kalimash	Morine		28.3	2017	2021	Not Req	2018	2021	2021	30,000	50
SH3	Perrenjas	Pogradec	Detailed	27	2017	2021	Not Req	2018	2021	2021	30,000	50
SH3	Pogradec	Korce		40	2017	2021	Not Req	2018	2021	2021	30,000	50
SH3	Korce	Kapeshtice	Detailed	32	2017	2021	Not Req	2018	2021	2021	30,000	50
SH3	Perrenjas	Qafe Thane	Detailed	13	2017	2021	Not Req	2018	2021	2021	30,000	50

Bosnia and Herzegovina – Plan for Road Safety Audits

Route	Name	Design stage	Length (km)	Start:	End	Stage One RSA	Stage Two RSA	Stage Three RSA	Stage Four RSA	Total Cost RSA Inputs (Euros)	Total Person Days RSAs
Route 2a	M-16 (Klašnice 2-Šargovac)	Main design	9.453	2017		Not Req	2018	TBC	TBC	12,000	20
Route 2a	M-16 (Šargovac - Banja Luka 1)		3.911	2017		Not Req	2018	TBC	TBC	12,000	20
Route 2a	M-16 (Banja Luka 1 - Banja Luka (Čajavec))		1.056	2017		Not Req	2018	TBC	TBC	12,000	20
Route 2a	M-16 (Banja Luka (Čajavec)-Banja Luka (Rudarska))		0.956	2017		Not Req	2018	TBC	TBC	12,000	20
Route 2a	M-16 (Banja Luka (Rudarska)-Srpske Toplice)		4.318	2017		Not Req	2018	TBC	TBC	12,000	20
Route 2a	M-16 (Srpske Toplice-Karanovac)		6.692	2017		Not Req	2018	TBC	TBC	12,000	20
Route 2a	M-16 (Karanovac-Crna Rijeka)	Main design	32.786	2017/ 2018	2018	Not Req	2018	2018	2018	30,000	50
Route 2a	M-16 (Crna Rijeka-granica RS (Ugar))		6.535	2017		Not Req	2018	TBC	TBC	12,000	20
Route 2b	Brod na Drini – Hum	Main design		2016	2018	Not Req	Not Req	2018	2019	18,000	30
Route 9a	"9. Januar" Laktaši - Prnjavor	Main design	35.913	2018	2018	Not Req	2018	2018	2019	30,000	50

The former Yugoslav Republic of Macedonia – Plan for Road Safety Audits

Route	Name	Design stage	Length (km)	Start:	End:	Stage One RSA	Stage Two RSA	Stage Three RSA	Stage Four RSA	Total Cost RSA Inputs (Euro)	Total Person Days RSAs
Corridor VIII (Kicevo – Podmolje) and Route 8 (Podmolje – Ohrid)	Kicevo – Ohrid										
Corridor VIII	Rankovce – Kriva Palanka										
Corridor X	Demir Kapija – Smokvica	Detailed	28,2	2015	2018	Not Req	Not Req	2018	2019	18,000	30
Corridor X	Gradsko – Veles										
Corridor X	Miladinovci – Petrovec										
Corridor X	Negotino - Demir Kapija										
Corridor X	Kumanovo- Miladinovci										
Corridor X	Smokvica – Gevgelija										
Corridor Xd	Gradsko – Prilep										
Corridor Xd	Prilep – Raec		8.8								
Route 6a	Skopje - Blace	Preliminary		Apr, 2015	Mar 2018	Not Req	Not Req	2018	2018	18,000	30
Route 10	Stip – Radovis		37	2015							
Route 10	Miladinovci – Stip										

Kosovo – Plan for Road Safety Audits

Route	Name	Design Stage	Length (km)	Start:	End:	Stage One RSA	Stage Two RSA	Stage Three RSA	Stage Four RSA	Total Cost RSA Inputs (Euros)	Total Person Days RSAs
Route 6a	Smrekonicë Mitrovivë	Preliminary/Detailed	5	2018	2020	Not Req	2018*	2020	2020	18,000	30
Route 6b	Kijevë Zahaq	Detailed	30	2018	2021	Not Req	2018	2021	2021	30,000	50
Route 6b	Pristina-Peje	Detailed	40	2015		Not Req	TBC	TBC	TBC		
Route 7	Besi Merdare/Serbia Border	Concept	26.5	Sep, 2017	Oct, 2018	Not Req	Not Req	2018	2019	18,000	30

*Stage Two Audit completed as pilot RSA as part of this project

Montenegro – Plan for Road Safety Audits

Route	Name of the Project (sections)	Design Stage	Length (km)	Start:	End:	Stage One RSA	Stage Two RSA	Stage Three RSA	Stage Four RSA	Total Cost RSA Inputs (Euros)	Total Person Days RSAs
Route 1	Debeli brijeg - H novi		5	2018	2018	Not Req	Not Req	2018	2019	18,000	30
Route 1	Debeli brijeg - H novi		2.4	2018	2018	Not Req	Not Req	2018	2019	18,000	30
Route 1	Petrovac - Bar		16.8	2017	2018	Not Req	Not Req	2018	2019	18,000	30
Route 2b	Ščepan polje – Plužine		25								
Route 2b	Zaborje - Jasenovo polje		19	2019	2020	2019	2019	2020	2020	40,200	67
Route 2b	Jasenovo polje - Vidrovan		5.5	2018	2018	Not Req	2018	2018	2019	30,000	50
Route 2b	Danilovgrad - Podgorica		15	2017	2018	Not Req	Not Req	2018	2019	18,000	30
Route 3	Lipci - Ljuta		15	2018	2018	Not Req	Not Req	2018	2019	18,000	30
Route 4	Tivat -Budva		16	2017	2019	Not Req	Not Req	2019	2020	18,000	30
Route 4	Barski most - Dobrakovo		4.1	2017	2018	Not Req	Not Req	2018	2019	18,000	30
Route 5	Kamenovo - Petrovac		10.3	2017	2018	Not Req	Not Req	2018	2019	18,000	30
Route 5	Dobrakovo - Bijelo polje		10.3	2017	2018	Not Req	Not Req	2018	2019	18,000	30
Route 6a	Obilaznica Bijelo polje - Ribarevine		3.3	2017	2018	Not Req	2018	2018	2019	30,000	50
Route 6a	Ribarevine - Poda		14.5	2017	2018	Not Req	2018	2018	2019	30,000	50
Route 6a	Poda -Berane		12.8	2017	2018	Not Req	2018	2018	2019	30,000	50
Route 6a	Berane - Tunel Lokve		15.2	2017	2018	Not Req	2018	2018	2019	30,000	50
Route 6a	Tunel Lokve - Rožaje		14.7	2017	2018	Not Req	2018	2018	2019	30,000	50
Route 6a	Obilaznica Rožaje II Phase		5	2017	2019	Not Req	Not Req	2019	2020	18,000	30
Route 6a	Rožaje - Špiljani		20	2017	2019	Not Req	Not Req	2019	2020	18,000	30
Route 6b	Andrijevića - Berane		16	2018	2019	Not Req	2018	2019	2020	50,000	50
Route 7	Bar - Ulcinj		21.4	2018	2019	Not Req	2018	2019	2020	50,000	50
Route 7	Ribarevine - Lepenac	Detailed	14.6	2017	2018	Not Req	2018*	2018	2018	18,000	30
Route 8	Ulcinj - Krute		14.7	2017	2018	Not Req	Not Req	2018	2019	18,000	30
Route 8	Mojkovac - Kolašin	Preliminary	21.35	2018	2019	2018*	2018	2019	2019	30,000	50
Route 9a	Kolašin - Crkvine	Preliminary	8.95	2018	2019	2018*	2018	2019	2019	30,000	50
Route 10	Tuneli 7,8,9		0.67	2018	2019	Not Req	2018	2019	2020	50,000	50
Route 11	Obilaznica golubovci - Virpazar		16.5	2018	2019	Not Req	2018	2019	2020	50,000	50
Route 12	Virpazar - Paštrovačka gora		14.8	2018	2020	Not Req	2018	2020	2021	30,000	50
Route 13	Paštrovačka gora - Petrovac		7.5	2018	2020	Not Req	2018	2020	2021	30,000	50

*Stage Two and Stage One Audits completed as pilot RSA as part of this project

Serbia – Plan for Road Safety Audits

Route	Name of the Project (sections)	Design stage	Length (km)	Project start:	Project end:	Stage One RSA	Stage Two RSA	Stage Three RSA	Stage Four RSA	Total Cost RSA Inputs (Euros)	Total Person Days RSAs
Corridor X	Ražanj 1 Paraćin 1	Detailed	24.781	2018	Jan-19	Not Req	2018	2019	2019	30,000	50
Corridor X	Aleksinac Ražanj 1	Detailed	23.645	2018	Jan-19	Not Req	2018	2019	2019	30,000	50
Corridor X	Ruma 1 Pećinci 1	Detailed	12.99	2018	Dec-18	Not Req	2018	2018	2019	30,000	50
Corridor X	Sremska Mitrovica Ruma 1	Detailed	13.75	2018	Jan-19	Not Req	2018	2019	2019	30,000	50
Corridor X	Niš 1 (Trupale) Niš 3 (Batušinac)	Detailed	9	2018	Jan-19	Not Req	2018	2019	2019	30,000	50
Corridor X	Niš 3 (Batušinac) Niš 1 (Trupale)	Detailed	8.998	2018	Jan-19	Not Req	2018	2019	2019	30,000	50
Corridor X	Ražanj 1 Aleksinac	Detailed	23.655	2018	Jun-19	Not Req	2018	2019	2019	30,000	50
Corridor X	Brestovac 1 Doljevac 1	Detailed	6.155	2018	Apr-19	Not Req	2018	2019	2019	30,000	50
Corridor X	Border CRO/SER (Batrovci) Kuzmin	Detailed	21.805	2017	Feb-18	Not Req	2018	2018	2018	30,000	50
Route 3	Požega Kotroman	Prelim	60	2006		Not Req	TBC	TBC	TBC		
Route 4	Border of APV (Pančevo) Pančevo (Kovin)	Detailed	2.766	2017	Jul-18	Not Req	2018	2018	2019	30,000	50
Route 4	Pančevo (Kovin) Border of APV (Pančevo)	Detailed	2.754	2017	Jul-18	Not Req	2018	2018	2019	30,000	50
Route 4	Kneževići Užice 3	Detailed	15.234	2017	Jun-18	Not Req	2018	2018	2018	30,000	50
Route 4	Požega Boljare	Prelim	107	2006		Not Req	Not Req	TBC	TBC		
Route 5	Pojate Preljina	Prelim	110	2015		Not Req	Not Req	TBC	TBC		
Route 7	Merošina Prokuplje (Orljane)	Detailed	11.503	2017	Nov-18	Not Req	2018	2018	2019	30,000	50
Route 7	Beloljin Rudare	Detailed	24.171	2017	Nov-18	Not Req	2018	2018	2019	30,000	50
Route 7	Niš Pločnik	Feas	40	2014	2018	2018*	2018	TBC	TBC	12,000	20
Route 7	Pločnik Merdare	Feas	37	2014	2018	Not Req	Not Req	2018	2019	18,000	30
Route 9a	Irig 2 Ruma 1 (motorway)	Detailed	15.245	2017	Feb-18	Not Req	2018	2018	2018	30,000	50
Route 9a	Novi Sad Ruma	Prelim		2008		Not Req	Not Req	TBC	TBC		
Route 9a	Ruma Šabac	Prelim	112	2008		Not Req	Not Req	TBC	TBC		
Route 9a	Šabac Loznica	Prelim		2008		Not Req	Not Req	TBC	TBC		

*Stage One Audit completed as pilot RSA as part of this project

Yearly allocation of resources by Regional Participant

	Year 1 2018	Year 2 2019	Year 3 2020	Year 4 2021	Total
Albania	300,000	-	-	450,000	750,000
Bosnia and Herzegovina	144,000	18,000	-	-	162,000
The former Yugoslav Republic of Macedonia	27,000	9,000	-	-	36,000
Kosovo	33,000	9,000	18,000	18,000	78,000
Montenegro	332,400	256,200	90,000	18,000	696,600
Serbia	291,000	180,000	-	-	471,000
Total	1,127,400	472,200	108,000	486,000	2,193,600

Three-year plan by Corridor and Route

Route	Section Start	Section End	Design Stage	Length (km)	Start:	End:	Stage One RSA	Stage Two RSA	Stage Three RSA	Stage Four RSA	Total Cost RSA Inputs (Euros)	Total Person Days RSAs
Corridor VIII	Tirana	Vore	Detailed	16	2017	2021	Not Req	2018	2021	2021	30,000	50
Corridor VIII	Vore	Durres	Detailed	22	2017	2021	Not Req	2018	2021	2021	30,000	50
Corridor VIII	Durres	Rrogozhine		37	2017	2021	Not Req	TBC	2021	2021	18,000	30
Corridor VIII	Rrogozhine	Lushnje	Detailed	20	2017	2021	Not Req	2018	2021	2021	30,000	50
Corridor VIII	Lushnje	Fier		22	2017	2021	Not Req	Not Req	2021	2021	18,000	30
Corridor VIII	Fier	Vlore	Detailed	39	2017	2021	Not Req	2018	2021	2021	30,000	50
Corridor VIII	Elbasan	Librazhd	Detailed	25	2017	2021	Not Req	2018	2021	2021	30,000	50
Corridor VIII	Librazhd	Perrenjas	Detailed	34	2017	2021	Not Req	2018	2021	2021	30,000	50
Corridor VIII	Tirana	Elbasan	Detailed	32	2017	2021	Not Req	2018	2021	2021	30,000	50
Corridor VIII (Kicevo – Podmolje) and Route 8 (Podmolje – Ohrid)	Kicevo	Ohrid										
Corridor VIII	Rankovce	Kriva Palanka										
Corridor X	Ražanj 1	Paraćin 1	Detailed	24.781	2018	Jan-19	Not Req	2018	2019	2019	30,000	50
Corridor X	Aleksinac	Ražanj 1	Detailed	23.645	2018	Jan-19	Not Req	2018	2019	2019	30,000	50
Corridor X	Ruma 1	Pećinci 1	Detailed	12.99	2018	Dec-18	Not Req	2018	2018	2019	30,000	50
Corridor X	Sremska Mitrovica	Ruma 1	Detailed	13.75	2018	Jan-19	Not Req	2018	2019	2019	30,000	50
Corridor X	Niš 1 (Trupale)	Niš 3 (Batušinac)	Detailed	9	2018	Jan-19	Not Req	2018	2019	2019	30,000	50
Corridor X	Niš 3 (Batušinac)	Niš 1 (Trupale)	Detailed	8.998	2018	Jan-19	Not Req	2018	2019	2019	30,000	50
Corridor X	Ražanj 1	Aleksinac	Detailed	23.655	2018	Jun-19	Not Req	2018	2019	2019	30,000	50
Corridor X	Brestovac 1	Doljevac 1	Detailed	6.155	2018	Apr-19	Not Req	2018	2019	2019	30,000	50
Corridor X	Border CRO/SER (Batrovci)	Kuzmin	Detailed	21.805	2017	Feb-18	Not Req	2018	2018	2018	30,000	50
Corridor X	Demir Kapija	Smokvica	Detailed	28,2	2015	2018	Not Req	Not Req	2018	2019	18,000	30
Corridor X	Gradsko	Veles										
Corridor X	Miladinovci	Petrovec										
Corridor X	Negotino	Demir Kapija										
Corridor X	Kumanovo	Miladinovci										
Corridor X	Smokvica	Gevgelija										
Corridor Xd	Gradsko	Prilep										
Corridor Xd	Prilep	Raec		8.8								

Three-year plan by Corridor and Route

Route	Section Start	Section End	Design Stage	Length (km)	Start:	End:	Stage One RSA	Stage Two RSA	Stage Three RSA	Stage Four RSA	Total Cost RSA Inputs (Euros)	Total Person Days RSAs
Route 1	Debeli brijeg	H novi		5	2018	2018	Not Req	Not Req	2018	2019	18,000	30
Route 1	Debeli brijeg	H novi		2.4	2018	2018	Not Req	Not Req	2018	2019	18,000	30
Route 1	Petrovac	Bar		16.8	2017	2018	Not Req	Not Req	2018	2019	18,000	30
Route 1	Shkoder	Lezhe	Detailed	42	2017	2021	Not Req	2018	2021	2021	30,000	50
Route 1	Lezhe	Milot	Detailed	13	2017	2021	Not Req	2018	2021	2021	30,000	50
Route 1	Mamurras	Fushe Kruje	Detailed	14	2017	2021	Not Req	2018	2021	2021	30,000	50
Route 1	Fushe Kruje	Vore	Detailed	13	2017	2021	Not Req	2018	2021	2021	30,000	50
Route 2a	M-16 (Klašnice 2	Šargovac)	Main design	9.453	2017		Not Req	2018	TBC	TBC	12,000	20
Route 2a	M-16 (Šargovac	Banja Luka 1)		3.911	2017		Not Req	2018	TBC	TBC	12,000	20
Route 2a	M-16 (Banja Luka 1	Banja Luka (Čajavec)		1.056	2017		Not Req	2018	TBC	TBC	12,000	20
Route 2a	M-16 (Banja Luka (Čajavec)	Banja Luka (Rudarska)		0.956	2017		Not Req	2018	TBC	TBC	12,000	20
Route 2a	M-16 (Banja Luka (Rudarska)	Srpske Toplice)		4.318	2017		Not Req	2018	TBC	TBC	12,000	20
Route 2a	M-16 (Srpske Toplice	Karanovac)		6.692	2017		Not Req	2018	TBC	TBC	12,000	20
Route 2a	M-16 (Karanovac	Crna Rijeka)	Main design	32.786	2017/ 2018	2018	Not Req	2018	2018	2018	30,000	50
Route 2a	M-16 (Crna Rijeka	Granica RS (Ugar)		6.535	2017		Not Req	2018	TBC	TBC	12,000	20
Route 2b	Brod na Drini	Hum	Main design		2016	2018	Not Req	Not Req	2018	2019	18,000	30
Route 2b	Šćepan polje	Plužine	Detailed	25								
Route 2b	Zaborje	Jasenovo polje		19	2019	2020	2019	2019	2020	2020	40,200	67
Route 2b	Jasenovo polje	Vidrovan		5.5	2018	2018	Not Req	2018	2018	2019	30,000	50
Route 2b	Danilovgrad	Podgorica		15	2017	2018	Not Req	Not Req	2018	2019	18,000	30
Route 2b	Hani i Hotit	Shkoder		35	2017	2021	Not Req	2018	2021	2021	30,000	50
Route 2c	Fier	Tepelene	Detailed	71	2017	2021	Not Req	2018	2021	2021	30,000	50
Route 2c	Tepelene	Gjirokaster	Detailed	23	2017	2021	Not Req	2018	2021	2021	18,000	50
Route 2c	Gjirokaster	Kakavija	Detailed	31	2017	2021	Not Req	2018	2021	2021	30,000	50
Route 3	Lipci	Ljuta		15	2018	2018	Not Req	Not Req	2018	2019	18,000	30
Route 3	Požega	Kotroman	Prelim	60	2006		Not Req	TBC	TBC	TBC		
Route 4	Border of APV (Pančevo)	Pančevo (Kovin)	Detailed	2.766	2017	Jul-18	Not Req	2018	2018	2019	30,000	50
Route 4	Pančevo (Kovin)	Border of APV (Pančevo)	Detailed	2.754	2017	Jul-18	Not Req	2018	2018	2019	30,000	50
Route 4	Kneževići	Užice 3	Detailed	15.234	2017	Jun-18	Not Req	2018	2018	2018	30,000	50
Route 4	Požega	Boljare	Prelim	107	2006		Not Req	Not Req	TBC	TBC		
Route 4	Tivat	Budva		16	2017	2019	Not Req	Not Req	2019	2020	18,000	30
Route 4	Barski most	Dobrakovo		4.1	2017	2018	Not Req	Not Req	2018	2019	18,000	30

Three-year plan by Corridor and Route

Route	Section Start	Section End	Design Stage	Length (km)	Start:	End:	Stage One RSA	Stage Two RSA	Stage Three RSA	Stage Four RSA	Total Cost RSA Inputs (Euros)	Total Person Days RSAs
Route 5	Kamenovo	Petrovac		10.3	2017	2018	TBC	TBC	TBC	TBC	TBC	TBC
Route 5	Dobrakovo	Bijelo polje		10.3	2017	2018	TBC	TBC	TBC	TBC	TBC	TBC
Route 5	Pojate	Preljina	Prelim	110	2015		Not Req	Not Req	TBC	TBC		
Route 6a	Skopje	Blace	Prelim		Apr, 2015	Mar 2018	Not Req	Not Req	2018	2018	18,000	30
Route 6a	Smrekonicë	Mitrovivë	Prelim/Detailed	5	2018	2020	Not Req	2018	2020	2020	18,000	30
Route 6a	Obilaznica Bijelo polje	Ribarevine		3.3	2017	2018	Not Req	2018	2018	2019	30,000	50
Route 6a	Ribarevine	Poda		14.5	2017	2018	Not Req	2018	2018	2019	30,000	50
Route 6a	Poda	Berane		12.8	2017	2018	Not Req	2018	2018	2019	30,000	50
Route 6a	Berane	Tunel Lokve		15.2	2017	2018	Not Req	2018	2018	2019	30,000	50
Route 6a	Tunel Lokve	Rožaje		14.7	2017	2018	Not Req	2018	2018	2019	30,000	50
Route 6a	Obilaznica Rožaje II Phase			5	2017	2019	Not Req	Not Req	2019	2020	18,000	30
Route 6a	Rožaje	Špiljani		20	2017	2019	Not Req	Not Req	2019	2020	18,000	30
Route 6b	Kijevë	Zahaq	Detailed	30	2018	2021	Not Req	2018	2021	2021	30,000	50
Route 6b	Pristina	Peje	Detailed	40	2015		Not Req	TBC	TBC	TBC		
Route 6b	Andrijeвица	Berane		16	2018	2019	Not Req	2018	2019	2020	50,000	50
Route 7	Merošina	Prokuplje (Orljane)	Detailed	11.503	2017	Nov-18	Not Req	2018	2018	2019	30,000	50
Route 7	Beloljin	Rudare	Detailed	24.171	2017	Nov-18	Not Req	2018	2018	2019	30,000	50
Route 7	Niš	Pločnik	Feas	40	2014	2018	2018	2018	TBC	TBC	12,000	20
Route 7	Pločnik	Merdare	Feas	37	2014	2018	Not Req	Not Req	2018	2019	18,000	30
Route 7	Bar	Ulcinj		21.4	2018	2019	Not Req	2018	2019	2020	50,000	50
Route 7	Ribarevine	Lepenac	Detailed	14.6	2017	2018	Not Req	2018	2018	2018	18,000	30
Route 7	Besi	Merdare/Serbia Border	Concept	26.5	Sep, 2017	Oct, 2018	Not Req	Not Req	2018	2019	18,000	30
Route 7	Milot	Mamurras		14	2017	2021	Not Req	2018	2021	2021	30,000	50
Route 7	Milot	Rreshen		25.9	2017	2021	Not Req	2018	2021	2021	30,000	
Route 7	Rreshen	Kalimash		21.4	2018	2019	Not Req	2018	2019	2020	50,000	50
Route 7	Kalimash	Morine		14.6	2017	2018	Not Req	2018*	2018	2018	18,000	30
Route 8	Ulcinj	Krute		14.7	2017	2018	Not Req	Not Req	2018	2019	18,000	30
Route 8	Mojkovac	Kolašin	Prelim	21.35	2018	2019	2018	2018	2019	2019	30,000	50

Three-year plan by Corridor and Route

Route	Section Start	Section End	Design Stage	Length (km)	Start:	End:	Stage One RSA	Stage Two RSA	Stage Three RSA	Stage Four RSA	Total Cost RSA Inputs (Euros)	Total Person Days RSAs
Route 8	Ulcinj	Krute		14.7	2017	2018	Not Req	Not Req	2018	2019	18,000	30
Route 8	Mojkovac	Kolašin	Prelim	21.35	2018	2019	2018	2018	2019	2019	30,000	50
Route 9a	Kolašin	Crkvine	Prelim	8.95	2018	2019	2018	2018	2019	2019	30,000	50
Route 9a	Irig 2	Ruma 1 (motorway)	Detailed	15.245	2017	Feb-18	Not Req	2018	2018	2018	30,000	50
Route 9a	Novi Sad	Ruma	Prelim	112	2008		Not Req	Not Req	TBC	TBC		
Route 9a	Ruma	Šabac	Prelim		2008		Not Req	Not Req	TBC	TBC		
Route 9a	Šabac	Loznica	Prelim		2008		Not Req	Not Req	TBC	TBC		
Route 9a	Laktaši	Prnjavor	Detailed	35.913	2018	2018	Not Req	2018	2018	2019	30,000	50
Route 10	Tuneli 7,8,9			0.67	2018	2019	Not Req	2018	2019	2020	50,000	50
Route 10	Stip	Radovis		37	2015							
Route 10	Miladinovci	Stip										
Route 11	Obilaznica Golubovci	Virpazar		16.5	2018	2019	Not Req	2018	2019	2020	50,000	50
Route 12	Virpazar	Paštrovačka gora		14.8	2018	2020	Not Req	2018	2020	2021	30,000	50
Route 13	Paštrovačka gora	Petrovac		7.5	2018	2020	Not Req	2018	2020	2021	30,000	50
SH3	Perrenjas	Pogradec	Detailed	27	2017	2021	Not Req	2018	2021	2021	30,000	50
SH3	Pogradec	Korce		40	2017	2021	Not Req	2018	2021	2021	30,000	50
SH3	Korce	Kapeshtice	Detailed	32	2017	2021	Not Req	2018	2021	2021	30,000	50
SH3	Perrenjas	Qafe Thane	Detailed	13	2017	2021	Not Req	2018	2021	2021	30,000	50

Pilot Road Safety Audits per WB6 Regional Participant

Pilot Road Safety Audits

- Pilot RSAs have been carried out in each of the WB6 Regional Participants
- Six RSAs - one in each Regional Participant
- Carried out in accordance with the SEETO RSA Manual (updated 2014) and Directive 2008/96/EC.

SEPTEMBER 2014
EUROPEAN COMMISSION - DG ELARG
SOUTH EAST EUROPE TRANSPORT OBSERVATORY (SEETO)

ROAD SAFETY AUDIT HANDBOOK

SUPPORT TO THE IMPLEMENTATION OF THE STRATEGIC WORK PROGRAMME OF THE
SOUTH EAST EUROPE TRANSPORT OBSERVATORY (SEETO) - TECHNICAL ASSISTANCE

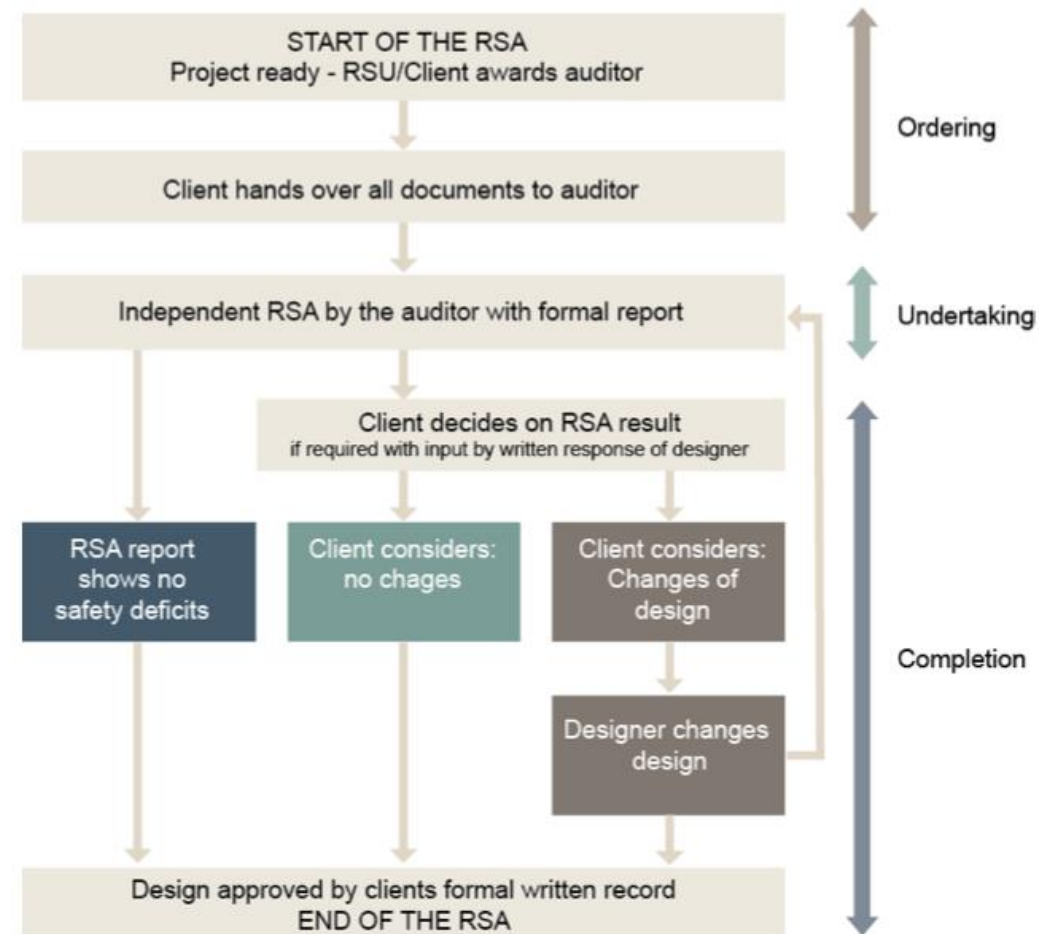


Pilot Road Safety Audits

Format for Missions to WB6 Countries

Day and Timing	Purpose of the Meeting	Attendees
Day One AM	<ul style="list-style-type: none"> • Introductions of all Parties. • Audit Team Presentation on Project and Audit Process and format for rest of mission • Design Team to introduce the Project and hand over design information to Audit Team in hard and soft copy formats 	<ul style="list-style-type: none"> • Audit Team • Road Authorities • Designer • Any other Stakeholders
Day One PM	<ul style="list-style-type: none"> • Audit Team to study submitted design information (with nominated attendees from road authority if requested) to identify points of interest for site visit on Day Two 	
Day Two All day if required	<ul style="list-style-type: none"> • Site Visit to road project (high visibility jackets to worn by all parties) • Audit Team to identify, discuss, clarify and any road safety problems with the design 	<ul style="list-style-type: none"> • Audit Team • Road Authority • Design Team (not essential) • Any other interested parties
Day Three PM	<ul style="list-style-type: none"> • Audit Team to present findings of the Audit and discuss with all parties • Opportunity to agree on Audit findings and recommendations and discuss practical implementation of any proposed design changes 	<ul style="list-style-type: none"> • Audit Team • Road Authority • Design Team • Any other interested parties

Typical road safety audit workflow



Pilot Road Safety Audits

Main issues identified:

- Crash barrier design
 - Unsafe barrier terminals
 - Short barrier length
 - Gaps in barriers
- Bridge parapet design and interface with crash barrier
- Junction and interchange layouts/geometry outdated and not in line with good practice
 - Gore lengths and entry and exit radii on grade separated junctions
 - Junction design
 - Roundabout Design/Locations
- Road Alignment
- Accesses
- Signing design and location
- Tunnel Design.

RSA Pilot Projects

Participant	Proposed Project	Design Stage
Albania	SH4-O Gjirokastra By-Pass	Detailed
Bosnia and Herzegovina	M5 Jajce - Donji Vakuf TBC (Federation)	Preliminary
The former Yugoslav Republic of Macedonia	A1 Lenishka – Belovodica	Detailed
Kosovo	R6a Lumadh to Smrekonicë	Preliminary
Montenegro	M-2 Kolašin Crkvine - Mojkovac	Preliminary/Detailed
Serbia	NIŠ-Pločnik	Preliminary

Main issues identified

Crash barrier design



- Examples of existing ramped and unsafe crash barrier terminals



- Example of crash barrier is too short and with an unsafe terminal end gap in crash barrier.

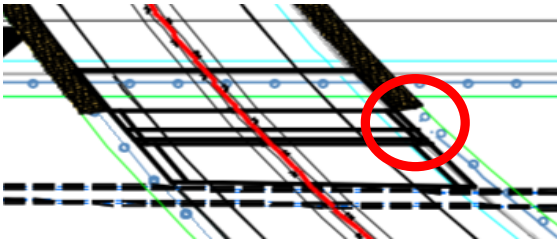
Typical recommendations



- Example of an energy absorbent end terminal from the United Kingdom
- Extend guardrail to fill gaps.

Main issues identified

Bridge parapet design and interface with crash barrier



- Steel crash barrier is not connected to the bridge parapet. If steel barrier is struck by an errant vehicle, they will impact end of bridge parapet



- Existing Bridge – poor design and condition of existing bridge parapet and no connection between barrier types, the steel crash barrier is not connected to the bridge parapet. If steel barrier is struck by an errant vehicle they will impact end of bridge parapet or potentially enter the river.

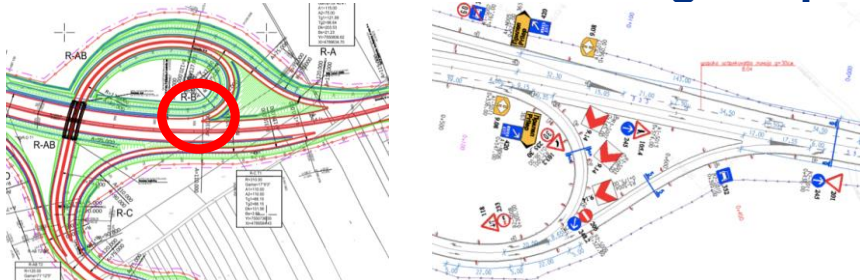
Typical recommendations



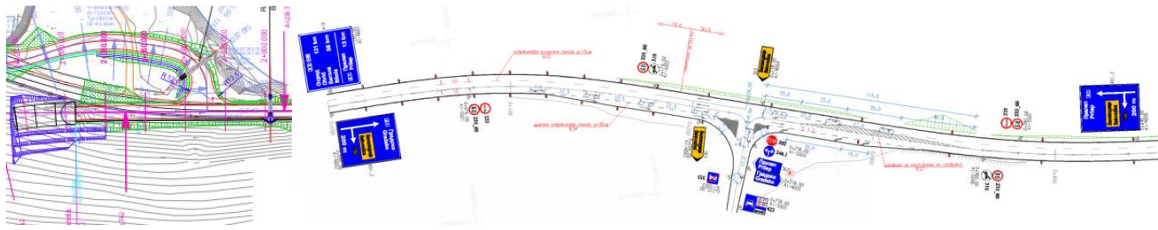
- Example of a safe connection between different barrier types from the United Kingdom.

Main issues identified

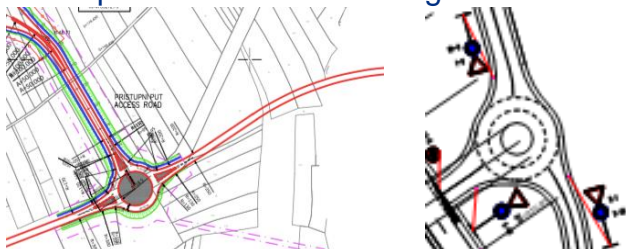
Junction and interchange layouts/geometry outdated and not in line with good practice



- Gore lengths and entry and exit radii on grade separated junctions



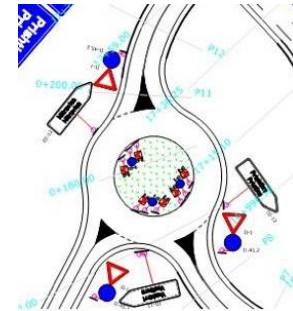
- Junction with no sheltered left turning lane, poor potential to and from the junction and tight radii unsuitable for large vehicles. Two lanes continued through the junction with poor merge arrangement and no protection for left turning vehicles



- Roundabout located in crest and single lane roundabout entries do not require two circulating lanes. This can lead to side swipe crashes. The deflection north to south is also very poor and no deflection splitter islands provided or signing.

Typical recommendations

- Longer gore lengths
- Closer to 90 degree angle of side roads
- Longer acceleration and deceleration lanes
- Consider location of junctions and roundabouts carefully to ensure sight distance and visibility



- Example of better roundabout design with deflection, single circulatory lane, splitter islands and correct signing.

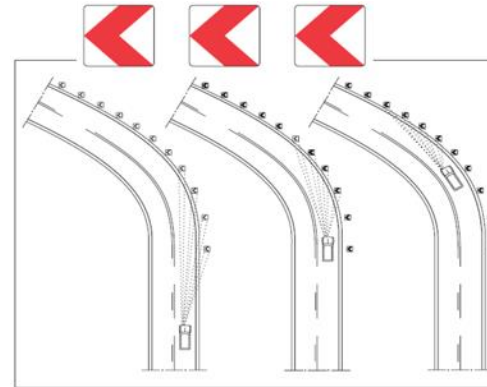
Main issues identified

Road Alignment



- Example of existing bends that are poorly signed. Chevron signs are poorly located and not conspicuous.

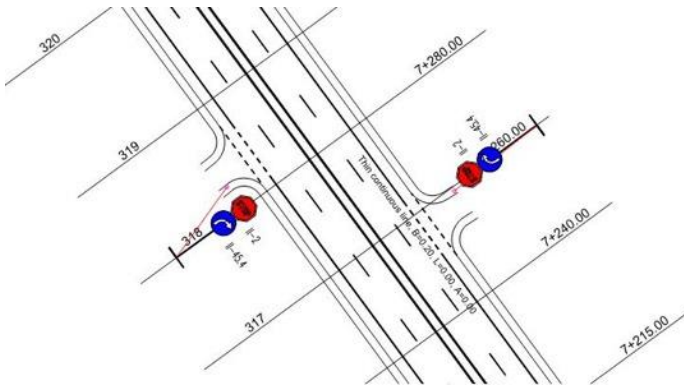
Typical recommendations



- Example of good design for chevron signs and good conspicuous signs with colour contrast.

Main issues identified

Accesses



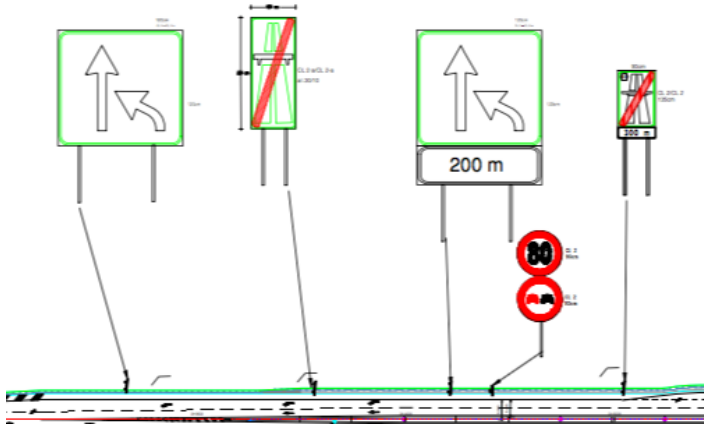
- Many accesses directly onto the highway with risk of conflicts between slow moving vehicles trying to access onto the highway and fast moving vehicles.

Typical recommendations

- The cross section should be adjusted with extra wide shoulder to act as sheltered lane for drivers entering/exiting accesses
- Where many accesses exist, the speed limit should be reduced or accesses closed.

Main issues identified

Signing design and location



- Example of scheme with too small spacing between signs and merge signs potentially masked by larger signs.

Typical recommendations

- Ensure sufficient distance between signs
- Ensure signs does not cover each other.

Main issues identified

Tunnel Design



- Existing tunnel on a project section – tunnel portal forms a roadside hazard and lane widths very tight for two large vehicles to safely pass.

Typical recommendations

- New design should ensure adequate clearance for two large vehicles to pass and safe entrance



- Example from another new road project – crash cushion fitted on tunnel headwall.



COMPONENT 3 – ROAD MAP FOR ESTABLISHING A NATIONAL SYSTEM FOR CONTINUOUS ROAD CRASH DATA COLLECTION

Activities on Road Map for establishing system for continuous road crash data collection

- Assess current road crash data collection-analysis systems
- Set up a concept for a common system in WB6 based on EU practice
- Prepare road map for establishing national system for continuous road crash data collection and analysis.

Purpose:

- Provide SEETO with the findings of the review and recommendations for Road Map for establishing system for continuous road crash data collection.

Definition

Phrase “Crash Database Systems” covers all the elements which

- *Constitute the methods and arrangements to collect, store and analyse any systematic report or information collected on road collisions and those injured in them (WHO 2010)*
- This definition therefore includes the stakeholders, which are any persons involved with the system in any capacity
- Generally, when Crash Data Systems are considered the focus tends to be on the IT systems primarily (associated computer hardware and software).

International Recommendations

CADaS

- An EU project initiative has sought to define the basic set of parameters that should be collected on a crash and casualty reporting form (CADaS)
- The CADaS report states that “the variables and values of CADaS may be considered as recommendations for national police road crash data collection reports”
- The full CADaS list of data elements is considerably longer and more complex than the minimum set and is aimed at capturing the information that academics might like to be available for high level analysis and research purposes.

Model Minimum Uniform Crash Criteria (2012) (MMUAC)

- An US Government initiative that has identified the basic set of fields which should be included in a crash report form which will provide the information required for safety management purposes
- MMUAC’s key aim is to promote greater uniformity of the data on crashes which is collected in the different US States
- The current recommended list gives a total of 110 elements which it recommends should be captured:
 - 77 of these being collected by police directly with a further 10 derived from the general scene information fields
 - The final 23 elements should be obtained from data linkages to external official data sources such as asset databases
 - These could be collected manually if data linkages are not in place.

Main elements and components of the crash data system

- Data collection fundamentals
 - Reporting Form
 - Comprehensiveness
 - Quality
 - Ease of filling
 - Reporting levels of incidents
 - Quality of data collection
 - Training/skill/commitment levels of staff
 - Resources available
 - Collection of location coordinates and/or location description
 - Links to other data sources
 - To improve data quality
 - To enable more advanced analyses
- Data Capture factors
 - Paper based collection
 - Manual data entry
 - Electronic collection direct into database (on mobile devices)
 - Quality checks on data (Validation)
- Data sharing/dissemination
 - Availability of data to all stakeholders
 - Filtering of sensitive information as appropriate
 - Direct access via internet link
 - Indirect access through manual import/export to other local systems
 - Regular summary reports available through various media
- Analysis for management functions
 - Summary reports
 - Crash information management
 - Safe Systems Analysis
 - Strategy development
 - Progress against casualty or other reduction targets
 - Monitoring of Key Performance Indicators (KPIs)
 - Road safety analysis
 - Identification of trends
 - Identification of blackspots/spatial analysis
 - Economic appraisal
 - Management of site treatments or enforcement efforts
 - Analysis of problem locations
- Evaluation and statistical analysis functions.

To achieve shared approach

- Training for both police and road safety engineers in crash scene analysis
- A more advanced database capable of sharing 'non-sensitive' data amongst the Ministries
- A more advanced database capable of providing the advanced analytical programmes to undertake the task
- Enhanced data will enable detailed analysis to be undertaken to fully understand why the collisions are occurring
 - This will lead to a more scientific data led approach to developing actions to reduce their reoccurrence.

Current road crash data collection-analysis systems

Albania

- Police have their own 'Accident Information System' (AIS) (Microsoft Access database)
- Incorporates some thirty data entry fields which can be used within a simple cross tab analysis to generate numerical table output
- The program lacks integral GIS capability
- The current crash report aligns with the existing database
- Further development, to align with the advanced CADaS datasets, is not possible within the capabilities of the current database
 - The institutions are aware of the problem.

Needs

- The requirement for a fully functioning advanced analytical and GIS capable database will be essential to achieve the proposals outlined in the report as the current database is very limited in its capability to expand
- The database also lacks a data linking capability appropriate to the objectives of this report
- Is in process of developing the procurement of a new system capable of aligning with the advanced CADaS principles.

Current road crash data collection-analysis systems

Bosnia and Herzegovina

- Police is responsible for attending and investigating road crashes
 - Use a paper-based form to record their findings
- Have a fragmented approach to statistical data collection
 - The police in FIB Republic of Srpska produce a statistical form which they encode into their database
 - The police in Federation of Bosnia and Herzegovina are disseminated into each Canton which have created their own statistical data collection form
 - The paper forms are submitted to Federation of Bosnia and Herzegovina MOI who collate the information without the use of a computer database
- Current crash data fields being recorded by FIBH MOI align with the basic CADaS datasets
- An updated statistical crash report form that enhances data collection closer to the advanced CADaS datasets has been developed.

Needs

- The initial requirement will be to agree on a standardised set of statistical data elements that must be collected
- A fully functioning advanced analytical and GIS capable database will then be required to achieve the proposals outlined in this report.

Current road crash data collection-analysis systems

The former Yugoslav Republic of Macedonia

- Police are responsible for attending and investigating road crashes
- Paper-based form to record findings. Two forms:
 - One for the crash report
 - Second for the Statistical data
- Statistical data form is not being completed so proposed that forms will be combined into a single report
- The report is still in development but should comply with the CADaS dataset
- Currently the paper forms are quality checked prior to being submitted to the statistical department at the MOI
- Current crash data fields being recorded are in line with the basic CADaS datasets.

Needs

- The requirement for a fully functioning advanced analytical and GIS capable database will be essential to achieve the proposals outlined as the current database is very limited in its capability to be expanded
- The database also lacks a data linking capability appropriate to the objectives of the report.
- Institutions are aware of the need to enhance the collection process and reportedly have achieved this in line with the advanced CADaS datasets
- A new crash database is also being developed to replace the current, very old system.

Current road crash data collection-analysis systems

Kosovo

- The Police are responsible for attending and investigating road crashes
 - Use paper-based form to record their findings
- The data collected is encoded into the Kosovo Police Information System (KPIS)
 - Initial report of the incident is required to be encoded into the database within 24 hours.
 - Final encoding occurring when the investigation and report is completed
- The crash report form has a requirement for GPS coordinates of the crash scene
 - The police are not currently collecting this as a matter of course
 - Trial undertaken to identify the best method to achieve this requirement
- The current database is reportedly being upgraded
 - Will have the capability to upload photographs and scanned documents
 - Proposals for upgrade of the system will include a GIS and analytical capability
- Current crash data fields being recorded in the Kosovo Police Information System (KPIS) exceeds the basic CADaS requirements but has not reached the full advanced dataset requirement.

Needs

- The requirement for a fully functioning analytical and GIS capable database will be essential to achieve the proposals outlined in the report
- Limitations of the database would seem to be a factor in the degree of enhancement possible
- In the short term the current database has the potential to be enhanced to achieve the primary goal
- In the long term achieving the level of data linking and advanced analytical capability will require the procurement of a bespoke system
- Not, as yet, reached the full advanced CADaS dataset requirement.

Current road crash data collection-analysis systems

Montenegro

- The Police are responsible for attending and investigating road crashes:
 - Use paper-based form to record their findings
 - The content of the forms is quality checked prior to being entered into the police database
 - The crash database is part of the main police system which uses an SQL format
- An occurrence register (diary) exist in which all incidents reported to the police station are recorded:
 - The Initial report as provided by the occurrence register is uploaded onto the police database within 24 hours of the incident being reported
 - The database, at this time, generates a unique Accident ID Number for the record
- The police commenced trialling a system for collecting GPS coordinates for the crash scene locations
 - The Police patrol vehicles have been fitted with Automatic Vehicle Location (AVL) system which is connected through the police radio network to the police control room
 - The collection of GPS locations by this system went live in January 2018
 - The GIS mapping system used to display the GPS data uses Vector and satellite maps
- The Ministry of Transport and Communications do currently not have a GIS capability
- The national and local ambulances have also been fitted with the same AVL system
 - Completes a paper-based form for each patient they attend
 - The report includes an injury assessment (C10) for the patient
 - Provided to the Police to enable them to classify the injury severity
- The current crash data fields being recorded are in line with the basic CADaS datasets.

Needs

- The requirement for a fully functioning advanced analytical and GIS capable database will be essential to achieve the proposals outlined in the report as the current database is very limited in its capability to expand
- The database lacks a data linking capability appropriate to the objectives of this report
- Not reached the full advanced CADaS dataset requirement.

Current road crash data collection-analysis systems

Serbia

- The Police responsible for attending and investigating road crashes
 - Use a paper-based form to record their findings
 - The content of the forms is quality checked prior to it being entered into the police database
- Recent project provided the capability of connecting all relevant road safety data holders to a unique database:
 - The greatest improvement to the datasets was in the accuracy of injury statistics and data from insurance companies
 - The crash database has a quality audit capability to check the accuracy of the information recorded
 - The location of the crashes is achieved by using Garmin GPS units and the police radio system.
- A very recent study trialled the inclusion of photographs and scanned sketch plans into the crash reports on the database
 - The limited storage capacity of the system was found to be an issue
 - Has been dropped until additional storage capacity can be identified
- Current crash data fields being recorded comply with mandatory fields in the advanced CADaS dataset
- The police database has limitations on the fields it records and on exporting.

Needs

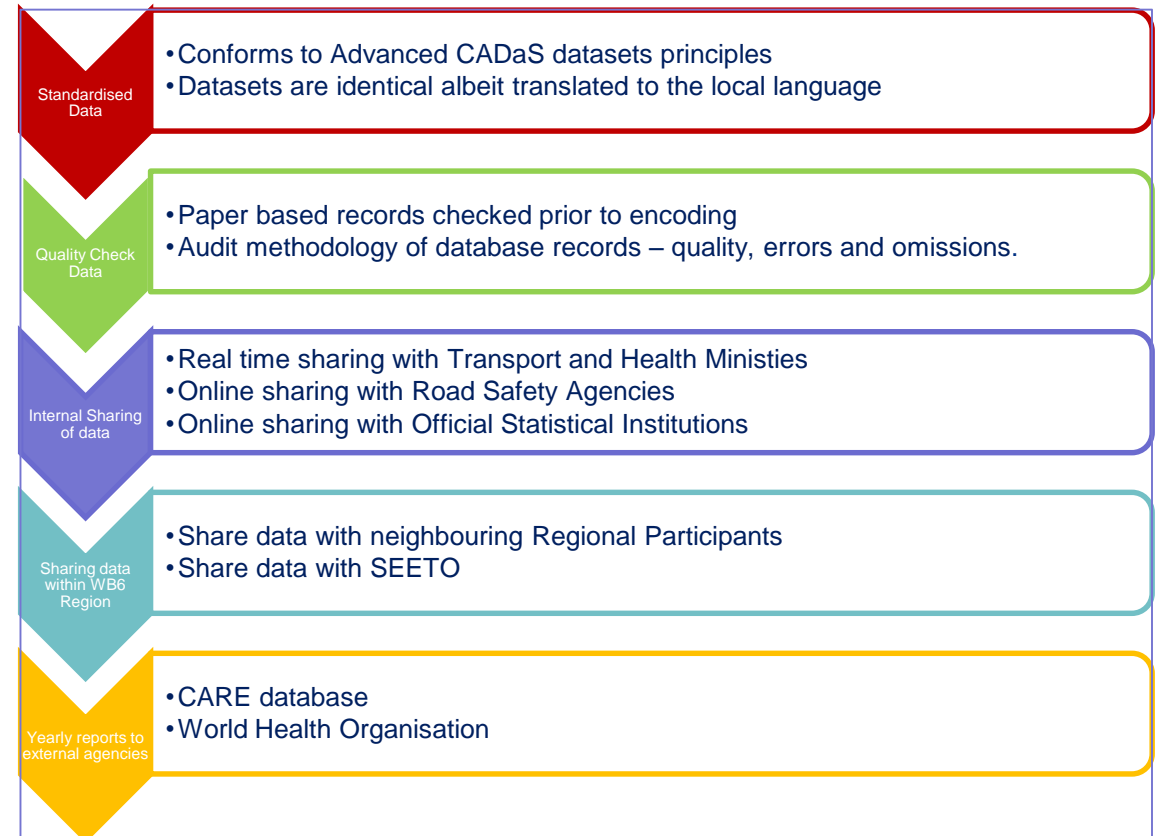
- The requirement for a fully functioning analytical and GIS capable database will be essential to achieve the proposals outlined in the report
- In short term the current database has the potential to be enhanced to achieve the primary goal
- In the long term achieving the level of data linking and advanced analytical capability will require the procurement of a bespoke system.

Concept for a common system in WB6 based on EU practice

Concept

- Data collection
- Data linking and sharing
- Data Analysis

Road Map



Recommendations

Activity	Actions	Components
Standardise statistical crash datasets	An agreement that all the advanced CADaS datasets version 3.6 2017 will be adopted within WB6 regional as the de-facto crash data recording convention.	It is proposed the WB6 Regional Representatives sign a formal agreement to use the Advanced CADaS datasets as a requirement
Standardise statistical crash reporting form	Enhancement of paper reporting form in line with Advanced CADaS datasets.	It is proposed a separate statistical crash data reporting form should be created to encompass all the advanced CADaS datasets
	Translation of advanced CADaS datasets and manual into local language	Use CADaS reference codes as de-facto dataset identification and develop an agreed translation for each dataset
	Produce protocol for completion statistical report form	Elements: <ul style="list-style-type: none"> • Identification of lead agency responsible for completion of statistical crash report • Identification of agency /officer / department responsible for completing each sections of report. • Maximum time periods permitted when form / sections should be completed • Protocol to quality audit paper form and require lead agency / officer / department to correct omissions and errors identified
Produce training manual in local language that provides an explanation of the CADaS dataset	Develop a reference guide for the completion of the crash report form in the local language based on the manuals provided by EU. Provide training to personnel on how to completing the crash report form	

Recommendations

Activity	Actions	Components
<p>Encoding statistical crash data into computer database</p>	<p>Enhancement of computer database datasets to enable encoding of new statistical datasets</p>	<p>There will be a need to either:</p> <ul style="list-style-type: none"> • Upgrade the existing database datasets to match statistical crash data form or • Procure / develop a separate crash database capable of encoding the statistical crash data form
	<p>Produce a protocol outlining the methodology for:</p> <ul style="list-style-type: none"> • Encoding the statistical crash data into the database. • Quality audit of data recorded • Protocol for marking record as complete and closed 	<p>Elements:</p> <ul style="list-style-type: none"> • Identification of lead agency responsible for encoding the statistical crash data • Maximum time periods permitted when initial record is encoded – within 24 hours • Maximum time periods when record should be completed <ul style="list-style-type: none"> ○ damage only 7 days ○ Serious injury 30 days ○ Fatal defined on an incident by incident bases at least 30 days. • Protocol to identify omissions and errors • Protocol to rectify errors and omissions • Protocol to close a record as complete.

Recommendations

Activity	Actions	Components
Multi-Agency approach	<p>Develop a multiagency approach to providing information for the statistical crash report form:</p> <ul style="list-style-type: none"> • Medical <ul style="list-style-type: none"> ○ Ambulance ○ Trauma centre • Fire and Rescue • Engineering <ul style="list-style-type: none"> ○ GIS mapping ○ Traffic flow and speed data ○ iRAP data 	<p>It is proposed each Region within the WB6 produce a formal agreement with the various Ministries to agree on a protocol for the dissemination of data associated with a road crash.</p> <ul style="list-style-type: none"> • Identify roles and responsibilities of each agency • Develop a protocol for the provision of data.
	<p>Ministry of Health to develop a protocol with the Ministry of Interior (police) with respect to the provision of trauma data from ambulance and trauma centre for a causality.</p>	<p>Medical data associated with a casualty involved in a crash is referenced to the casualty’s name and date of birth. The Police database also contains the names and date of births of the casualties involved in a collision. Proposal is to encode the medical casualty data into the police database to enable easy linking of data.</p>
	<p>Regional agreement on adopting the Maximum Abbreviated Injury Scale (MAIS) casualty coding system within WB6 Region</p>	<p>It is proposed each Region within the WB6 formal agree to adopt MAIS injury coding system.</p>
	<p>Ministry of Infrastructure to develop a protocol to provide access to GIS mapping</p>	<p>This will require a computer system capable of displaying crash data as an overlay within a GIS map</p>

Recommendations

Activity	Actions	Components
Data Sharing	<p>Achieve a real time sharing of all the CADaS statistical data sets with all the relevant Ministries and Road Safety Agencies within a Regional Participant</p> <p>Drafting of a memorandum of understanding (MOU) between all participants</p>	<p>An example MOU has been provided</p>
Data Linking - local	<p>Develop the technical capabilities to achieve a secure linking capability for the non-sensitive statistical crash data between the relevant Ministries</p>	<p>The actual exchange of data will require the creation of a compatible computer linking database or 'HUB' which will facilitate the exchange of data between each of the data sources. The central 'HUB' database will combine the data into records associated with each crash and display the information using advanced GIS technology</p>
Data Linking - Regional	<p>Develop the technical capabilities to achieve a secure linking capability for the non-sensitive statistical crash data between the WB6 Regions and SEETO</p>	<p>To achieve this sharing will require:</p> <ul style="list-style-type: none"> • The drafting of a memorandum of understanding (MOU) between all the parties involved outlining the exchange mechanism, security protocols and timelines. • Each recipient will require a compatible computer linking database or 'HUB' which will facilitate the exchange of data between each of the data sources. • An advanced analytical database to permit the end user to view and analyse the crash records provided.
Data Analysis	<p>Develop an ability to undertake advanced analysis of the statistical crash data within a GIS environment.</p>	<p>It is proposed that to undertake this style of analysis will require the procurement of an 'off the shelf' Analytical GIS capable crash database.</p> <p>Many such programs also combine the ability to function as a 'HUB' to permit the linking of other data sources.</p>



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