Società Italiana Infrastrutture Viarie dept. Civil Environmental Engineering

Summer School SIIV 2012

European Directive 2008/96/CE

Road Infrastructures Safety Management

Opening Session

Monday 24 sept. 2012

European Directive on road infrastructure safety management

Monday 24 Sept. 2012 **- Session A**

15:00 - 15:30 Welcome and Opening (S. Cafiso, E. Foti, D. Manuele)

15:30 - 16:30 Introduction to European Directive 2008/96/CE and Italian Guidelines (S. Cafiso - P. Colonna)

16:30 - 17:00 Coffee break

17:00 - 18:00 Safety management of road infrastructure: an European Overview (S. Campagnolo)

17:30 - 18:00 Implementations and latest developments of EU Directive 2008/96/CE (H. Cullen)

18:00 - 19:00 Discussion

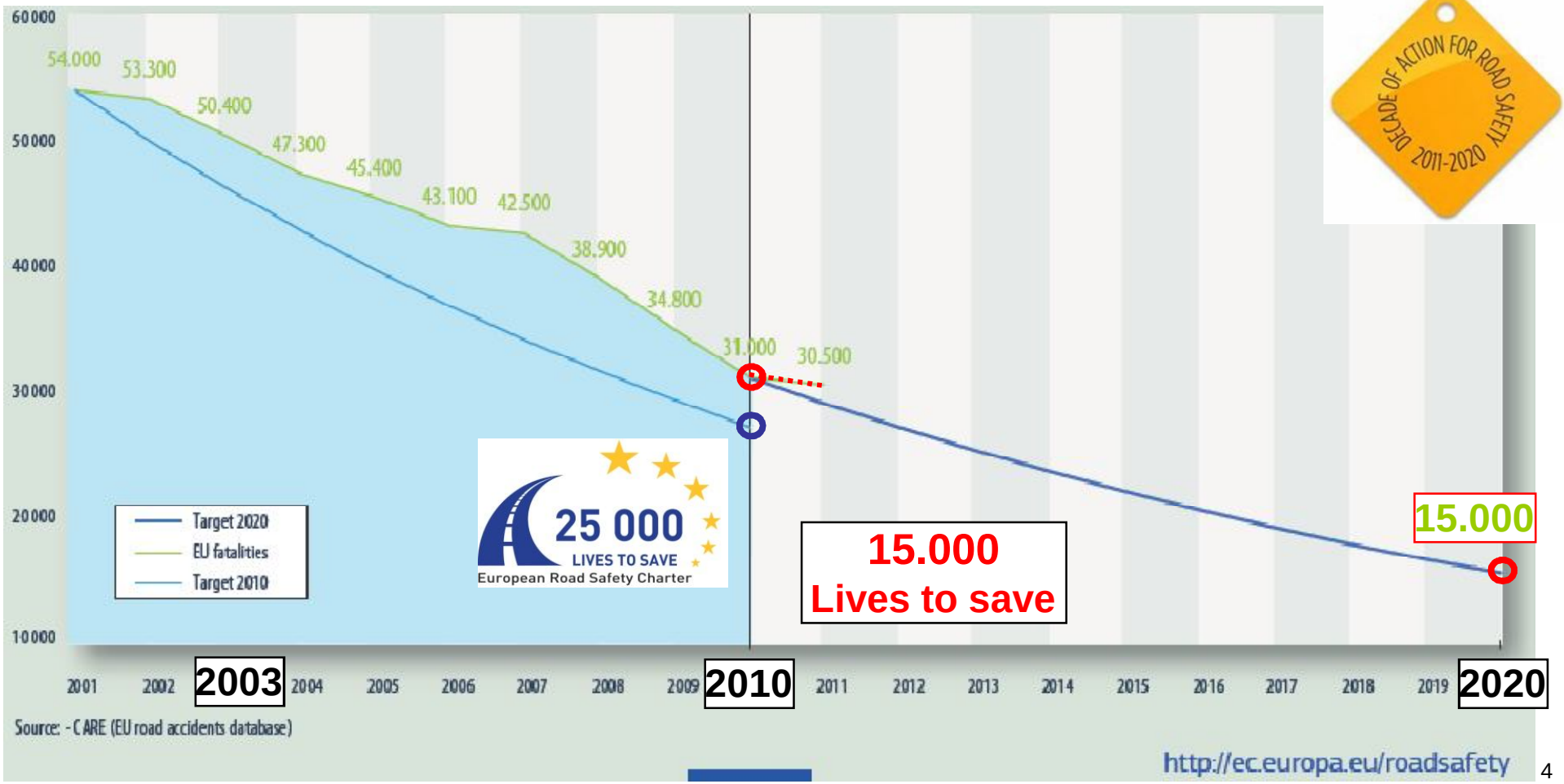
European Directive 2008/96/CE Overview & Italian Guidelines

Salvatore Cafiso

University of Catania

EU Safety Programme 2010-2020

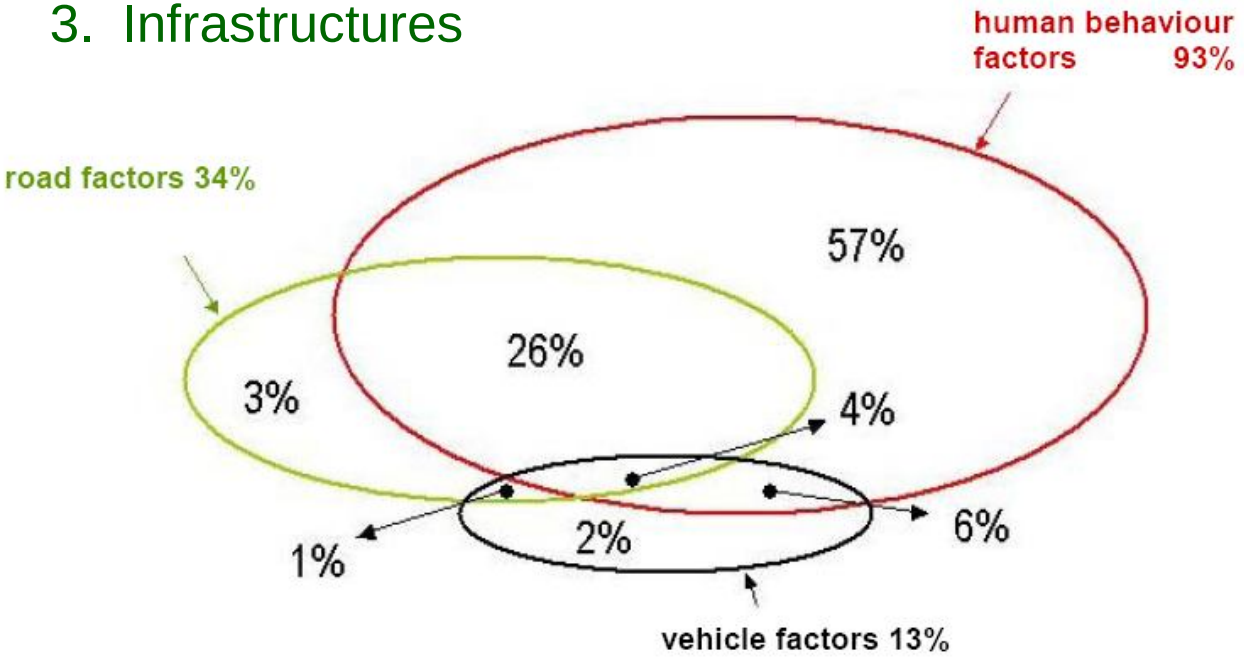
Halve the number of road deaths by 2020



EU Strategic objectives

Road Safety is based on 3 Pillars

1. Education, Training, Enforcement, Emergency
2. Vehicle
3. Infrastructures



(Source: PIARC Road Safety Manual, 2003)

DIRECTIVE 2008/96/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 19 November 2008 on Road Infrastructure Safety Management

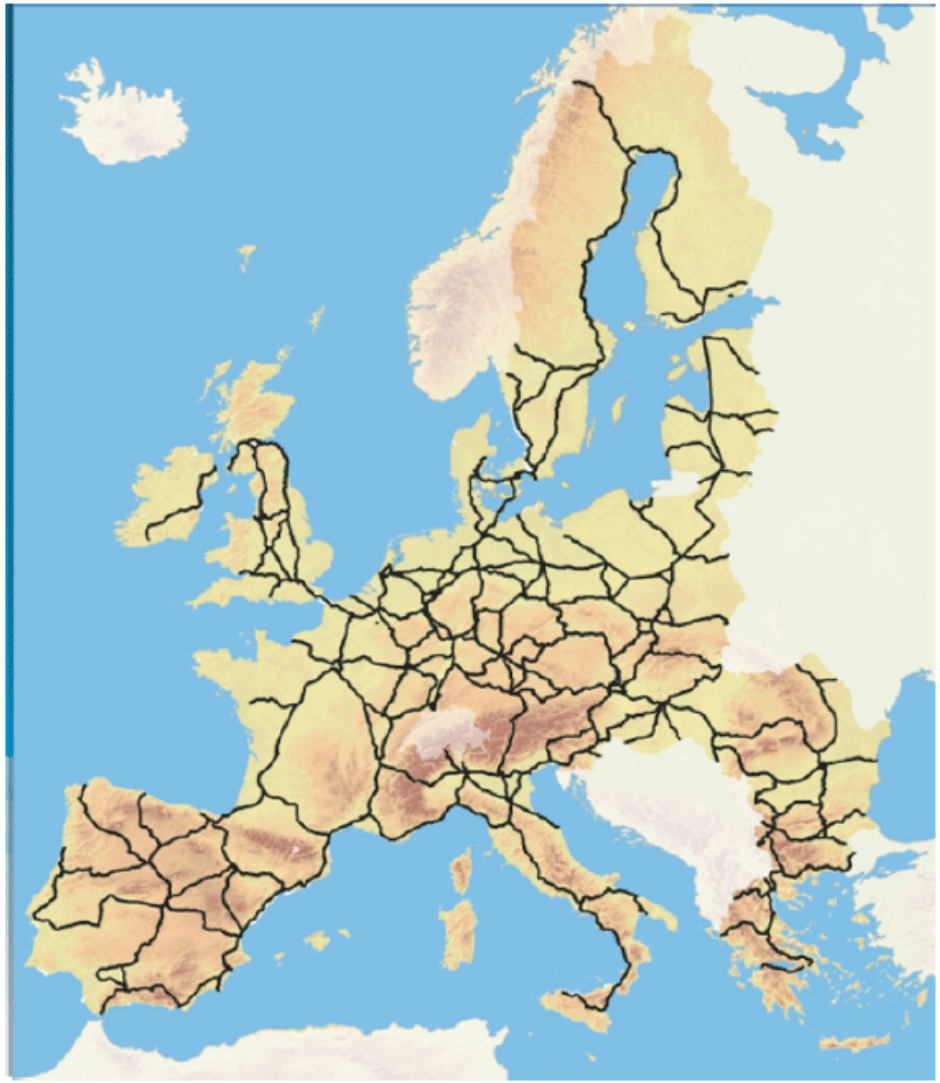
Article 1
Subject matter and scope

1. This Directive requires the establishment and implementation of procedures relating to **road safety impact assessments**, **road safety audits**, the management of **road network safety** and **safety inspections** by the Member States.

2. This Directive shall apply to roads which are part of the **trans-European road network**, whether they are at the **design** stage, under **construction** or **in operation**.

3. Member States may also apply the provisions of this Directive, as a set of good practices, to national road transport infrastructure, not included in the trans-European road network, that was constructed using Community funding in whole or in part.

DECISION No 661/2010/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL
of 7 July 2010
on Union guidelines for the development of the
Trans-European Transport Network



Objectives

The trans-European transport network must ensure the sustainable mobility of persons and goods within an area without internal frontiers under the **best possible social and safety conditions**, while helping to achieve the Union's objectives, particularly in regard to the environment and competition, and contribute to strengthening economic and social cohesion;

…….

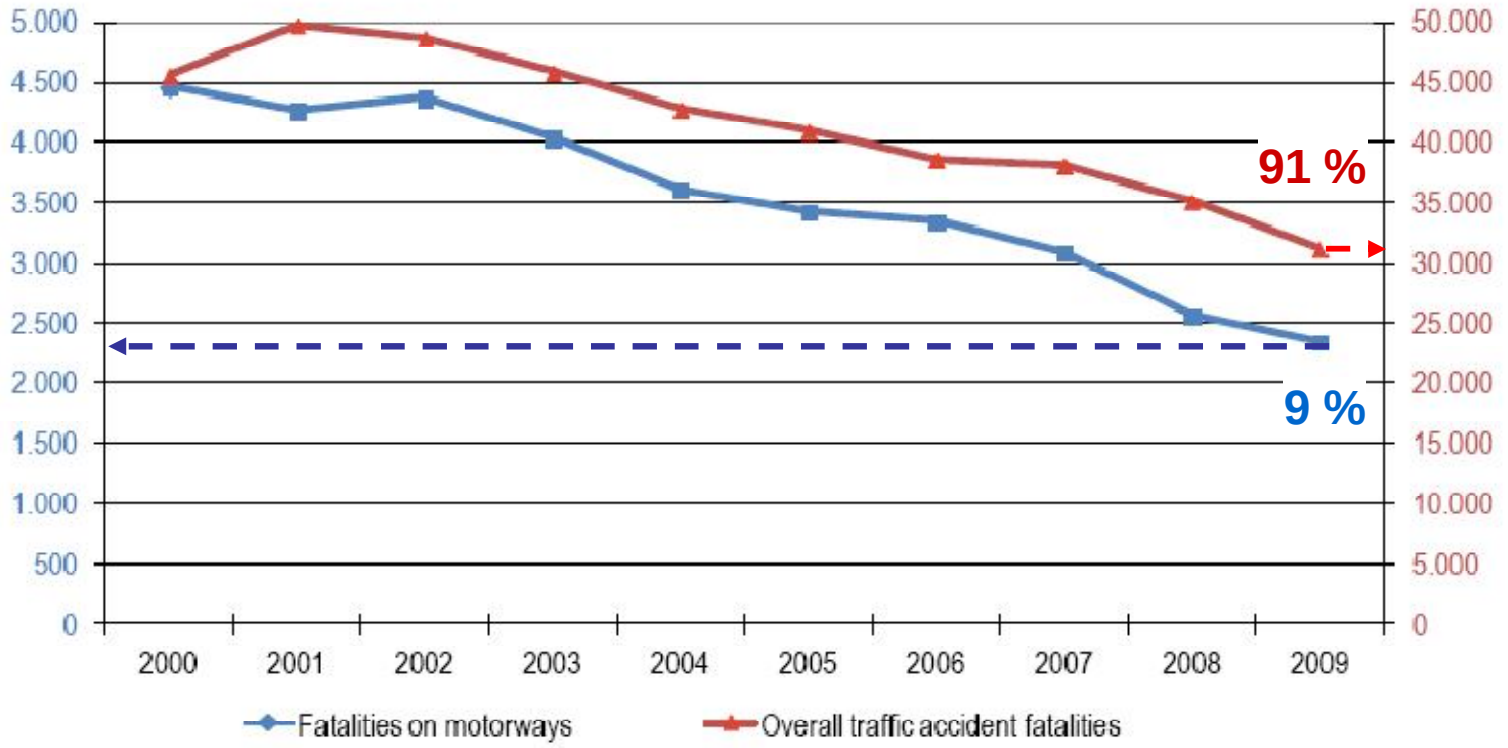
Art. 9 - **TERN comprises motorways and high-quality roads which play an important role in long distance traffic**

Why Directive applies to TERN network ?

- Is number of fatalities or crash rate higher on TERN ?
- Is the maximum benefits expected on TERN ?
- Is it a Political choice ?

Number of fatalities and crash cost rate on motorways

Figure 1: Fatalities evolution in the EU-18[1], 2000-2009[2]



Source: CARE Database / EC

Date of query: December 2011

Crash cost rates:

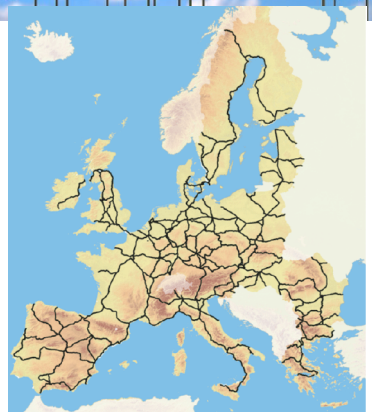
7.6 € /(1000 vehic km) motorways ÷ 24 € /(1000 vehic km) 2lane rural roads

Is the maximum benefits expected on TERN ?

It is estimated that **400 lives** per year could be saved if the safety management is applied to **motorways**, and **additional 900 lives** could be saved every year if it is applied to the main road network **not included in the TERN**.

According to the EU monetary estimations, the **welfare benefit** of these reduction on motorways corresponds to more than **1.5 billions €** per year. If the Directive will be applied on all motorways and main roads, the reduction of fatalities is estimated around 1.300 every year, this corresponds to more than **5 billions €** per year.

It is a Political decision



EU Directive: (art. 1.3) *Member States may also apply the provisions of this Directive, as a set of good practices, to national road transport infrastructure, not included in the trans-European road network, that was* ***constructed using Community funding*** *in whole or in part.*

Italian Law: *by 2016, Directive will be applied to the whole road network of national interest (30.500 km)*

Directive EU 2008/96/CE was transposed by Italian Legislative decree n. 35 *November 2011*

Italian Guidelines for Safety Audit, Safety Inspection and Road Network Safety Management

September 2012

DIRECTIVE 2008/96/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 19 November 2008 on road infrastructure safety management

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3. Member States may also apply the provisions of this Directive, as a set of good practices, to national road transport infrastructure, not included in the trans-European road network, that was constructed using Community funding in whole or in part.

Design Stage

"The setting up of appropriate procedures is an essential tool for improving the safety of road infrastructure within the trans-European road network.

Road safety impact assessments *should demonstrate, on a strategic level, the implications on road safety of different planning alternatives of an infrastructure project and they should play an important role when routes are being selected.*

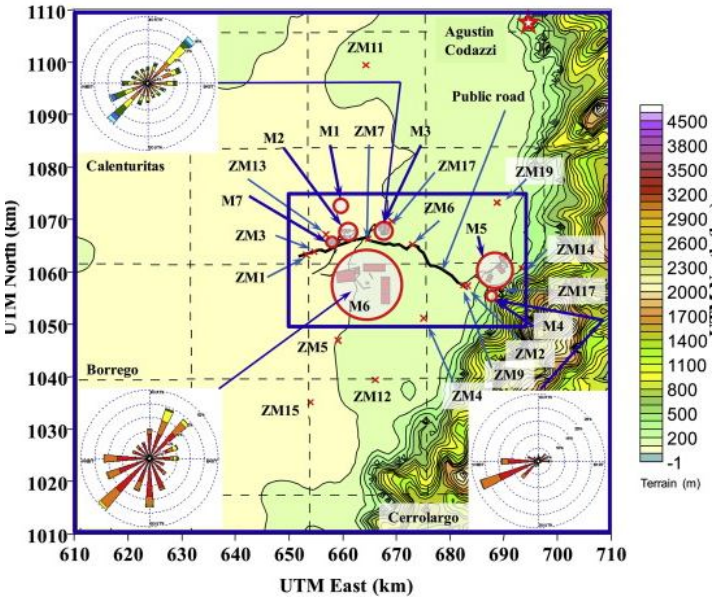
Road safety audits *should identify, in a detailed way, unsafe features of a road infrastructure project"*

Design Stage

Article 3 (Annex I)

Road Safety Impact Assessment

Network Level - Planning

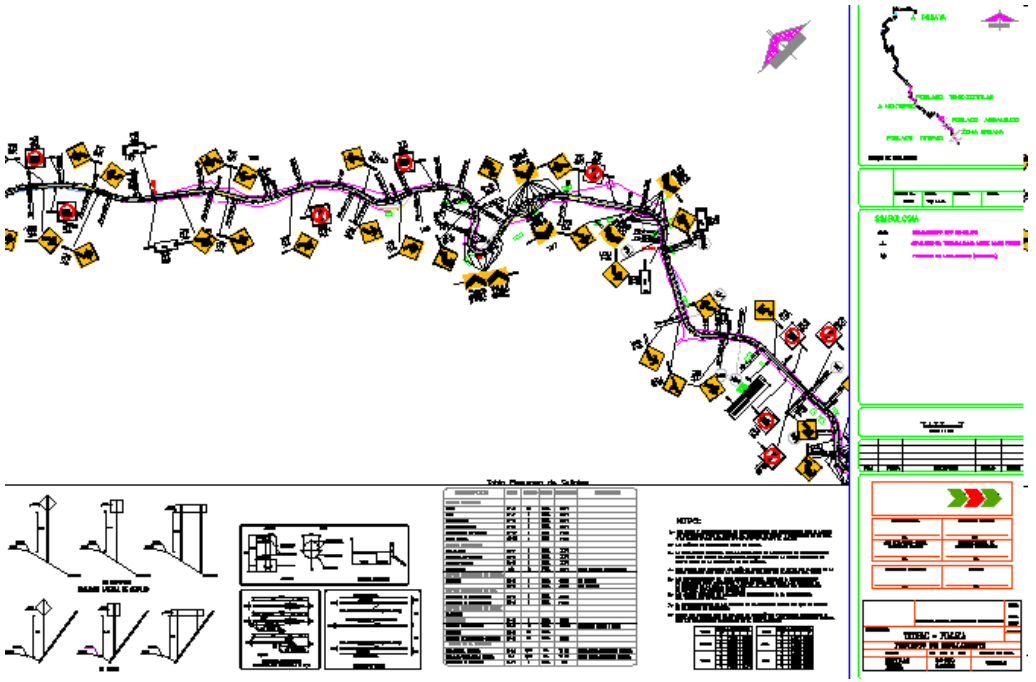


Article 4 (Annex II) (Art. 9)

Road Safety Audit (&Training requirements)

Project Level

Stage 1: Preliminary Design
Stage 2: Detailed Design
Stage 3: Pre-opening
Stage 4: Early Opening



Road safety impact assessment for infrastructure projects

Tuesday 25 Sept. 2012 **- Session B**

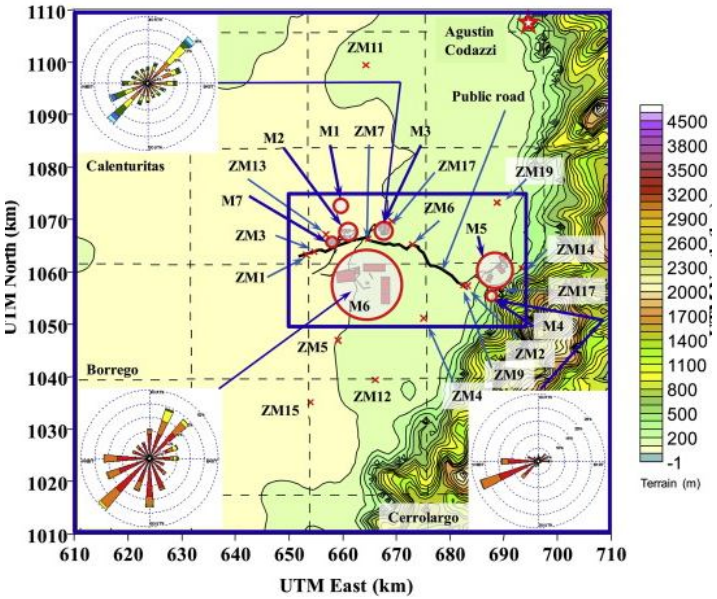
09:00 - 09:15	Introduction (Chair P. Colonna)
09:15 - 10:45	Modulo B1 – Safety Impact Assessment at the Program and System Levels (J. Kononov)
10:45 - 11:15	Break
11:15 - 12:45	Modulo B2 – A systematic approach to road safety impact assessment (R. Elvik)
12:45 - 14:00	Lunch
14:00 - 15:00	Modulo B3: case studies and practical examples (J. Kononov, R. Elvik)
15:00 - 15:30	Discussion

Design Stage

Article 3 (Annex I)

Road Safety Impact Assessment

Network Level - Planning



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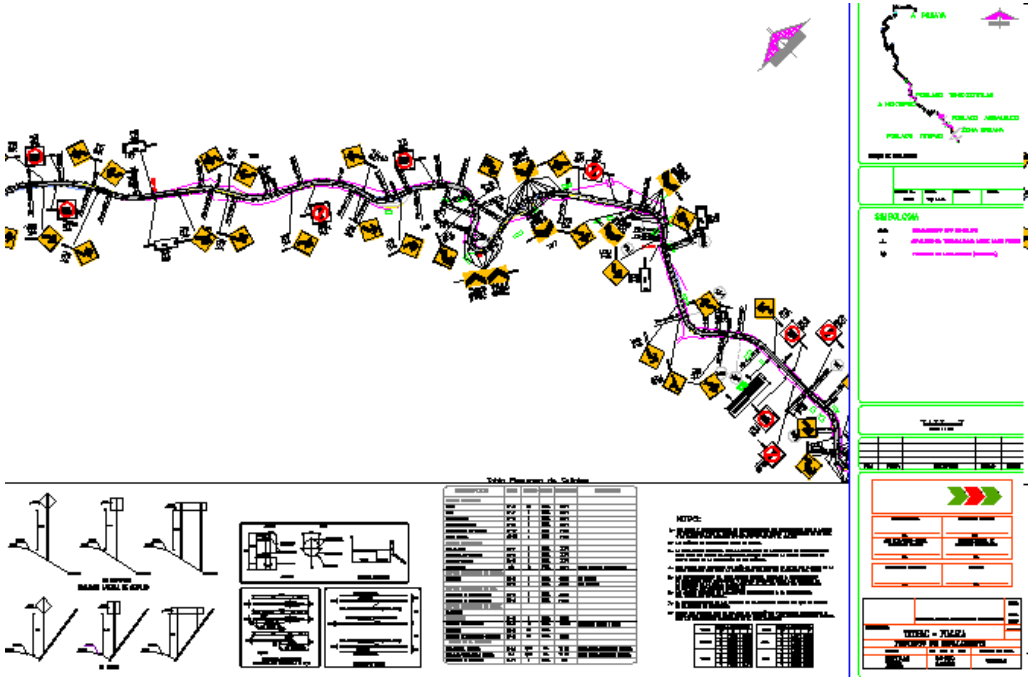

Road Safety Audits & Inspections

Thursday 27 Sept. 2012 **- Session D**

09:00 - 09:15 Introduction (Chair L. Domenichini)

09:15 - 10:15 Modulo D1 – Safety Audit and Safety Inspection (H. Cullen)

10:15 - 11:15 Modulo D2 – Diagnosis and Site Visit (J. Kononov)

11:15 - 11:30 Coffee Break

11:30 - 12:00 Auditors and Inspectors Training – European Harmonization (A. Adesiyun)

12:00 - 13:30 Modulo D3 - case studies and practical examples (H. Cullen)

13:30 - 14:00 Discussion

ROAD SAFETY AUDITS

Definition by Directive (art. 4)

"***Road Safety Audit***": *an independent detailed systematic and technical safety check relating to the design characteristics of a road infrastructure project and covering all stages from planning to early operation;*"

Road Safety Audit

Italian Guidelines 2012

Italian guidelines for conducting a Safety Audit are in line with the international practice. In the following some peculiarities:

- Interim audit
- Audit team

Composition: No minimum number of experts is defined (also a 1 expert audit can be allowed)

Certification: Civil engineering degree as prerequisite; Initial Training of 180 hours (including Directive 2004/54/EC) + refresher course of 30 hours/3 years;

- Tunnels

Audit team is in charge also for safety analysis of road tunnels (if present) in compliance with Directive 2004/54/EC

Road Tunnels

have to be considered in the Safety Analysis ?

EU Directive states:

It therefore makes sense to develop procedures to be followed in those two fields (i.e. assessment & audit) *with the aim of increasing safety of road infrastructures on the trans-European road network, whilst at the same time excluding road tunnels which are covered by Directive 2004/54/EC of the European Parliament and of the Council of 29 April 2004 on minimum safety requirements for tunnels in the trans-European road network" (500 m longer)*

Monte Bianco
24 March, 1999
39 fatalities

Road Tunnels

have to be considered in the Safety Analysis ?

Italian Legislative decree (n. 35/2011) states:

This legislative decree doesn't apply to road tunnels which are covered by Directive 2004/54/EC of the European Parliament and of the Council of 29 April 2004 on minimum safety requirements for tunnels in the trans-European road network" (500 m longer)

Italian Guidelines (2012) states:

It should be better to include tunnels longer than 500 m in the fields of application of the Legislative decree n.35/2011.

The audit/Inspection team in charge for the safety analysis of a road stretch including a tunnel longer than 500 m must check also the tunnel in compliance with the Directive 2004/54/EC

Road Safety Audit & Inspection Stages

Italian Guidelines, 2012

					New Design				Re-design of existing			
					Rural		Urban		Rural		Urban	
					Double carriag.	Single carriag.	Double carriag.	Single carriag.	Double carriag.	Single carriag.	Double carriag.	Single carriag.
Road Project	CONTROLL	Preliminary Design	Audit		1.CON.PP NUEXDC	2.CON.PP NUEXSC	3.CON.PP NUURDC	4.CON.PP NUURSC	5.CON.PP ESEXDC	6.CON.PP ESEXSC	7.CON.PP ESURDC	8.CON.PP ESURSC
		Detailed Design			9.CON.PD NUEXDC	10.CON.PD NUEXSC	11.CON.PD NUURDC	12.CON.PD NUURSC	13.CON.PD ESEXDC	14.CON.PD ESEXSC	15.CON.PD ESURDC	16.CON.PD ESURSC
		Executive Design			17.CON.PE NUEXDC	18.CON.PE NUEXSC	19.CON.PE NUURDC	20.CON.PE NUURSC	21.CON.PE ESEXDC	22.CON.PE ESEXSC	23.CON.PE ESURDC	24.CON.PE ESURSC
	PRIME ISPEZIONI DI VERIFICA SUL PROGETTO	Construction	Inspection		13.ISP.C NUEXDC	14.ISP.C NUEXSC	15.ISP.C NUURDC	16.ISP.C NUURSC	17.ISP.C ESEXDC	18.ISP.C ESEXSC	19.ISP.C ESURDC	20.ISP.C ESURSC
		Pre Opening			21.ISP.PA NUEXDC	22.ISP.PA NUEXSC	23.ISP.PA NUURDC	24.ISP.PA NUURSC	25.ISP.PA ESEXDC	26.ISP.PA ESEXSC	27.ISP.PA ESURDC	28.ISP.PA ESURSC
		In Operation			29.ISP.PF NUEXDC	30.ISP.PF NUEXSC	31.ISP.PF NUURDC	32.ISP.PF NUURSC	33.ISP.PF ESEXDC	34.ISP.PF ESEXSC	35.ISP.PF ESURDC	36.ISP.PF ESURSC
Existing	ISPEZIONI A REGIME	PERIODICA		Routine Inspection	1.ISP.PD EXDC	2.ISP.PD EXSC	3.ISP.PD URDC	4.ISP.PD URSC	1.ISP.PD EXDC	2.ISP.PD EXSC	3.ISP.PD URDC	4.ISP.PD URSC
				Site Visit	5.ISP.PP EXDC	6.ISP.PP EXSC	7.ISP.PP URDC	8.ISP.PP URSC	5.ISP.PP EXDC	6.ISP.PP EXSC	7.ISP.PP URDC	8.ISP.PP URSC
		STRAORDINARIA (cantieri)		PUNTUALE	9.ISP.SP EXDC	10.ISP.SP EXSC	11.ISP.SP URDC	12.ISP.SP URSC	9.ISP.SP EXDC	10.ISP.SP EXSC	11.ISP.SP URDC	12.ISP.SP URSC

Road Safety Audit – Check List
Italian Guidelines 2012

PROGETTO PRELIMINARE - NUOVE INFRASTRUTTURE			
MACROVOCE	**VOCE**	**ASPETTI DA CONTROLLARE**	**GIUDIZIO**
ASPETTI GENERALI	FUNZIONE	funzione svolta nuova infrastruttura all'interno della rete esistente	
		funzione assegnata alla nuova infrastruttura	
	INSERIMENTO NELLA RETE ESISTENTE	tipologia di connessione con la rete adiacente	
		variazione volume di traffico sulle infrastrutture adiacenti	
	CONDIZIONI AMBIENTALI E PAESAGGIO CIRCOSTANTE	contesto ambientale e paesaggistico	
		presenza interferenze con la nuova infrastruttura	
	TRAFFICO	valutazione soluzione progettuale in funzione del tipo e volume di traffico previsto	
		volumi di traffico rilevanti per tipologie particolari di utenza	
		coerenza tra classe della nuova infrastruttura e volume e tipo di traffico previsto	
GEOMETRIA	TRACCIATO PLANIMETRICO (VERIFICA IN RIFERIMENTO AL D.M. 05.11.01)	dimensionamento dei rettifili in funzione della velocità di progetto	
		dimensionamento delle curve di transizione in funzione della velocità di progetto	
		dimensionamento delle curve circolari in funzione della velocità di progetto	
	TRACCIATO ALTIMETRICO (VERIFICA IN RIFERIMENTO AL D.M. 05.11.01)	dimensionamento delle livellette in funzione della velocità di progetto	
		dimensionamento dei raccordi convessi in funzione della velocità di progetto	
		dimensionamento dei raccordi concavi in funzione della velocità di progetto	
	COORDINAMENTO PLANO-ALTIMETRICO (VERIFICA IN RIFERIMENTO AL D.M. 05.11.01)	coordinamento in funzione della velocità di progetto	
	INTERSEZIONI A LIVELLI SFALSATI	numero, frequenza e posizionamento in funzione della classe di strada	
		tipologia del volume e del tipo di traffico in funzione della classe di strada	
ALTRI ASPETTI	ACCESSI E DIRAMAZIONI	localizzazione aree di servizio e aree di sosta in funzione della classe di strada	
	altri aspetti specifici individuati dal controllore		

Check list: **1_CON_PP_NUEXDC**
1: ID
CON: Control (i.e. Audit)
PP: Preliminary project
NU: new
EX: rural
DC: double carriageway

Road Safety Audit – Check List
Italian Guidelines 2012

GEOMETRIC DESIGN	**Horizontal Alignment** check compliance with DM 05.11.01 (Design Standards)	Tangents and Design Speed
		Transition curves and Design Speed
		Circular curves and Design Speed
	Vertical Alignment check compliance with DM 05.11.01 (Design Standards)	Gradient and Design Speed
		Crest curves and Design Speed
		Sag curves and Design Speed
	Vertical Vs. Horizontal check compliance with DM 05.11.01 (Design Standards)	Coordination and Design Speed
	Junctions	Number and location with reference to road class
		Traffic volume composition with reference to road class

1_CON_PP_NUEXDC: Audit_Preliminary Project_New_Design_ Rural_Double Carriageway

Road Safety Audit & Inspection Stages

Italian Guidelines, 2012

					New Design				Re-design of existing			
					Rural		Urban		Rural		Urban	
					Double carriag.	Single carriag.	Double carriag.	Single carriag.	Double carriag.	Single carriag.	Double carriag.	Single carriag.
Road Project	CONTROLL	Preliminary Design		Audit	1.CON.PP NUEXDC	2.CON.PP NUEXSC	3.CON.PP NUURDC	4.CON.PP NUURSC	5.CON.PP ESEXDC	6.CON.PP ESEXSC	7.CON.PP ESURDC	8.CON.PP ESURSC
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		Executive Design			17.CON.PE NUEXDC	18.CON.PE NUEXSC	19.CON.PE NUURDC	20.CON.PE NUURSC	21.CON.PE ESEXDC	22.CON.PE ESEXSC	23.CON.PE ESURDC	24.CON.PE ESURSC
	PRIME ISPEZIONI DI VERIFICA SUL PROGETTO	Construction		Inspection	13.ISP.C NUEXDC	14.ISP.C NUEXSC	15.ISP.C NUURDC	16.ISP.C NUURSC	17.ISP.C ESEXDC	18.ISP.C ESEXSC	19.ISP.C ESURDC	20.ISP.C ESURSC
		Pre Opening			21.ISP.PA NUEXDC	22.ISP.PA NUEXSC	23.ISP.PA NUURDC	24.ISP.PA NUURSC	25.ISP.PA ESEXDC	26.ISP.PA ESEXSC	27.ISP.PA ESURDC	28.ISP.PA ESURSC
		In Operation			29.ISP.PF NUEXDC	30.ISP.PF NUEXSC	31.ISP.PF NUURDC	32.ISP.PF NUURSC	33.ISP.PF ESEXDC	34.ISP.PF ESEXSC	35.ISP.PF ESURDC	36.ISP.PF ESURSC
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		STRAORDINARIA (cantieri)	PUNTUALE		9.ISP.SP EXDC	10.ISP.SP EXSC	11.ISP.SP URDC	12.ISP.SP URSC	9.ISP.SP EXDC	10.ISP.SP EXSC	11.ISP.SP URDC	12.ISP.SP URSC

MACROVOCE	VOCE	PARAMETRO	INDICATORE		0,500	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500	5,000
SEDE STRADALE	PIATTAFORMA, MARGINI E FASCE DI PERTINENZA	BANCHINA LATERALE	assenza o insufficiente larghezza	M										
				G										
			restringimento in corrispondenza opera d'arte	M										
				G										
		CORSIA EMERGENZA	assenza o insufficienza larghezza	M										
				G										
		CORSIE MARCIA E SORPASSO	insufficienza larghezza	M										
				G										
			eccesso larghezza	M										
				G										
		BANCHINA INTERNA	assenza o insufficiente larghezza	M										
				G										
		SPARTITRAFFICO	inadeguatezza organizzazione spazi	M										
				G										
			effetti negativi su visibilità	M										
				G										
		DISPOSITIVI DI RITENUTA	assenza	M										
				G										
			inadeguatezza tipologia	M										
				G										
			inadeguatezza transizioni e terminali	M										
				G										
			inadeguatezza varchi spartitraffico	M										
				G										
			scorrettezza condizioni di installazione	M										
				G										
			presenza ostacoli non protetti	M										
				G										
		SCARPATE	inefficienza manutenzione verde	M										
				G										
			mancanza protezione pericoli	M										
				G										
		DRENAGGI	inefficienza manutenzione	M										
				G										
		RECINZIONE	inefficienza manutenzione	M										
				G										
SEGNALETICA	SEGNALETICA ORIZZONTALE	VISIBILITA' STRISCE DI MARGINE	insufficienza retroriflettenza	M										
				G										
		VISIBILITA' STRISCE DI DEMARCAZIONE CORSIE	insufficienza retroriflettenza	M										
				G										
		GUIDA NEI PUNTI SINGOLARI DEL TRACCIATO	assenza o inadeguatezza	M										
				G										
	SEGNALETICA VERTICALE	SEGNALI DI PERICOLO, PRESCRIZIONE E INDICAZIONE	insufficiente visibilità	M										
				G										
			inadeguatezza leggibilità	M										
				G										
			insufficienza intelleggibilità	M										
				G										
		LIMITI VELOCITA' *(anche particolare)*	assenza o scorrettezza posizionamento	M										
				G										
			inadeguatezza rispetto alla velocità di progetto	M										
				G										
			inadeguatezza rispetto alla velocità operativa	M										
				G										
	SEGNALI LUMINOSI	SEGNALI DI PERICOLO SEGNALI DI PRESCRIZIONE	inefficienza manutenzione	M										
				G										
		LANTERNE CORSIE REVERSIBILI LANTERNE IMBOCCHI GALLERIE LANTERNE LAMPEGGIANTI	inefficienza manutenzione	M										
				G										
		DELINEATORI DI MARGINE	inefficienza manutenzione	M										
				G										
	SEGNALETICA COMPLEMENTARE	DELINEATORI CURVE	assenza o inadeguatezza	M										
				G										
		DELINEATORI MARGINI	assenza o inadeguatezza	M										
				G										

Safety Inspection Check List

Italian Guidelines 2012

Ceck list: 1_ISP_PD_EXDC_GENERALE

MACROVOCE	VOCE	PARAMETRO	INDICATORE		0,500	1,000	1,500	2,000	2,500	3,000
SEDE STRADALE	PIATTAFORMA, MARGINI E FASCE DI PERTINENZA	Shoulder	Not present or reduced width	M						
				G						
			restringimento in corrispondenza opera d'arte	M						
				G						
		CORSIA EMERGENZA	assenza o insufficienza larghezza	M						
				G						
		CORSIE MARCIA E SORPASSO	insufficienza larghezza	M						
				G						
			eccesso larghezza	M						
				G						
		BANCHINA INTERNA	assenza o insufficiente larghezza	M						
				G						
		SPARTITRAFFICO	inadeguatezza organizzazione spazi	M						
				G						
			effetti negativi su visibilità	M						
				G						
		DISPOSITIVI DI RITENUTA	assenza	M						
				G						
			inadeguatezza tipologia	M						
				G						
			inadeguatezza transizioni e terminali	M						
				G						
			inadeguatezza varchi spartitraffico	M						
				G						
			scorrettezza condizioni di installazione	M						
				G						
			presenza ostacoli non protetti	M						
				G						
		SCARPATE	inefficienza manutenzione verde	M						
				G						
			mancanza protezione pericol	M						
				G						
		DRENAGGI	inefficienza manutenzione	M						
		RECINZIONE	inefficienza manutenzione	G						

Ceck list: 1_ISP_PD_EXDC_GENERALE

European Project

IASP: "Identification of Hazard Location and Ranking of Measures to Improve Safety on Local Rural Roads"

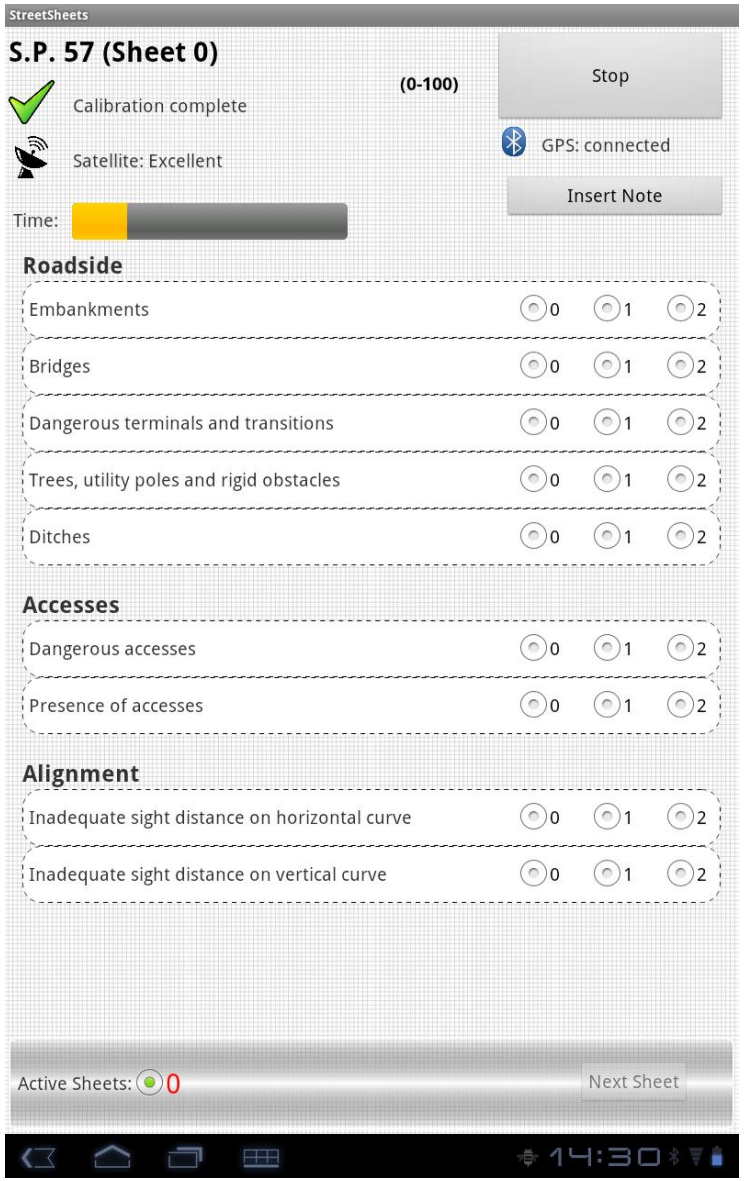
Scientific coordinator: S. Cafiso

IASP Final **Report** and Safety Inspection Operative **Manual**

http://ec.europa.eu/transport/road_safety/projects/doc/iasp.pdf

VEHICLE EQUIPMENT
&
Tablet App

Front Seat Inspector



Tablet Android App

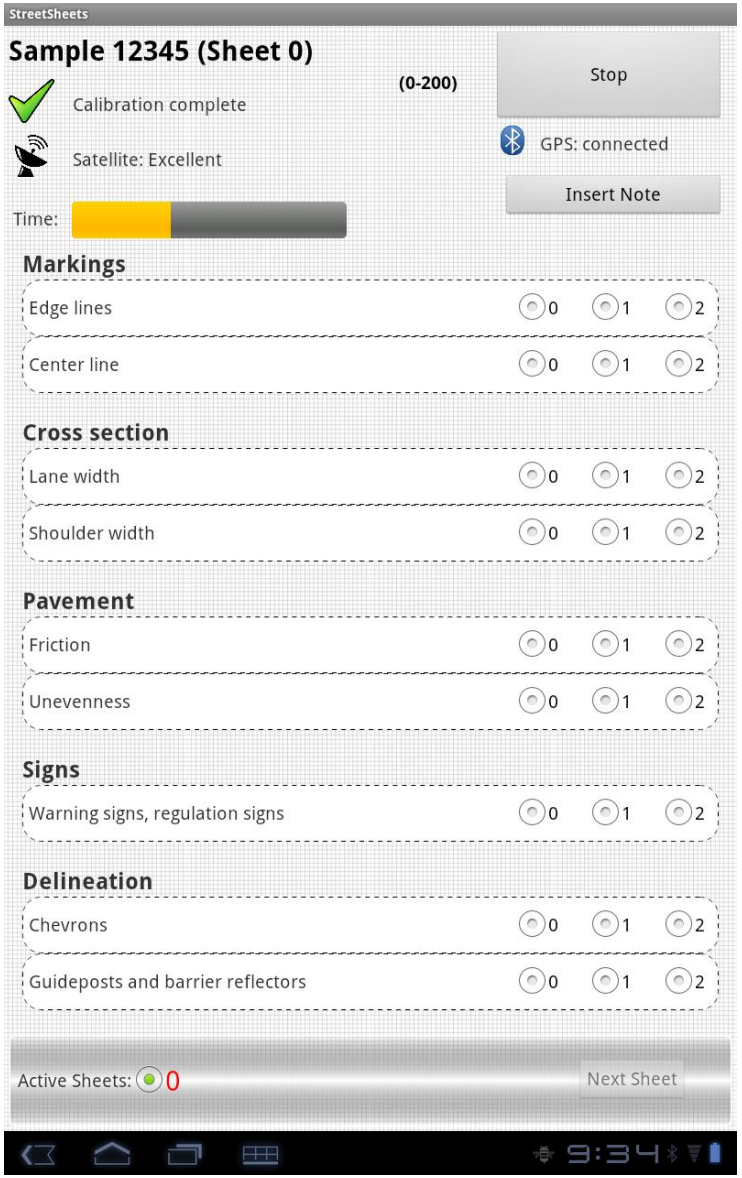
Check list automatically change after the fixed length of the section (eg. 200 m). Inspector can fill, stop, review, insert notes during the inspection. Inspection and GPS Data are stored and synchronized in both directions

0 = no problem

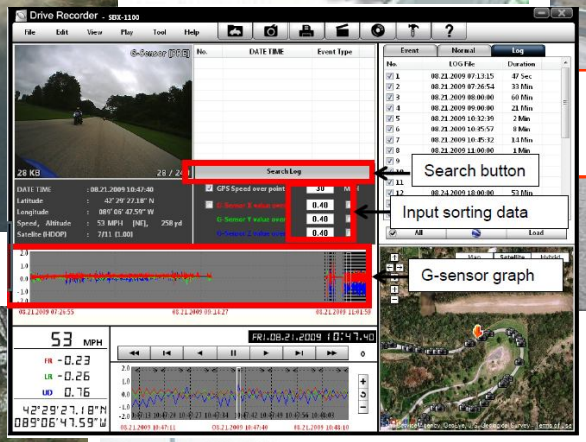
1 = Low level

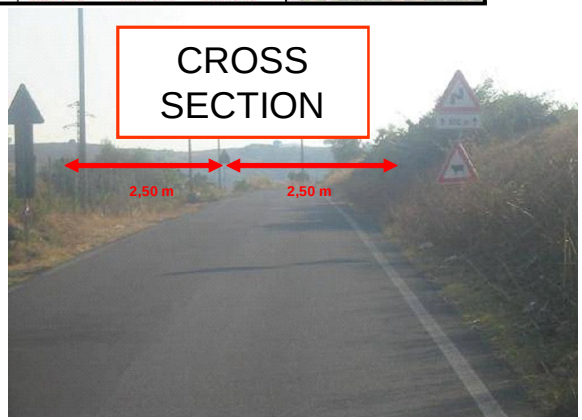
2 = High level

Rear Seat Inspector

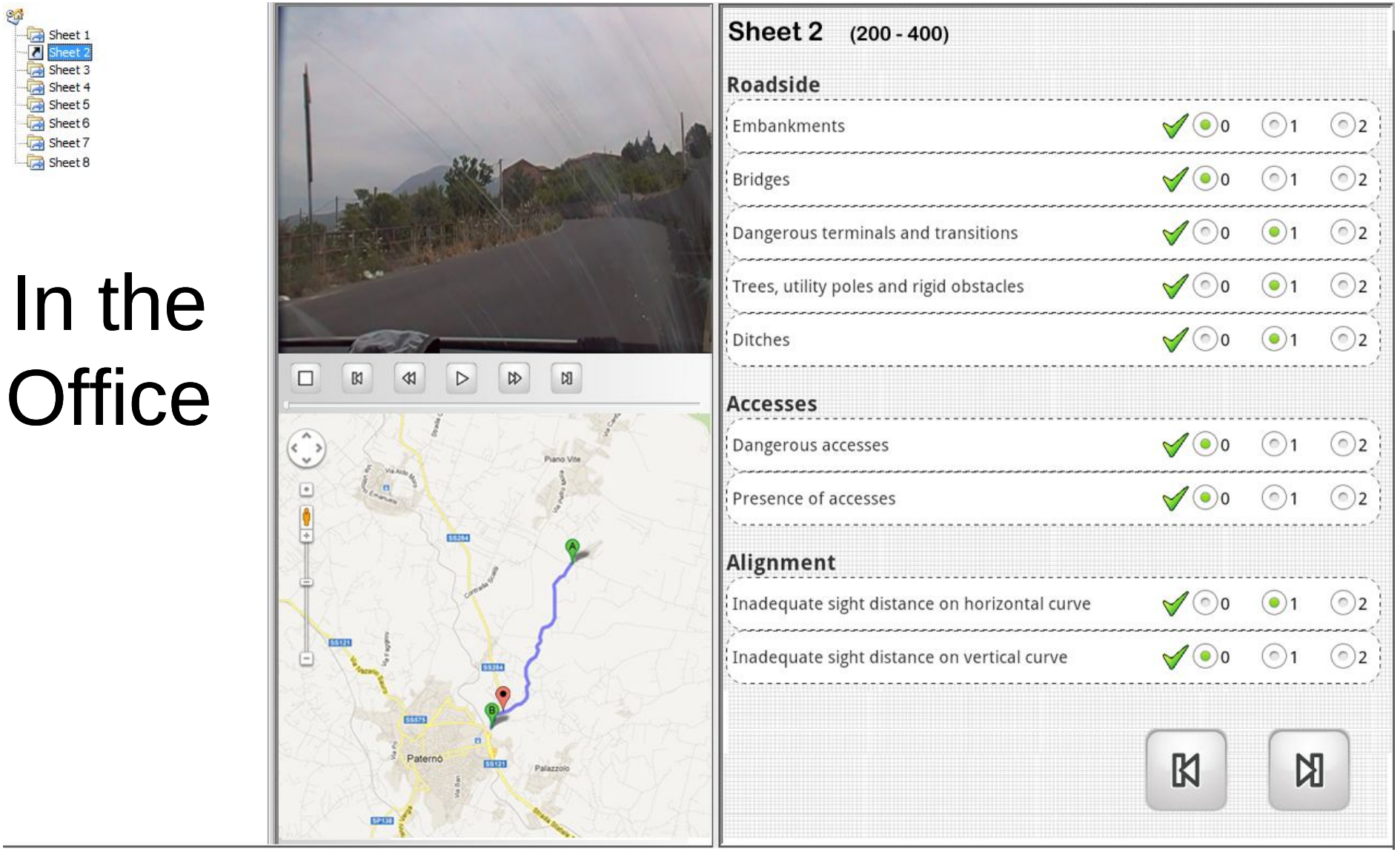


Examples of Safety Issues identified by Road Safety Inspection





In the Office



After in field Safety Inspection, Checklists are reviewed in the office by the Inspection Team

SafeOpt© Software - Strategy Selection

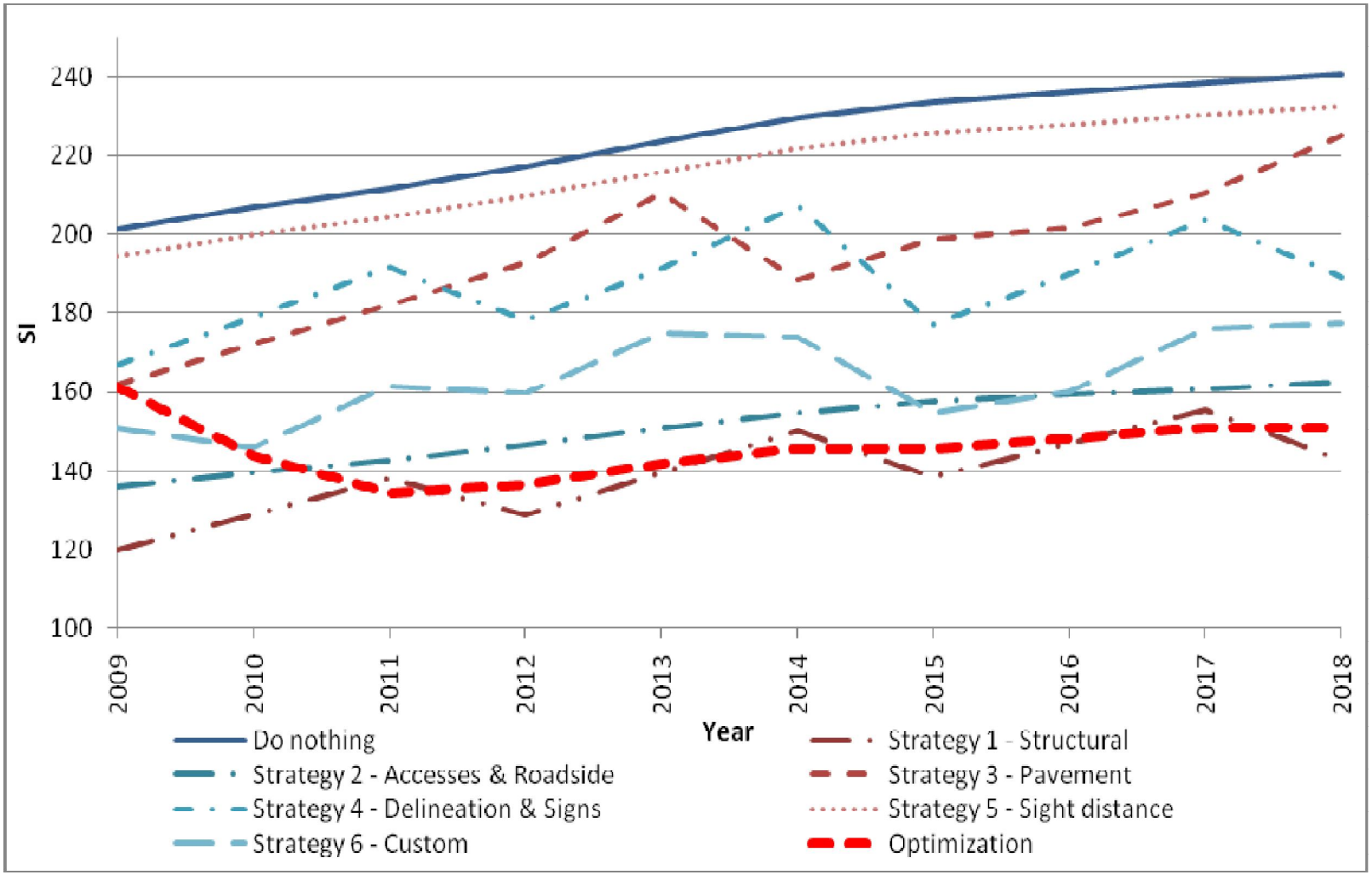
Countermeasures related to:

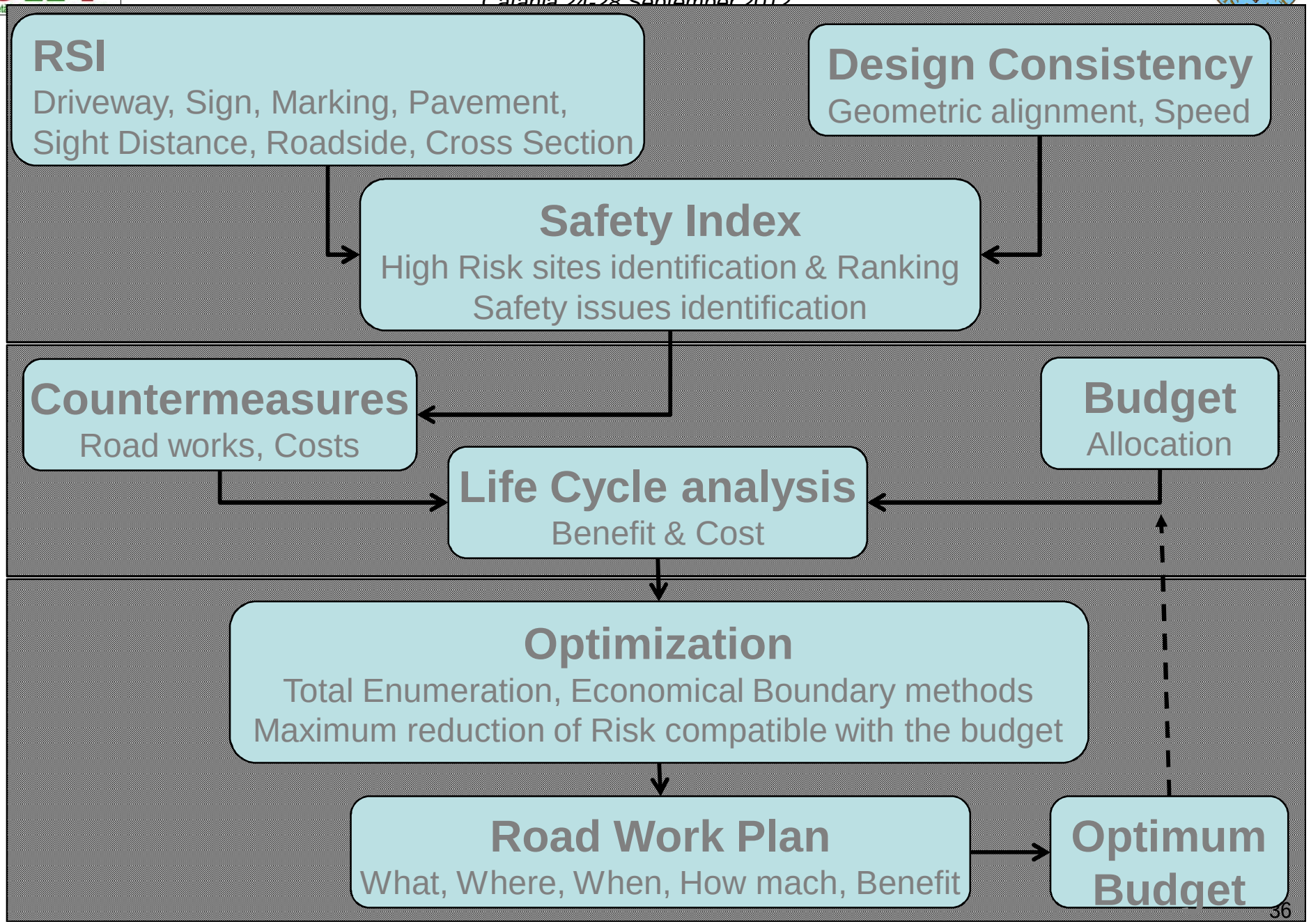
- **Accesses (A),**
- **Cross section (B),**
- **Delineation (C),**
- **Markings (D),**
- **Pavement (E),**
- **Sight distance (F),**
- **Signs (G),**
- **Geometry (H),**
- **Roadside (I).**

The operator can choose different intervention strategies

	COD.	Tipologia Intervento	Pesi
Accessi	A.1	*Riduzione numero di accessi fino a 2 ogni 200m*	0
	A.2	*Riduzione numero di accessi fino a 1 ogni 200m*	0,5
	A.3	*Miglioramenti sulla geometria dell'accesso*	0,5
	A.4	*Eliminazione accessi*	0
Sezione corsia	B.1	*Adeguamento totale*	0
	B.2	*Adeguamento parziale*	0,5
Sezione banchina	B.3	*Adeguamento totale*	0
	B.4	*Ade*	
Delineazioni	C.1	*Deli*	
	C.2	*Che*	
Segnaletica	D.1	*Rifa*	

SafeOpt© - Selection of the optimum intervention strategy




RSI
Driveway, Sign, Marking, Pavement,
Sight Distance, Roadside, Cross Section
Design Consistency
Geometric alignment, Speed
Safety Index
High Risk sites identification & Ranking
Safety issues identification
Countermeasures
Road works, Costs
Budget
Allocation
Life Cycle analysis
Benefit & Cost
Optimization
Total Enumeration, Economical Boundary methods
Maximum reduction of Risk compatible with the budget
Road Work Plan
What, Where, When, How mach, Benefit
Optimum Budget

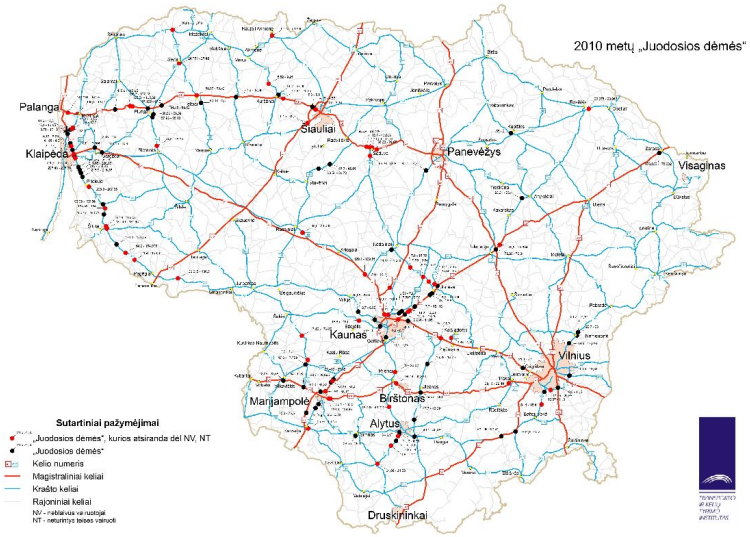
Article 5

Safety ranking and management of the road network in operation

1. Member States shall ensure that the **ranking of high accident concentration sections** and the **network safety ranking** are carried out on the basis of reviews, at least every three years, of the operation of the road network.
2. Member States shall ensure that **road sections** showing higher priority according to the results of the ranking of high accident concentration sections and from network safety ranking **are evaluated by expert teams** by means of **site visits** guided by the elements referred to in point 3 of Annex III. At least one member of the expert team shall meet the requirements set out in Article 9 (appointment, training).
3. Member States shall ensure that **remedial treatment** is targeted at the road sections referred to in paragraph 2. Priority shall be given to those measures referred to in point 3(e) of Annex III paying attention to those presenting the **highest benefit-cost ratio**.

Road Network in Operation

Article 5
Management of the road network



Ranking of road section with high accident concentration (5.1)

↓

Site visit (5.2)

↓

Treatments (5.3)

Article 6
Safety Inspection

Identify road safety features to prevent accidents (6.1)

Inspections of road network
&
road works (6.2)

Sufficiently frequent to safeguard safety levels (6.3)

Network Safety Ranking & Safety Inspection

EU Directive states:

*"**Network safety ranking** has a high potential immediately after its implementation. Once road sections with a high accident concentration have been treated and remedial measures have been taken, **safety inspections** as a preventive measure should assume a more important role.*

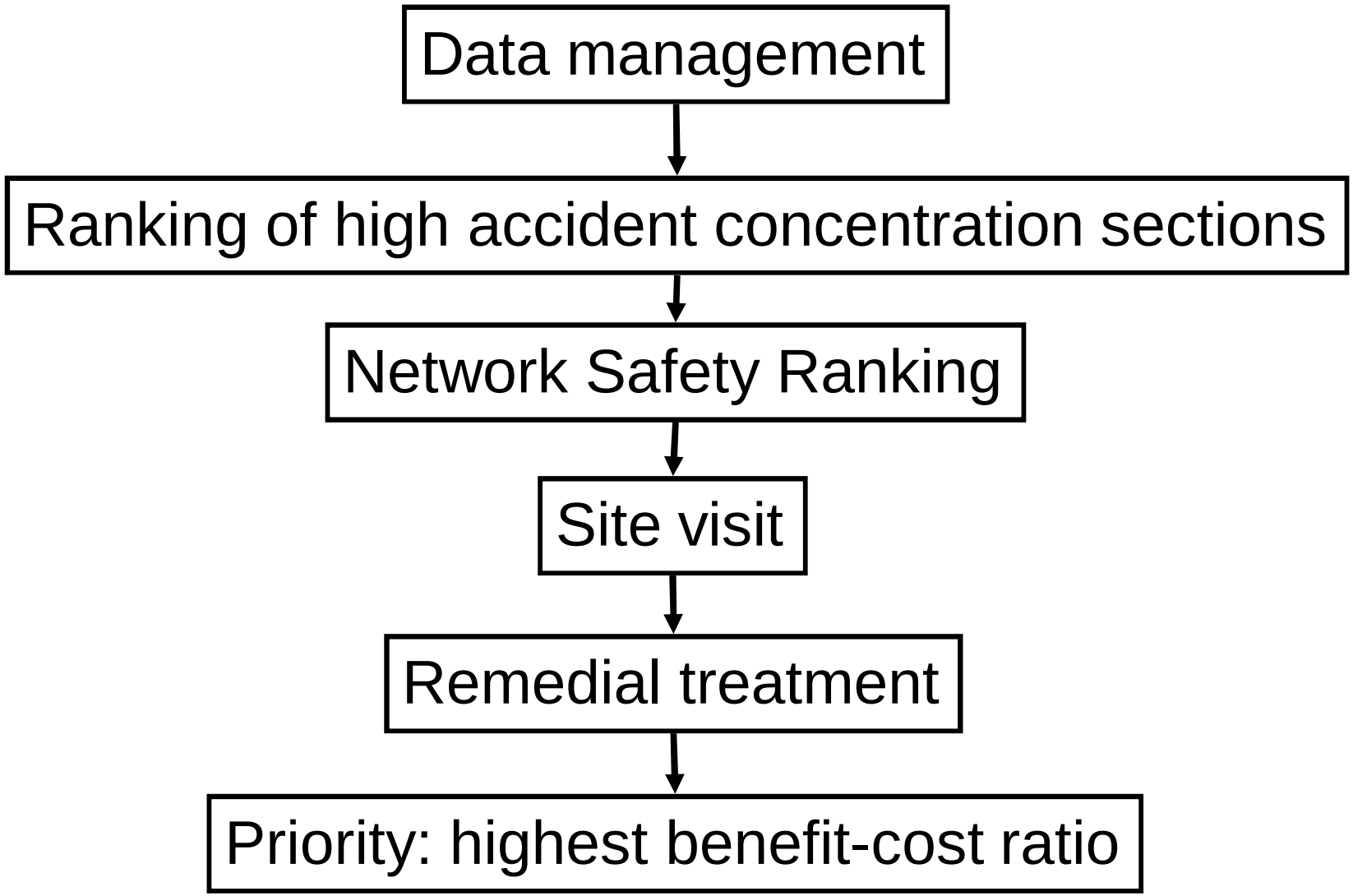
*Regular **inspections** are an essential tool for preventing possible dangers for all road users, including vulnerable users, and also in case of roadworks"*

Article 7
Data management

1. Member States shall ensure that for each **fatal accident** occurring on a road referred to in Article 1(TERN) an accident report is drawn up by the competent entity. Member States shall endeavour to include in that report each of the elements listed in Annex IV.

2. Member States shall calculate the average **social cost of a fatal accident** and the average **social cost of a severe accident** occurring in its territory. Member States may choose to further differentiate the cost rates, which shall be updated at least every five years.

Safety ranking & Management



Safety ranking and management of the road network in operation

Wednesday 26 Sept. 2012 **- Session C**

09:00 - 09:15	Introduction (Chair S. Cafiso)
09:15 - 10:45	Modulo C1 – Network Safety Screening – Basics and North American Perspectives (B. Persaud)
10:45 - 11:15	Coffee Break
11:15 - 12:30	Modulo C2 – Network safety screening and the identification of hazardous road locations – State of the Art and European Practice (R. Elvik)
12-30 - 14:00	Lunch
14:00 - 15:30	Modulo C3 – Evaluation of Safety Effects of Design Decisions and Countermeasures (B. Persaud)
15:30 - 16:00	Discussion

Ranking of high accident concentration sections
Italian Guidelines 2012

Priority	Crash measures	Dimensions
1	Fatal crash rate	N. Fatal crashes/vehic. × km
	Injury crash rate	N. injury crashes/vehic. × km
	Crash rate	N. crashes/vehic. × km
	Fatality rate	N. Fatalities/vehic. × km
	Severity rate	N.(Fatalities+Injuried)/vehic. × km
	Injury rate	N. injured peoples/vehic. × km
2	Fatal crash frequency	N. Fatal crashes/ km
	Injury crash frequency	N. injury crashes/ km
	Crash frequency	N. crashes/ km
	Fatality frequency	N. Fatalities/ km
	Injury frequency	N. injured peoples/ km
3	Fatality rate	N. Fatalities/N. crashes
	Severity rate	(N. Fatalities+ N. injured)/N. crashes
	Injury rate	N. Injured people/N. Crashes
	Fatalities	N. Fatalities
	Injured people	N. Injured people
	Crashes	N. Crashes

Example of Ranking

Table 4. Italian Guidelines 2012

Crash Measure								
Homogenous Section	Length	**Fatality rate**	**Fatality frequency**	**Fatalities**	**Injury rate**	**Injury frequency**	**Injured people**	**Ranking**
	Km	N.Fatalities /vehic.×km	N.Fatalities / km	N.	N.Injuries/ vehic.×km	N. injured peoples/km	N.	
A	5	1/15	1/5	1	3/15	3/5	3	**2**
B	3	1/18	1/3	1	3/18	3/3	3	**3**
	2		1/2	1	3/8	3/2	3	

Network Safety Ranking

Italian Guidelines 2012

SAFETY POTENTIAL: SAPO

Excess of crash cost for site i

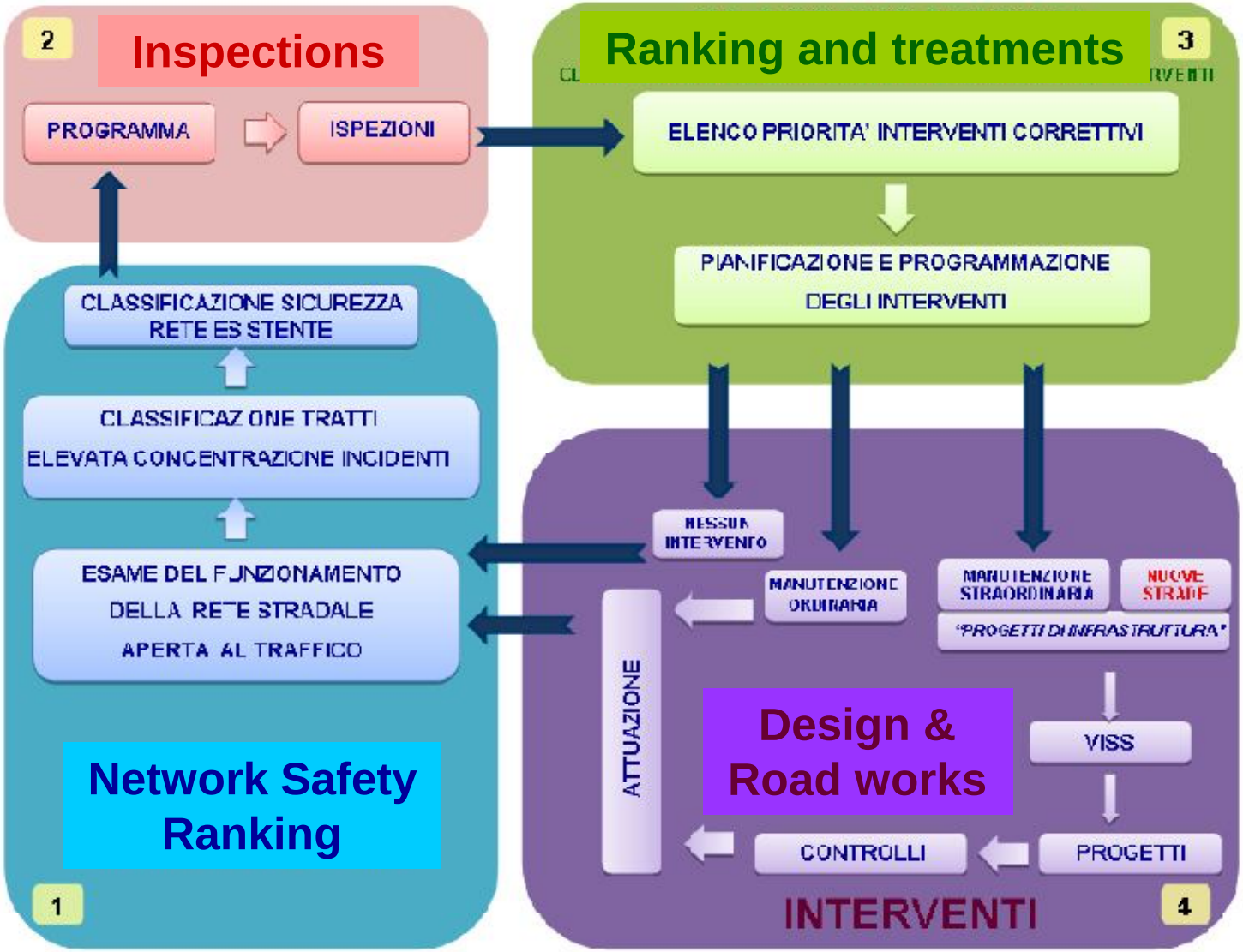
$SAPO_i = (\text{Crash cost})_i - (\text{reference Crash cost})$

Crash cost: $site_i$ costs of (fatalities+severe injured+injured) per unit length per year;

Reference crash cost: average cost rate (€/vehic×km) × (365 $AADT_i$);

7.6 € /(1000 vehic km) motorways ÷ 24 € /(1000 vehic km) 2lane rural roads

Safety Management Cycle
Italian Guidelines, 2012



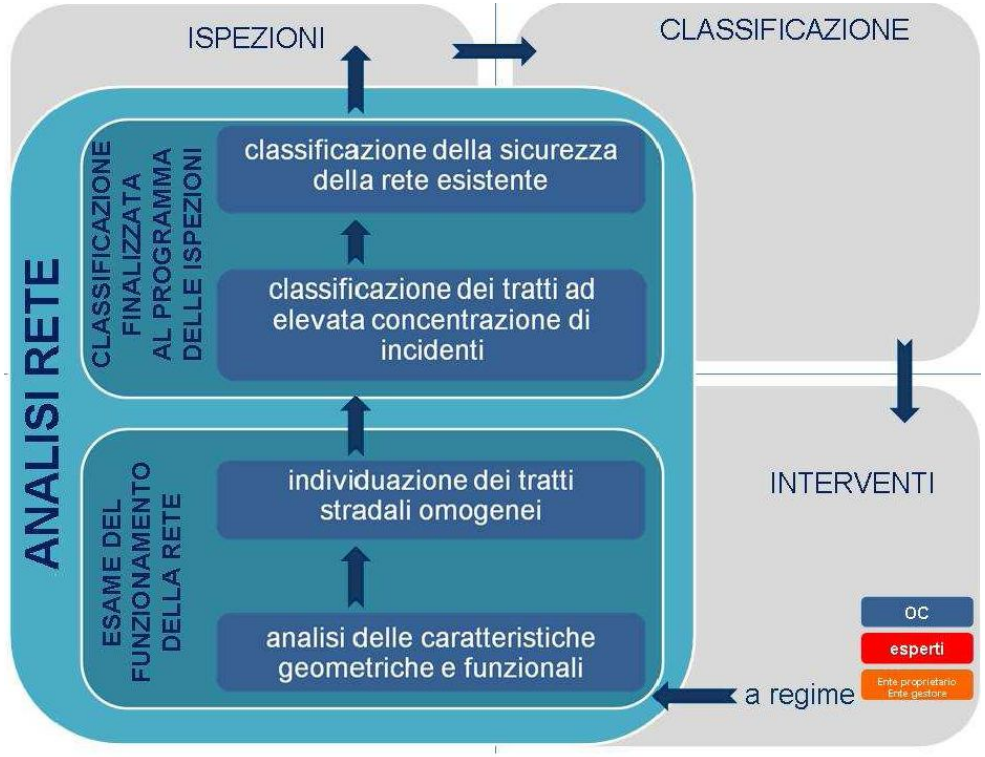


Figura 7: il dettaglio della fase ANALISI RETE

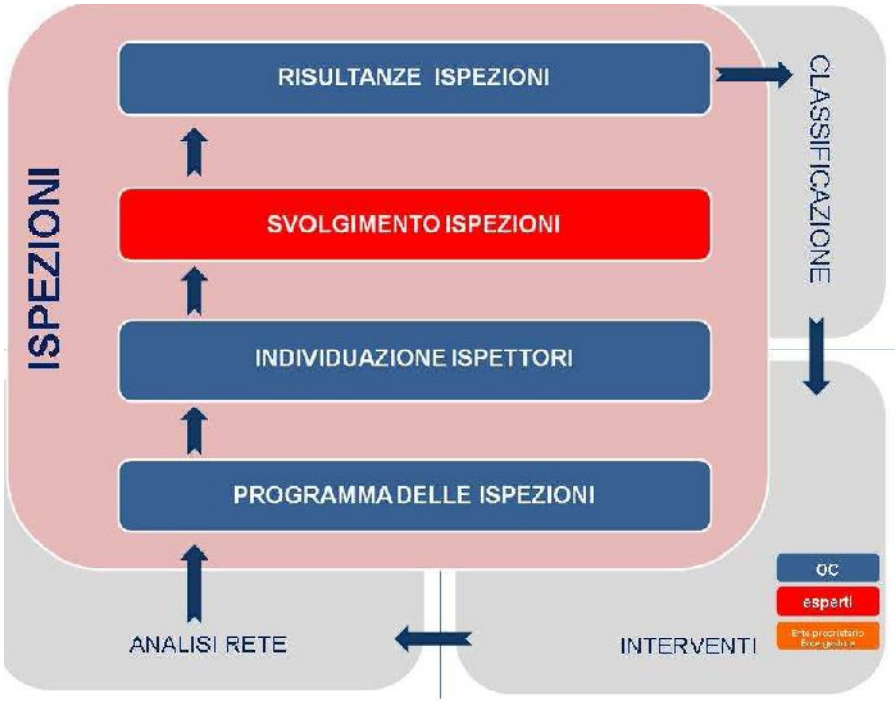


Figura 11: il dettaglio della fase ISPEZIONI

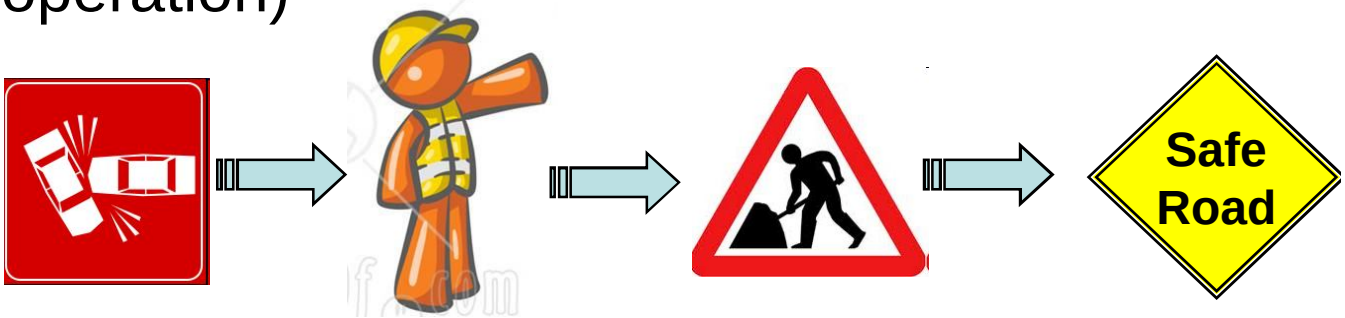
Italian Guidelins (2012):

Waiting for the network classification, inspection program can be fixed basing on crash count. In the location where a crash occurs a site visit has to be carried out together with a safety inspection along all the road segment.

Definitions

'**Site Visit**': road sections showing higher priority according to the results of the ranking of high accident concentration sections and from network safety ranking are evaluated by expert teams by means of site visits; (art. 5: Safety ranking and management of the road network in operation)

Reactive approach



'**Safety Inspection**' an ordinary periodical verification of the characteristics and defects that require maintenance work for reasons of safety; (art. 6)

Proactive approach

Article 10
Exchange of best practices

In order to improve the safety of roads within the European Union that are not part of the trans-European road network, the Commission shall establish a coherent system for the **exchange of best practices between the Member States**, covering, inter alia, existing road infrastructure safety projects and proven road safety technology.

Article 11

Continuous improvement of safety management practices

1. The Commission shall facilitate and structure the exchange of knowledge and best practices between Member States, making use of the experience gained in existing relevant international forums, with a view to achieving continuous improvement of safety management practices concerning road infrastructures in the European Union.

2. The Commission shall be assisted by the Committee referred to in Article 13. In so far as the adoption of specific measures is required, such measures shall be adopted in accordance with the regulatory procedure with scrutiny referred to in Article 13(3).

3. Where appropriate, relevant non-governmental organisations, active in the field of safety and management of road infrastructures, may be consulted on matters related to technical safety aspects.

European Directive on road infrastructure safety management

Monday 24 Sept. 2012 **- Session A**

15:00 - 15:30 Welcome and Opening (S. Cafiso, E. Foti, D. Manuele)

15:30 - 16:30 Introduction to European Directive 2008/96/CE and Italian Guidelines (S. Cafiso - P. Colonna)

16:30 - 17:00 Coffee break

17:00 - 18:00 Safety management of road infrastructure: an European Overview (S. Campagnolo)

17:30 - 18:00 Implementations and latest developments of EU Directive 2008/96/CE (H. Cullen)

18:00 - 19:00 Discussion