

SafetyCube – the European Road Safety Decision Support System



H2020RTR November 28, 2018
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www.roadsafety-dss.eu

#roadsafetydss



A short movie...



<https://www.youtube.com/watch?v=Y-mVUde3knU>

SafetyCube project

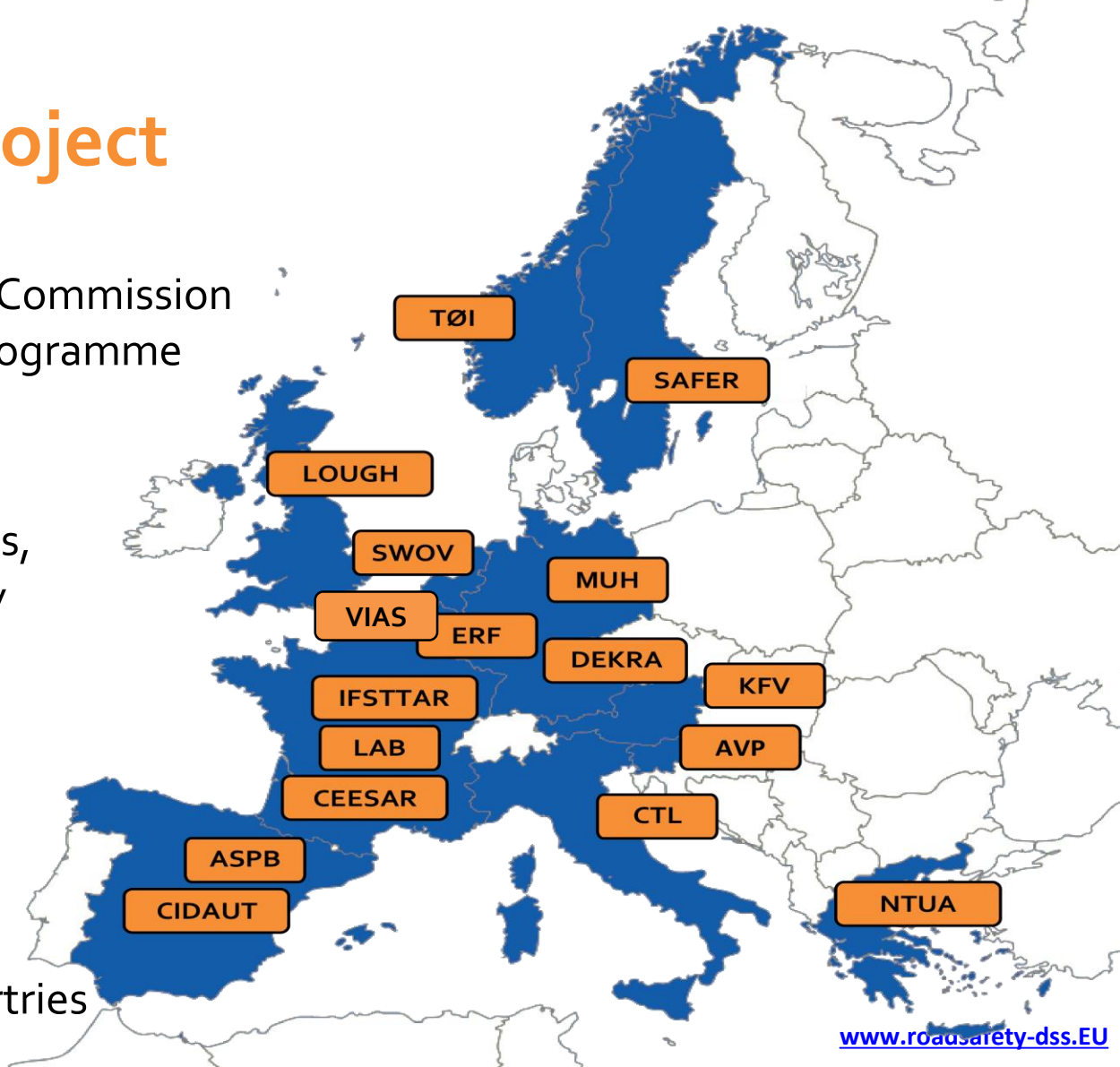
Funded by the European Commission
Horizon 2020 research programme
Budget €5.8 million

Coordinator: Pete Thomas,
Loughborough University

Start: May 2015

Finish: April 2018

17 partners from 12 countries



SafetyCube primary objective



SafetyCube DSS Objectives



*The SafetyCube DSS objective is to provide the European and Global road safety community
a user friendly, web-based, interactive Decision Support Tool
to properly substantiate their road safety decisions
for the actions, measures, programmes, policies and strategies
to be implemented at local, regional, national, European and international level.*

The main contents of the SafetyCube DSS concern:

- road accident risk factors and problems
- road safety measures
- best estimate of effectiveness
- cost-benefit evaluation
- Serious injuries
- all related analytic background



- ... then use SafetyCube DSS to have the answers



SafetyCube DSS Users

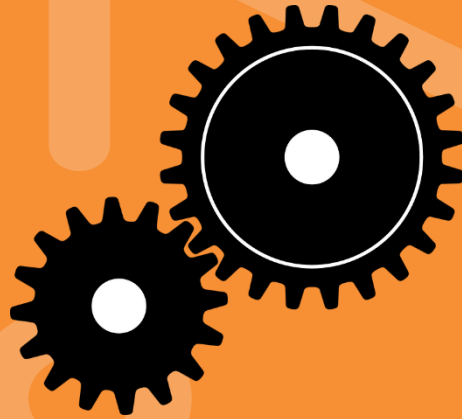


- **Public Authorities**
local, regional, national, European and international
- **Industry**
Infrastructure, Vehicle, Insurance, Technology
- **Research Institutes, Experts**
- **Non Governmental Organisations**
- **Media**
- **Everyone**

The SafetyCube DSS is intended to have **a life well beyond the end of the SafetyCube** research project.



Methodology



SafetyCube Methodology



1. Consulting **stakeholders** to understand needs
 2. Creating **taxonomies** of risk factors and measures
 3. Exhaustive literature review and rigorous study selection criteria
 4. Use of a template for **coding studies**, to be introduced in the DSS back-end database
 5. Carrying out **meta-analyses** to estimate the effects of risk factors / measures.
 6. Drafting **Synopses** summarising results of risk factors / measures.
- **Systems approach:** links between infrastructure, user and vehicle risks & measures
 - Emphasis on risk factors and measures of **priority issues** (VRUs, ADAS, speed management, distraction, etc.)
 - Rigorous assessment of the **quality of the data / study methods**



SafetyCube Synopses



211 Syntheses on risk factors / measures

Summary (2 pages)

- Effect of risk factor / measure and ranking (colour code)
- Risk / safety effect mechanisms
- Risk / safety effects size, transferability of effects

Scientific overview (4-5 pages)

- Comparative analysis of available studies
- Meta-analysis/Vote-count analysis/Qualitative analysis

Supporting document (3-10 pages)

- Literature search strategy and study selection
- Detailed analyses

<p>Presence of workzones - Workzone duration</p> <p>Please refer to the document Presence of workzones - Workzone duration for more information on the topic. The document is available in the SafetyCube Synopses section of the SafetyCube Synopses website.</p>  <p>Please refer to the document Presence of workzones - Workzone duration for more information on the topic. The document is available in the SafetyCube Synopses section of the SafetyCube Synopses website.</p>	
<p>Presence of workzones - Workzone duration</p> <p>1 Summary</p> <p>1.1 Introduction</p> <p>Workzone duration is a risk factor for road traffic accidents. It is defined as the time during which a road is closed to traffic for maintenance or construction work. This document provides a summary of the available literature on this topic.</p>	<p>Presence of workzones - Workzone duration</p> <p>1.2 Objectives</p> <p>The objective of this synthesis is to provide a summary of the available literature on the effect of workzone duration on road traffic accidents. The synthesis will focus on the following questions:</p> <ul style="list-style-type: none">What is the effect of workzone duration on road traffic accidents?What are the mechanisms of the effect of workzone duration on road traffic accidents?What are the risk factors for road traffic accidents during workzone duration?

SafetyCube Related Risks / Measures

- Linking based on a **dedicated model** categorizing risks
- Every Risk Factor (88) is **linked** to one or more Road Safety Measure(s) (175)
- Every Road Safety Measure (175) is **linked** to one or more Risk Factor(s) (88)
- A total of **762 links** between risk factors and measures



The screenshot shows the SafetyCube DSS (European Road Safety Decision Support System) interface. It features a search bar and navigation tabs for Search, Knowledge, Calculator, Methodology, and Support. Below the header, it displays 'Related Studies for "poor visibility - darkness"'. A text box states: 'the following measures are related to the risk factor you selected, select a measure from the table below to see the available safetycube results.' A table with four columns (Risk Factor, Intervention, Vehicle, and Post-Injury Care) lists related measures. The 'Intervention' column includes 'installation of road lighting' and 'improvement of existing lighting'. The 'Vehicle' column lists 'Enhanced headlights (automated, adaptive, advanced drivers, ...)' and 'Night vision'. The 'Post-Injury Care' column is marked as 'Not applicable'.

Risk Factor	Intervention	Vehicle	Post-Injury Care
Decrease in helmets, protective clothing and visibility	installation of road lighting	Enhanced headlights (automated, adaptive, advanced drivers, ...)	Not applicable
	improvement of existing lighting	Night vision	
		Vehicle backup camera - reversing detection or camera systems (L4/L5)	

Countries

- ☐ CANADA
- ☐ NETHERLANDS
- ☐ UNITED KINGDOM
- ☐ UNITED STATES

SafetyCube Synopses



Installation of lighting & Improvements to existing lighting: GREEN (07720710) - U

The vast majority of results show that the installation of road lighting and improvements to existing road lighting have favourable effects on the number of occurring crashes

ID	Title	Source	Year	Design	Countries
254	Relationship Between Roadway Illuminance Level and Nighttime Road Intersection Safety	TRANSPORTATION RESEARCH BOARD JOURNAL OF THE TRANSPORTATION RESEARCH BOARD, VOL. 2145, PP. 9-15	2015	CH0001 36-01-0004	UNITED STATES
255	Road lighting effects on Bicycle and Pedestrian Accident Frequency: case study in Montreal, Quebec, Canada	TRANSPORTATION RESEARCH BOARD JOURNAL OF THE TRANSPORTATION RESEARCH BOARD, NO. 2555, PP. 10-14	2016	CH0001 SECTIONAL	CANADA

DSS links from risks to related measures



Measures addressing “driving when tired”

The following measures are related to the risk factor you selected. Select a measure from the table below to see the available SafetyCube re

Behavior	Infrastructure	Vehicle
Fitness to drive, medical referrals	installation of median	Electronic Stability Control (ESC)
<u>Campaigns on fatigue</u>	increase median width	Lane Departure Warning (LDW), Lane Keeping Assist (LKA) & Lane Centering System
	change median type	Drowsiness and Distraction Recognition
	implementation of rumble strips at centerline	
	shoulder implementation (shoulder type)	
	increase shoulder width	
	change shoulder type	
	safety barriers installation	
	change type of safety barriers	
	create clear-zone / remove obstacles	
	increase width of clear-zone	
	implementation of edgeline rumble strips	

DSS links from measures to related risks

- Risks addressed by “Emergency Braking Assistance Systems”

The following risk factors are related to the measure you selected. Select a risk factor from the table below to see the available SafetyCube results.

Behavior	Infrastructure	Vehicle
Headway distance	secondary crashes	Risk to be injured in rear impact
Insufficient skills and operating errors		
Observation errors		
Elderly (65+)		

SafetyCube Tools for Prioritisation

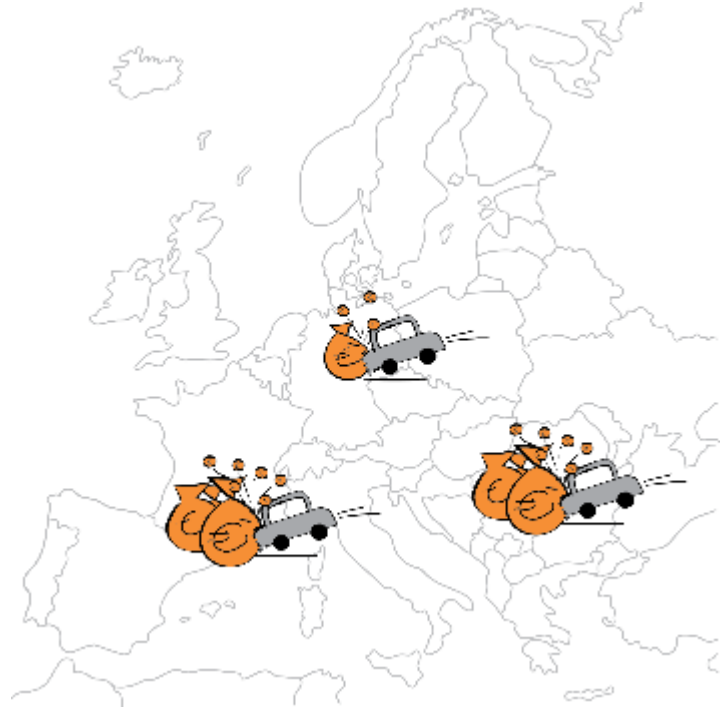


E3-calculator

Crash costs



- Based on SafetyCube crash-cost collection
- User can select
 - *Countries' own reported values*
 - *Common methodology estimates per country*
 - *EU standardized cost*

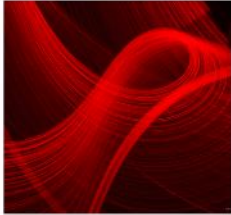


Serious injuries



Serious injuries in SafetyCube

- Estimation of the number of MAIS₃+ casualties
- Consequences of serious road injuries
- Costs related to serious road injuries
- Risk factors associated with serious road injuries



Practical guidelines for the registration and monitoring of serious traffic injuries

Deliverable 7.1



Physical and psychological consequences of serious road traffic injuries

Deliverable 7.2



Costs related to serious road injuries

Deliverable 7.3



Identification of Key Risk Factors Related to Serious Road Injuries and Their Health Impacts

Deliverable 7.4



<https://www.roadafety-dss.eu/>

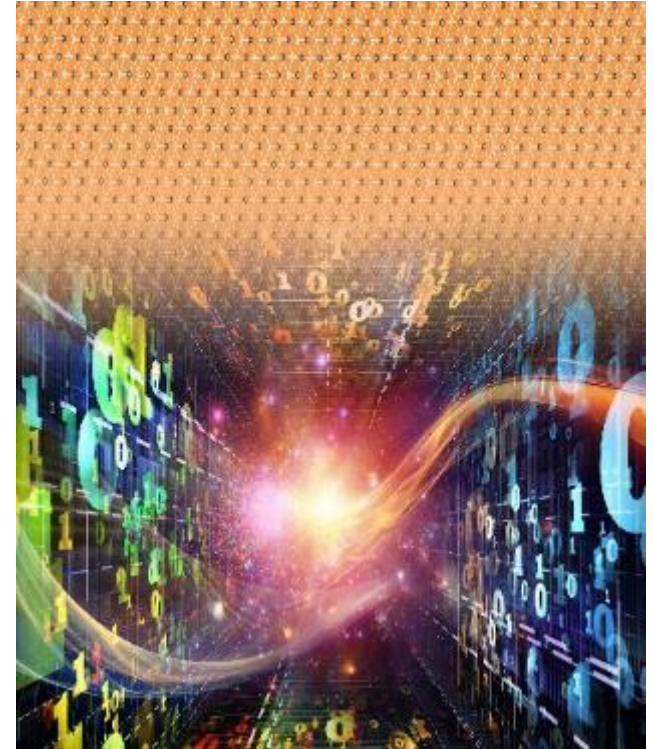


SafetyCube DSS Knowledge Wealth



SafetyCube DSS includes by April 2018:

- more than **1,250 studies**,
- with more than **7,500 estimates** of risks/measures effects on:
 - behaviour,
 - infrastructure,
 - vehicle, and
 - post impact care
- **211 Synopses**
- **36 cost-benefit analyses**



SafetyCube DSS Menu

- **Search**
Risk Factors & Measures
- **Knowledge**
211 Synopses, Serious Injuries, Accident Scenarios
- **Calculator**
Economic Efficiency Evaluation
- **Methodology**
System documentation
- **Support**
Contact, help, feedback



An abstract background featuring a solid orange color with a light orange geometric pattern. The pattern consists of interconnected lines and circles, forming a network-like structure that resembles a stylized molecular or circuit diagram. The lines are of varying thickness and connect several circular nodes of different sizes.

Conclusion & next steps ...

Delivering a long awaited powerful tool



- SafetyCube DSS is the first integrated road safety support system **developed in Europe**
- SafetyCube DSS **offers for the first time** scientific evidence on:
 - risks and not only measures
 - risks and measures not only on infrastructure
 - a very large number of estimates of risks and measures effects
 - links between risks factors and measures
- SafetyCube DSS aims to be **a reference system** for road safety in Europe, constantly improved and enhanced



SafetyCube – Required next steps



The **future operation** of the SafetyCube DSS concerns:

1. the uninterrupted operation of the current SafetyCube DSS
2. updates of the risk factors, measures and cost-benefit analyses (recent studies but also older ones)
3. possibility to receive, check and incorporate studies submitted by external experts and organizations and the respective quality control
4. a partnership of public and private organisations is being assembled to enable the DSS to continue



SafetyCube - the European Road Safety Decision Support System



All deliverables of the project are available at

www.Safetycube-project.eu

You are welcome to use the DSS at

www.roadsafety-dss.eu

