SweRoad

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SweRoad

TRAFIKVERKET
SWEDISH TRANSPORT ADMINISTRATION

Vision: *Everybody arrives smoothly, the green and safe way*

The STA is responsible for:

- the long-term planning of the transport system for road traffic, rail traffic, maritime shipping, and air traffic
- construction, operation and maintenance of the state road network (98 000 km) and national railway network (12 000 km).

SweRoad

Swedish Transport Policy

The overarching goal of Swedish transport policy is to ensure a socio-economically efficient transport provision, sustainable over the long term, for citizens and trade and industry across the country

- The main objective for Sweden´s transport policy:
  Accessibility
- Considering and setting end conditions for:
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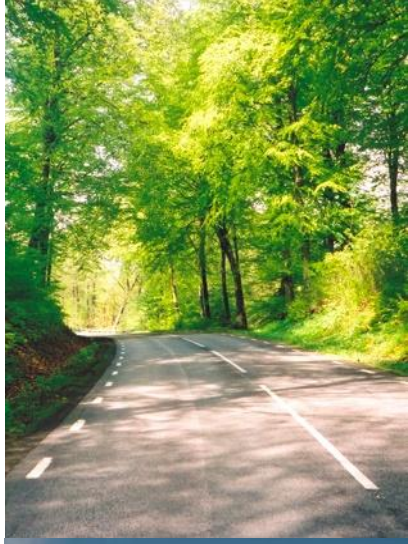

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SWEROAD

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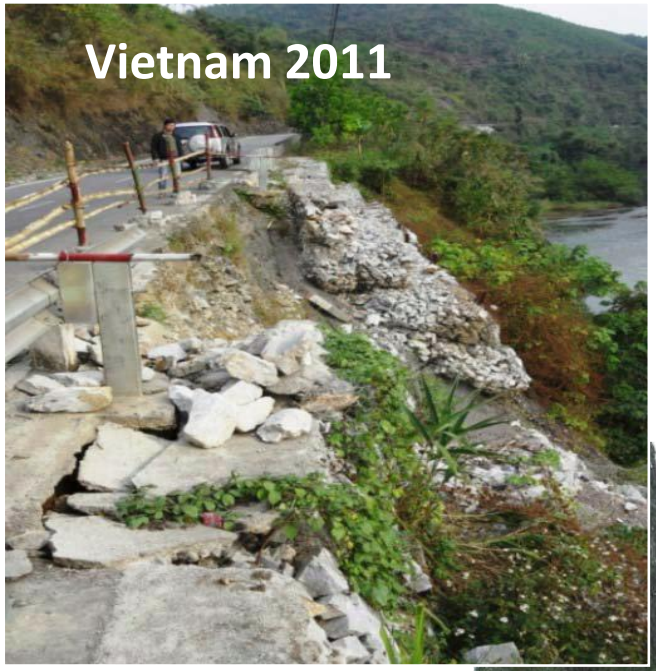

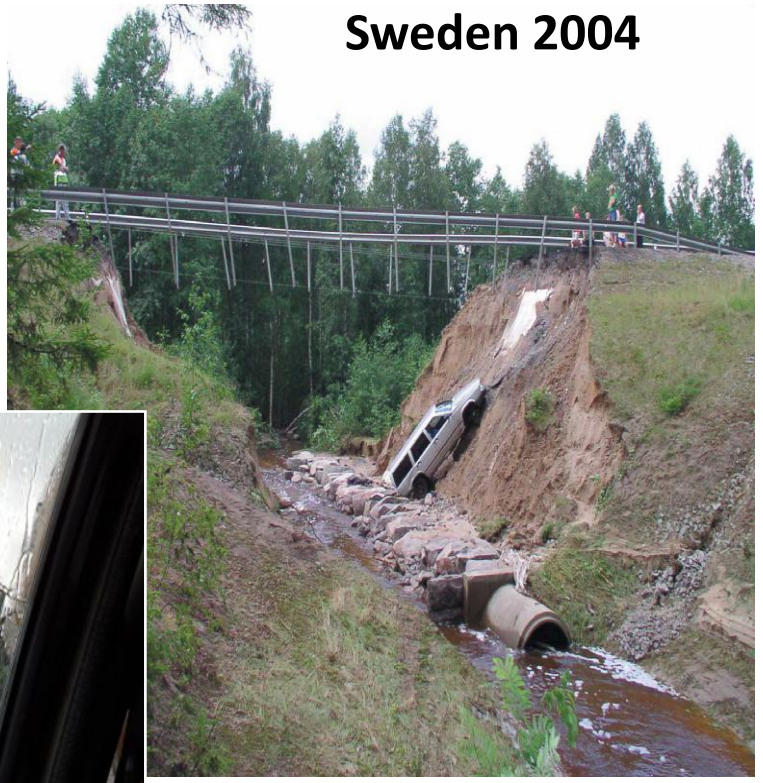

Through:

Climate Change Mitigation

Climate Change Adaptation

Disaster Risk Management

SweRoad

Climate Change Adaptation

A well established and well functional transport network is essential for a country's economical growth.

A Chinese proverb says: *"If you want to become rich you should build roads first".*

The transport system provides access to economical, social and health services.

However, the recent climate change activities threaten the investment in the transport sector. This became apparent in Sweden some 20 years ago and something had to be done.

What did the Swedish Transport Administration do?

Swedish Transport Administration's response to Climate Change threats (1)

- **Participated actively in preparation of the Swedish Climate & Vulnerability Report being responsible for the transport section**
- **The report came to the conclusion that these sectors were threaten:**
  - **¤ Communications;**
  - **¤ Technical supply systems;**
  - **¤ Urban settlements and buildings;**
  - **¤ Natural resources;**
  - **¤ The environment; and**
  - **¤ Human health**

.

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Swedish Transport Administration's response to Climate Change threats (2)

- **A vast majority of Government departments were part of the preparation of the report, among them:**
  - **¤ Swedish Civil Contingency Agency**
  - **¤Swedish Meteorology and Hydrology Institute**
  - **¤ Swedish Geotechnical Institute**

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The finding and action initiated by the STA

- **Identified the most likely Climate Change events to take place in Sweden and their effects on the road network**
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The transport sector should adapt to

- Extreme rainfall (heavy showers long lasting rains)
- Seasonal and annual average rainfall
- Sea level rise
- Maximum Temperature and number of consecutive hot days
- Drought
- Extreme wind speeds

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How has STA organised its Climate Change Adaptation?

- Coordination with other stakeholders
- Establishment of warning systems
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This is a way to identify the potential risks to the transport sector regarding type and magnitude.

STA has used a matrix to identify the areas at risk.

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	Moderate	3				
	Low	4				

The colours represent the following:

	Acceptance
	Investigation
	Action

Thank you

gunnar.tunkrans@sweroad.se

SweRoad

Gunnar Tunkrans

Managing Director

Björn Möller

Marketing Director

SWEROAD

Gunnar Tunkrans

Managing Director

M Sc Civil Engineering

40+ years experience of planning, design, construction and management of roads and road transport.

5 years international experience.

Member of PIARC committee Financing, Managing and Contracting of Road System Investments.

Swedish chairman of Nordic Road Forum committee Organization and Market

SWEROAD

B Sc Civil Engineering
B Sc Education

35+ years experience of planning, design, construction and management of roads and road transport.

15 years international experience.

3 years with Nordic Development Fund.

Björn Möller

Marketing Director

SweRoad

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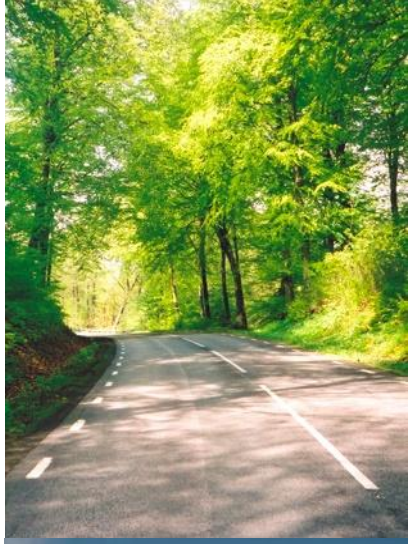

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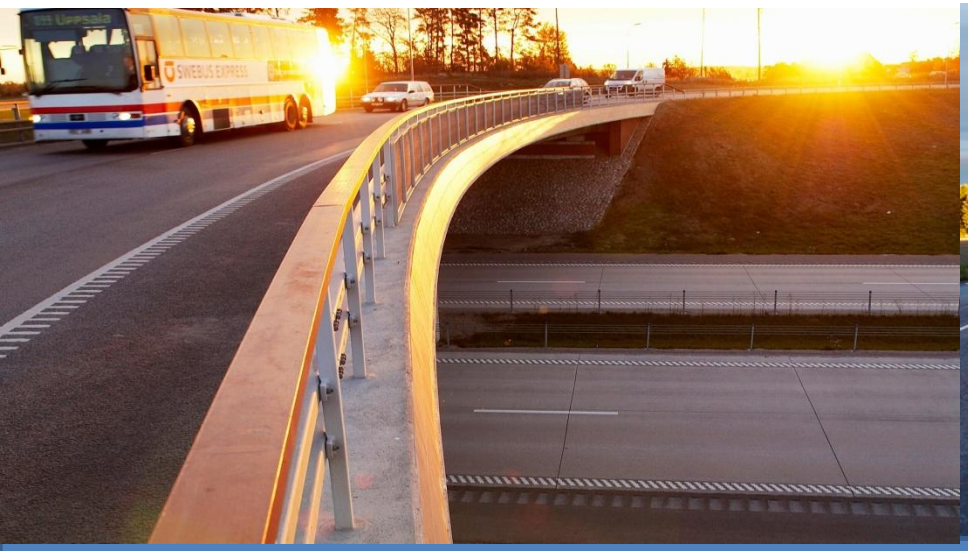
Swedish Road and Rail Networks

The road network

- 98,400 km of state roads
- 41,000 km of municipal streets and roads
- 76,100 km of private roads with state grant

The railway network

- 11,900 km of railway line
- 90% electrified
- 11 400 switches
- 560 stations for boarding and alighting



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- *to a safe transport system*

SweRoad

TRAFIKVERKET
SWEDISH TRANSPORT ADMINISTRATION

STA is committed to a safe transport system

- Adjustment of road traffic speed – adjusting to road traffic safety standards
- More than 1,000 traffic safety cameras are located on the most dangerous roads
- Work on influences: alcohol/drugs, seat belt use, keeping to the speed limit, safety on and near railway tracks, and bicycle helmet use
- 4200 km of multi-lane, bidirectional highways
- Suicide on roads and rail reduced through preventative measures

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15 years ago Sweden started to look for a new long-term road safety strategy

- Already one of the safest countries in the world (6.5 killed/100 000 inhab.).
- Traditional strategy: fighting speeding, drunk driving, promoting safe driving, seat-belts etc..
- More of the same – or?

SweRoad

Vision Zero: a Safe Traffic Concept

History

On October 9, 1997 the Road Traffic Safety Bill founded on "Vision Zero" was passed by a large majority in the Swedish Parliament. This represents an entirely new way of thinking with respect to road traffic safety.

Goal

The long term goal is that no-one shall be killed or seriously injured within the Swedish road transport system.

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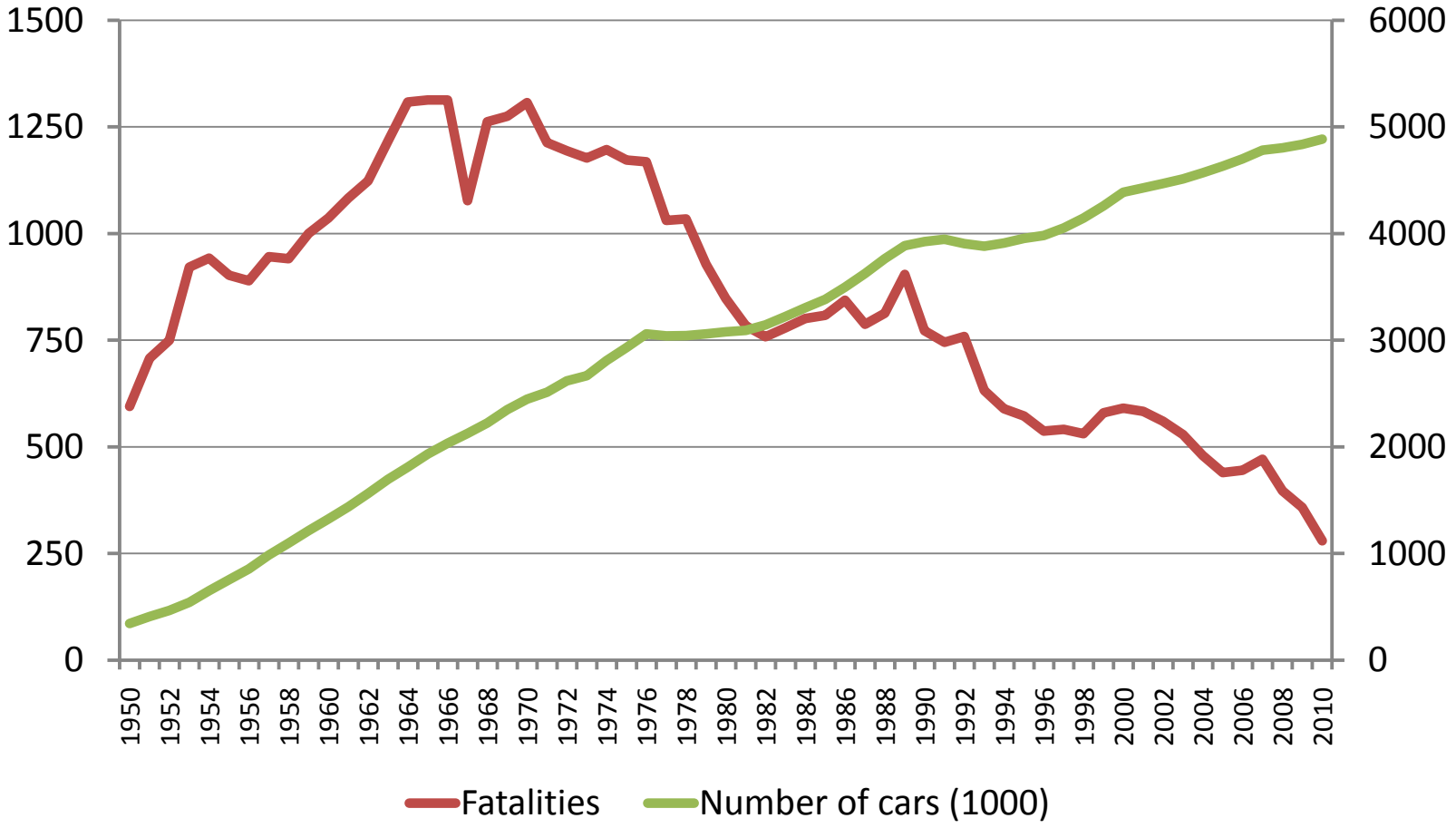
Fatalities in road traffic and cars in use in Sweden 1950-2010



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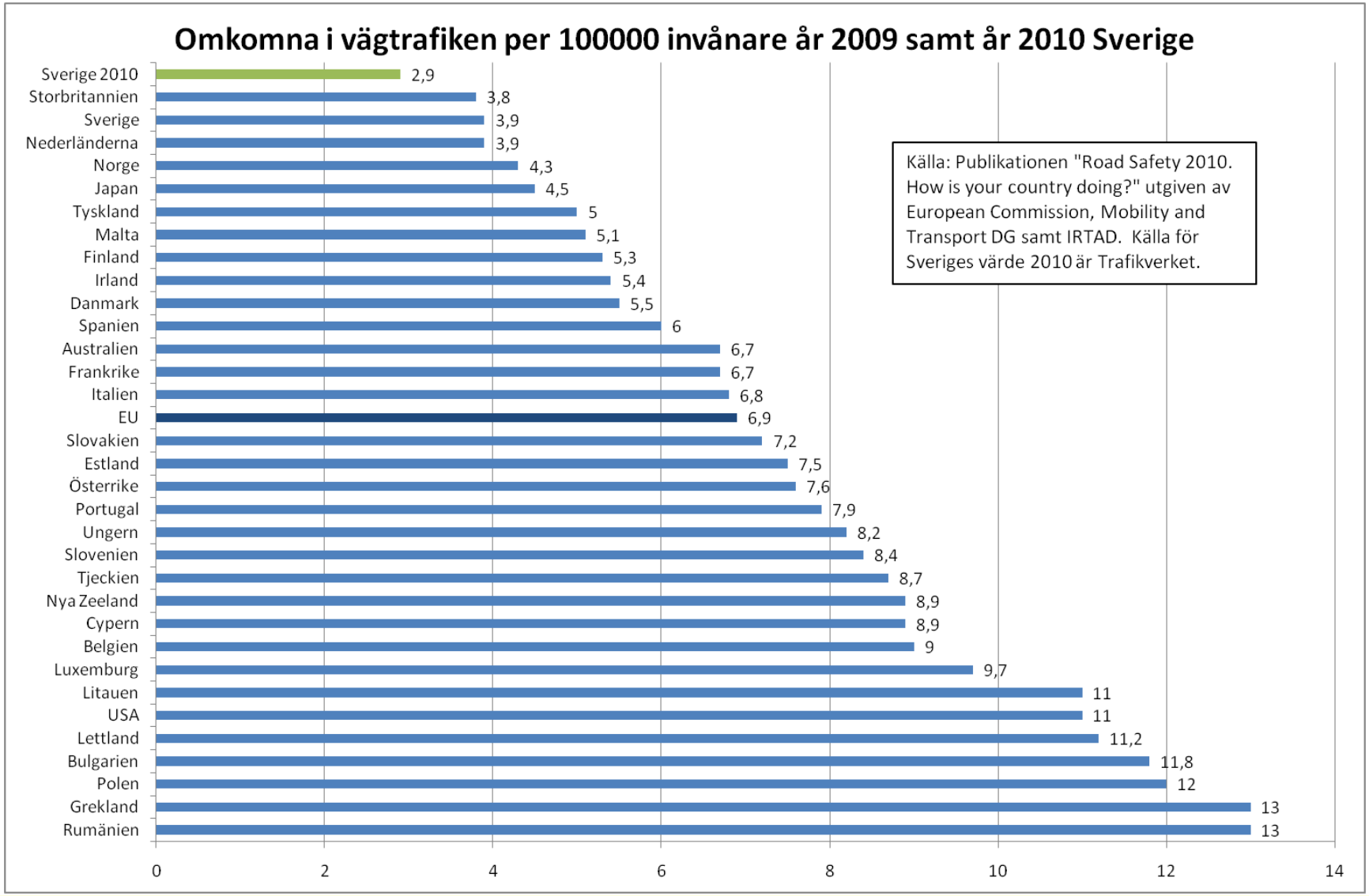
Omkomna i vägtrafiken per 100000 invånare år 2009 samt år 2010 Sverige
Sverige 2010 2,9
Storbritannien 3,8
Sverige 3,9
Nederländerna 3,9
Norge 4,3
Japan 4,5
Tyskland 5
Malta 5,1
Finland 5,3
Irland 5,4
Danmark 5,5
Spanien 6
Australien 6,7
Frankrike 6,7
Italien 6,8
EU 6,9
Slovakien 7,2
Estland 7,5
Österrike 7,6
Portugal 7,9
Ungern 8,2
Slovenien 8,4
Tjeckien 8,7
Nya Zeeland 8,9
Cypern 8,9
Belgien 9
Luxemburg 9,7
Litauen 11
USA 11
Lettland 11,2
Bulgarien 11,8
Polen 12
Grekland 13
Rumänien 13
0
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4
6
8
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14
Källa: Publikationen "Road Safety 2010. How is your country doing?" utgiven av European Commission, Mobility and Transport DG samt IRTAD. Källa för Sveriges värde 2010 är Trafikverket.

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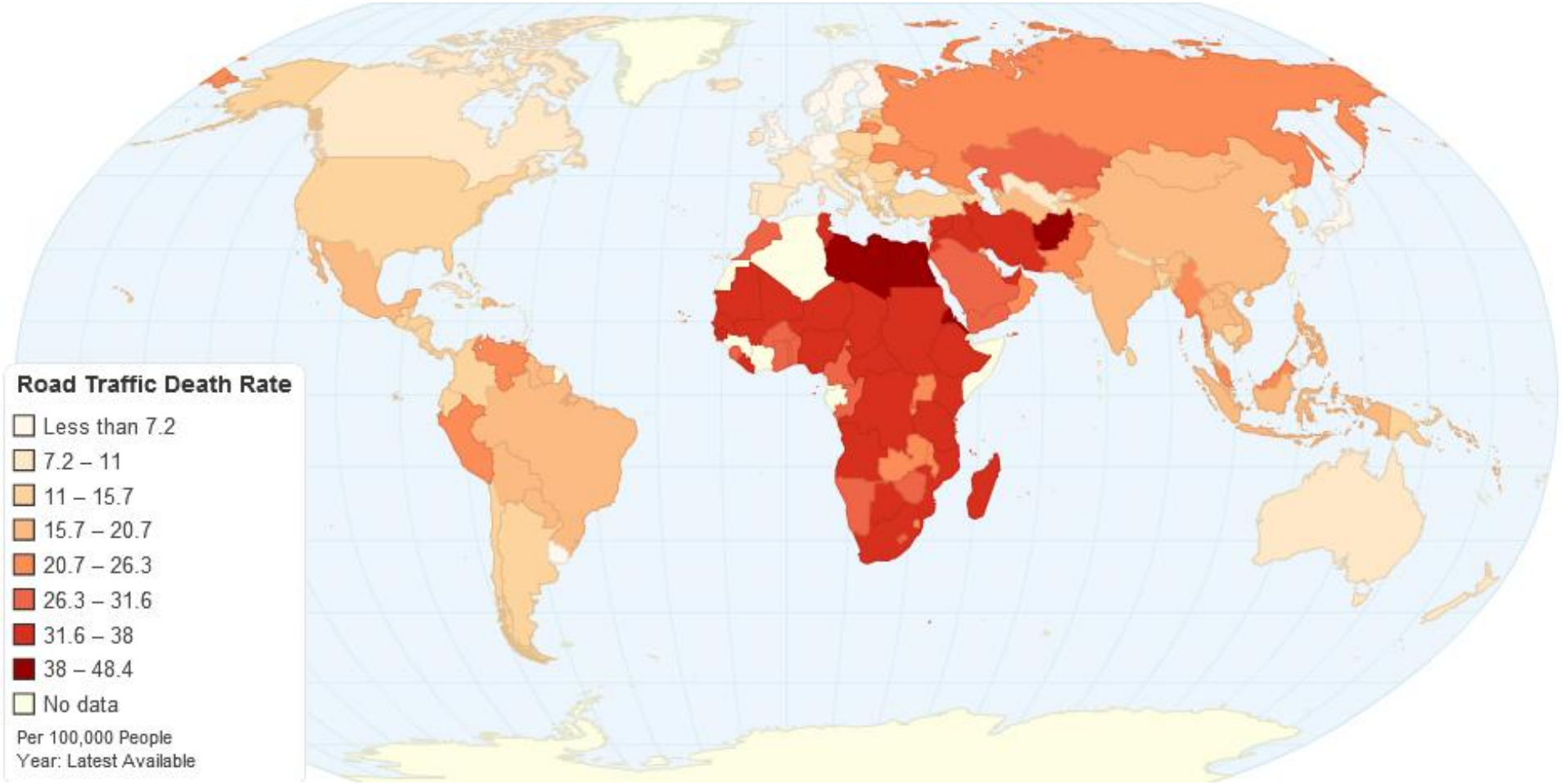
Road Traffic Death Rate



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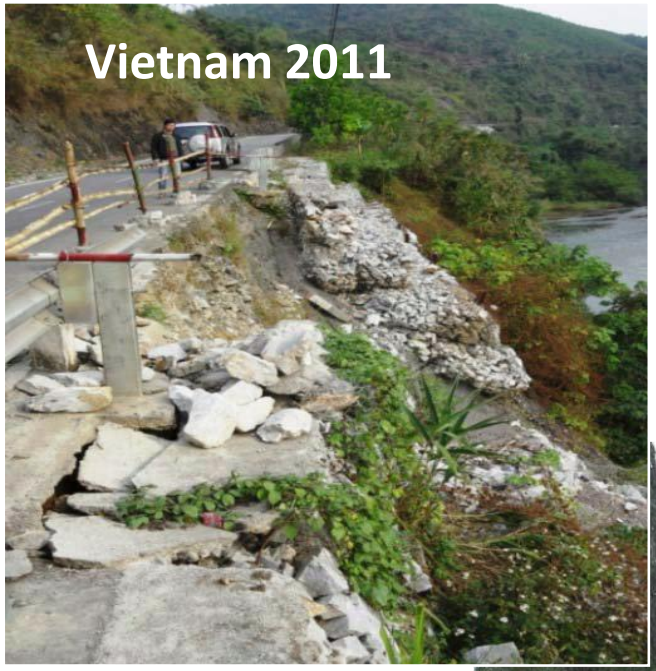

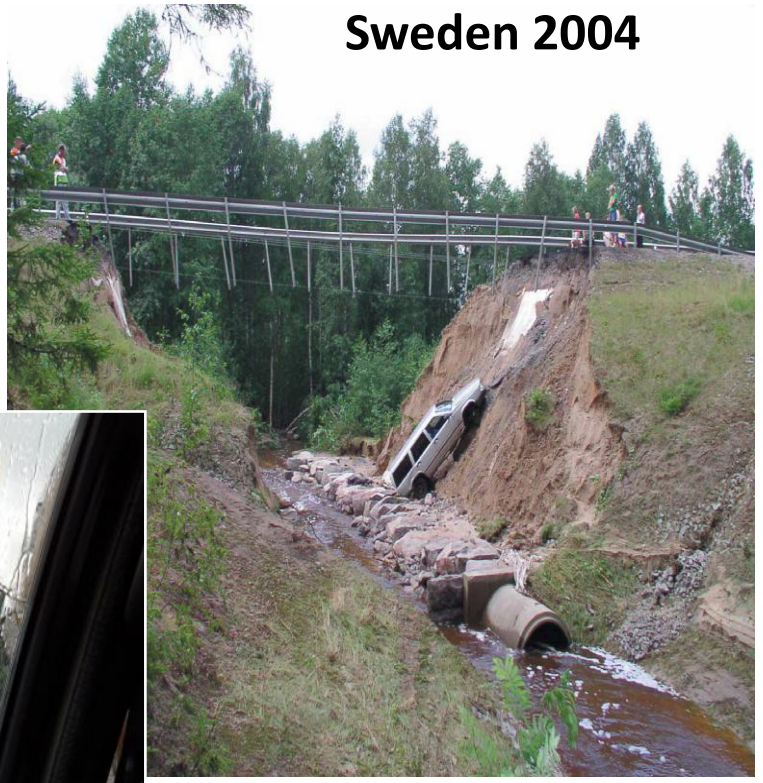

Through:

Climate Change Mitigation

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Disaster Risk Management

SweRoad

Climate Change Mitigation

Swedish Transport Administration has developed a plan on how to mitigate the negative effects of Climate Change in the Transport Sector with the overriding targets to:

- Create a Transport efficient society
- Ensure Energy-efficient management of Infrastructure
- Strive for Energy-efficient vehicles, ships and planes using sustainable energy sources
- Contribute to future Energy-efficient usage
- How will this be achieved?

Climate Change Economical Consequences

- Traffic Disruptions
- Cost for Reconstruction
- Indirect Costs
- Precaution and Protection Costs

SweRoad

Features of the STA's plans to Mitigate Climate Change Effects

- Urban areas to be planned and built for shorter journeys
- Shift goods transport from roads to ship and rail
- Encourage increased use of public transport, cycling and walking
- Congestion charges in cities
- Energy and carbon taxes
- Increased use of renewable energy sources
- Work to create a transport modal shift

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Potential Areas for Energy Saving

Type of transport	Energy saving	Renewable energy	Planning of communities and infrastructure , and shifts
Passenger cars			
Trucks (heavy and light)			
Shipping			
Aviation			
Rail			
Energy saving in const-ruction, operation and maintenance of the infrastructure			

SweRoad

Climate Change Adaptation

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SweRoad

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SweRoad

What weather events should the transport sector adapt to? (1)

Climate Change Events	**Risks to the transport infrastructure**
Extreme rainfall (heavy showers long lasting rains)	Erosion, landslides and mudslides, Limited capacity of the drainage system Flooding of roadways, Traffic hindrance and safety

SweRoad

What weather events should the transport sector adapt to? (2)

Climate Change Events	**Risks to the transport infrastructure**
Seasonal and annual average rainfall	Impact on soil moisture level affecting structural integrity of roads bridges and tunnels Adverse impact on standing water at the road base Risk of floods from runoff, landslides, slope failures and damage to embankments if changes occur in the precipitation pattern

SweRoad

What weather events should the transport sector adapt to? (3)

Climate Change Events	**Risks to the transport infrastructure**
Sea level rise	Inundation of roads and railways in coastal areas Erosion of the road base and bridge support Bridge scour Reduced clearance under bridges Extra demand on the infrastructure when used for evacuation/emergency purposes

SweRoad

What weather events should the transport sector adapt to? (4)

Climate Change Events	**Risks to the transport infrastructure**
Maximum Temperature and number of consecutive hot days	Concerns regarding pavement integrity e.g. softening, traffic related rutting, embrittlement, migration of liquid asphalt Thermal expansion in bridge expansion joints Impact on landscaping

SweRoad

What weather events should the transport sector adapt to? (5)

Climate Change Events	**Risks to the transport infrastructure**
Drought	Wildfires that threaten transport infrastructure Mudslides in areas deforestrated by wild fires Unavailability of water for compaction works
Extreme wind speeds	Threat to stability of bridge decks Damage to signs, lightning fixtures and supports

SweRoad

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The colours represent the following:

	Acceptance
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	Action

SWEROAD

Design Criteria

The design criteria has been revised based on new information provided by amongst other the SMHI such as:

- Information about the water flow in in rivers and streams when constructing roads railways and bridges
- Information about highest and lowest water levels and extreme water levels
- Information of predicted future water levels and water flows

Climate Change Adaptation in the Cambodian Road Sector

SweRoad has recently signed a contract with the Ministry of Rural Development in Cambodia.

- The project is financed by Nordic Development Fund in parallel with the Asian Development Bank
- The contract amount is USD 5.4 million
- The implementation period is 3 years

SWEROAD

SweRoad will provide expertise in:

- Climate Change Adaptation
- Climate Change Hydrology Modelling
- Climate Change Economics
- Disaster Risk Management
- Road Design Engineering

SweRoad

Other Technical Focal Areas (1)

Weather Events	**Risks**	**Prevention measures**
Heavy rain for longer periods	- Flooding of the roads - Erosion - Landslides - Overloaded drainage system	Raise the road above highest flood level, stabilise slopes, clear ditches from debris
Cyclones and extreme winds	Destabilisation of bridges Trees blocking roadways Damage to traffic signs	Close bridges from traffic, install warning systems, close road stretches exposed to heavy winds, remove trees

SWEROAD

Other Technical Focal Areas (2)

Weather Events	**Risks**	**Prevention measures**
Drought	Bleeding asphalt Dust on unpaved roads	Use correct asphalt mix
Sea level rise	Salt water intrusion Erosion Bridge Scour	In a long term perspective shift locations for roads and bridges. In the short term perspective provide improved slope protection and ensure that bridge wing-walls are in functioning condition.

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Non Technical Aspects of the Project

- Establish coordination with different stakeholders
- Establish an Early Warning System
- Develop Emergency Management Planning procedures
- Provide training
- Establish Green Planning procedures for slope protection

Thank you

gunnar.tunkrans@sweroad.se; bjorn.moller@sweroad.se