

# Vision Zero: Applying road safety to mountain rescuers

Dale Atkins



# Mountain Rescuer Accidents

#	year	killed	state	cause	setting
1	1964	1	CA	fall on ice/snow	training
2	1966	1	CA	fall on ice/snow	sar
3	1968	1	CA	fall from rappel	sar
4	1969	1	CA	flood – drowning	sar
5	1969	1	CA	flood – drowning	sar
6	1969	1	CA	flood – drowning	sar
7	1977	1	CA	fall on rock	sar
8	1978	4	TN	helicopter crash	sar
9	1978	1	AZ	flood – drowning	sar
10	1980	5	WA	helicopter crash	sar
11	1981	1	CO	medical condition	sar
12	1982	1	NH	avalanche	sar
13	1986	1	CO	fall on snow	training
14	1988	1	CO	fixed-wing crash	sar
15	1992	1	AK	rope-drill fall	training
16	1994	2	CO	helicopter crash	sar
17	1994	1	VA	motor vehicle accident	sar
18	1995	3	HI	helicopter crash	sar
19	1995	2	WA	fall on ice	sar
20	1997	3	WA	helicopter crash	sar
21	1997	1	CA	fall on ice	training
22	1998	1	NV	ice fall	training
23	1998	4	UT	helicopter crash	sar
24	1998	1	AK	fall on snow/ice	sar
25	2008	1	AZ	walked into heli rotor blade	sar
26	2009	2	NM	helicopter crash	sar
27	2012	1	WY	helicopter crash	sar
28	2012	1	WA	fall on snow/ice	sar
29	2013	1	NV	fall from from hoist	sar
30	2014	1	WA	fall on rock	sar
31	2014	1	CO	medical condition	sar

Sample of fatal accidents on US mountain rescue operations: 1964 – 2014.

31 fatal accidents  
48 fatalities

Suspect that all victims were trying to be careful.

# Purpose

- To look to road safety as a metaphor for rescuer safety for a **source of new ideas** from which road safety concepts may (or may not) be applied to mountain rescuer safety.



**Roads**

## Similarities



**Mtn-Rescuer**

significant hazards to people

most accidents victim-caused

most victims have training & skills  
(experienced?)

individuals viewed as responsible for  
their own safety





## **Roads**

- artificial environment
- 1.2 million killed/yr
- societal disaster / public health problem
- billions and billions of \$ spent on safety/yr

# Differences



## **Mtn-Rescuer**

- natural or man-made environment
- 2+ killed/yr
- individual's problem
- little \$ spent on rescuer safety/yr



# Vision Zero

“No loss of life is acceptable.”

[www.visionzeroinitiative.se](http://www.visionzeroinitiative.se)

# Stop Deaths

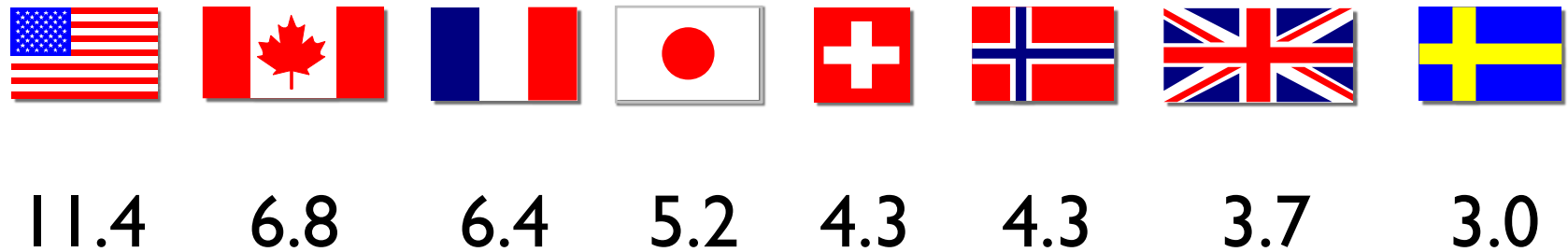


“paradigm shift”

- Rejects conventional trade-offs of safety, mobility and economics.
- Emphasis to move away from reducing accidents to moving toward eliminating the risk of fatalities and life-changing injuries.

# How Dangerous Is Driving

Deaths per 100,000 people

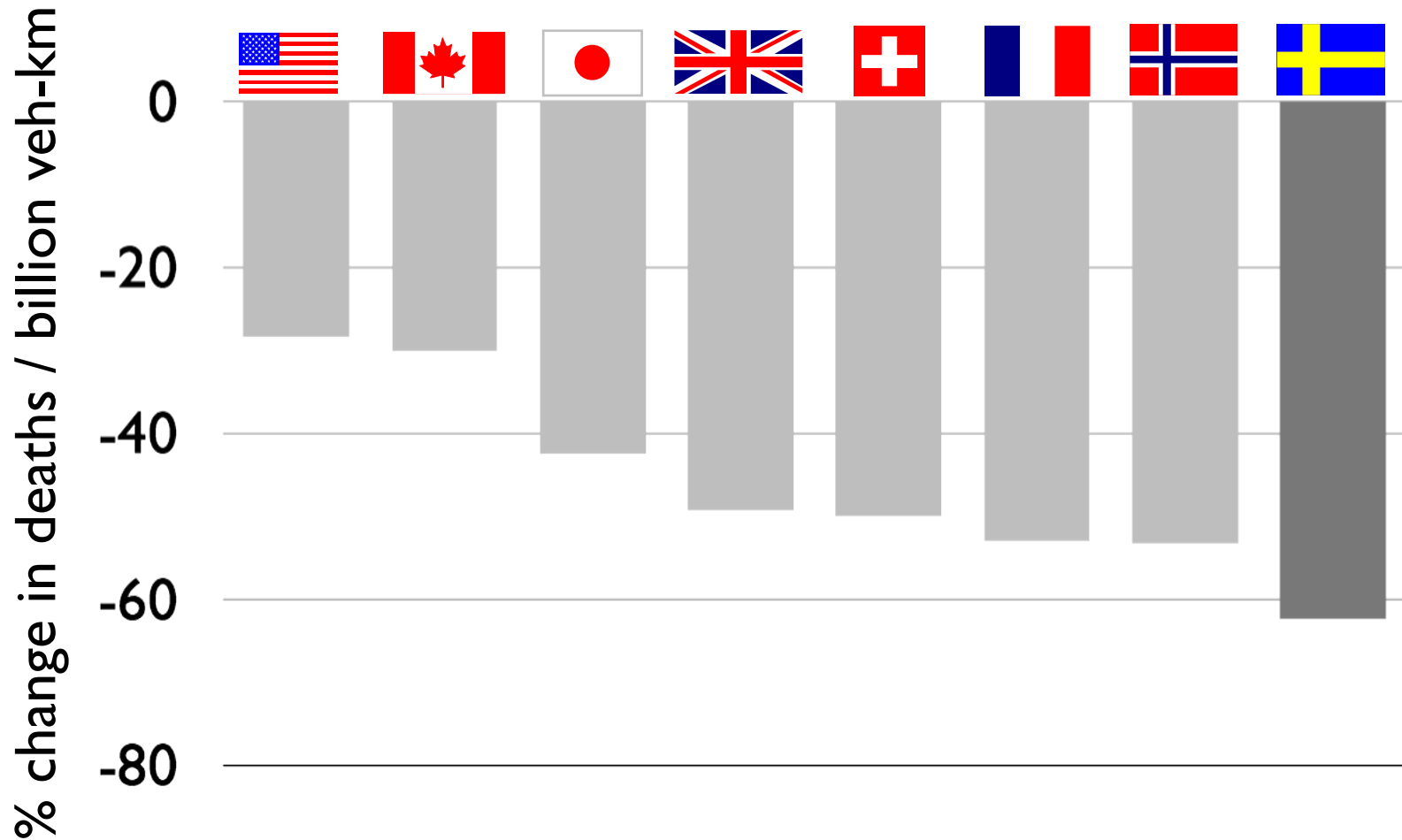


(WHO, 2013)

- “Sweden’s roads have become the world’s safest.”

(Economist, 2014)

# Percent Change In Traffic Deaths From 1990 Through 2010



(International Traffic Safety Data Analysis Group, 2011)



# Vision Zero

## Adopters & Adapters

Australia

Netherlands

Norway

Poland

Slovenia

Sweden

United Kingdom

Volvo AB

American Traffic Safety Services Association

Vision Zero Aviation Safety Award

Minnesota

Oregon

Washington

West Virginia

Chicago

New York City









# Conventional Road Safety

## **Road-User**

Road user is responsible for their safety.

Counter measures seek to change behaviors so user adapts to road system.

Safety is a function of mobility.



# Conventional Rescuer Safety



## **Individual-User**

- Individual is responsible for their safety.
- Counter measures seek to change behaviors so user adapts to conditions.

Safety is a function of fun.



# Conventional Rescuer Safety

## Individual-User

- Individual is responsible for their safety.
  - Counter measures seek to change behaviors so user adapts to conditions.
- Safety is a function of efficiency.







# Vision Zero Road Safety

## **Systems Approach**

- The road system must adapt to the conditions and limitations of the human being.
- Safety is a responsibility shared by road users, designers, road operators, and rescuers.

Mobility is a function of safety.

<b>Traditional Thinking</b>	<b>Vision Zero</b>
focus on accidents	focus on fatalities and serious injuries
excessive mechanical forces on humans	reduce mechanical forces to human tolerances
perfect human behavior	accommodate human failings into designs
enforcement and education – regulatory driven	enforcement and education – market forces (demand) driven
individual responsibility	shared responsibility
people don't care about safety	people demand safety
reasonable risks	unreasonable risks
single strategy solution	multiple combined-strategies solution
risk reduction	risk elimination
saving lives is expensive	saving lives is cheap

<b>Traditional Thinking</b>	<b>Vision Zero</b>
focus on accidents	focus on fatalities and serious injuries
excessive mechanical forces on humans	reduce mechanical forces to human tolerances
perfect human behavior	accommodate human failings into designs
enforcement and education – regulatory driven	enforcement and education – market forces (demand) driven
individual responsibility	shared responsibility
people don't care about safety	people demand safety
reasonable risks	unreasonable risks
single strategy solution	multiple combined-strategies solution
risk reduction	risk elimination
saving lives is expensive	saving lives is cheap





# Focus On Fatalities And Serious Injuries

- Mountain rescuers should seek more forensic and medical study of rescuer-victims.
- Improved knowledge to the frequency and pathology of their injuries and deaths will lead to improved use of personal protective equipment and mean better prehospital and hospital care.

# Shared Responsibility

A black and white photograph of a vintage car stuck in a deep rut on a dirt road. The car is positioned in the center of the frame, facing forward. To the right of the car is a wooden boardwalk that runs parallel to the road. In the background, there is a barn and some trees. The overall scene suggests a rural or agricultural setting.

- **Users**
- **Designers**
- **Enforcers**
- **Rescuers**

If **Users** fail, responsibility on **D-E-R** to redesign the system.



# Shared Responsibility

- **Rescuers**
  - **Designers** – equipment manufacturers, trainers ...
  - **Enforcers** – bosses, land managers, law enforcement, avalanche centers ...
  - **Transporters** – ground, water, aviation
  - **Providers** – prehospital and hospital care
- If **Rescuers** fail, responsibility on **D-E-T-P** to redesign the system.



# Multiple Combined- Strategies Solution





In traditional thinking, whose problem is this?

Driver



A photograph of a moose standing on the side of a road. In the background, a blue Volvo car is driving towards the viewer. The scene is set against a clear blue sky and a line of trees.

# In Vision Zero it is the car.

**Solutions:**

**\*\*Not avoidance\*\***

Detection, automatic braking to reduce speed to where car's internal safety systems are effective.




A photograph of a moose standing on a road. In the background, a car is visible on the road. The sky is blue. The text 'In Vision Zero it's the car.' is overlaid at the top.

# In Vision Zero it's the car.

## Solutions?

- ~~Avoidance~~
- Detection, automatic braking to reduce speed to where car's internal safety systems are effective.

A person wearing a dark jacket and a backpack is walking through a vast, flat landscape of snow and ice. The terrain is uneven with small mounds and depressions. The overall scene is desolate and cold.

In traditional thinking, who's  
problem is this?

Companion

**Traditional Tools**


transceiver

probe

shovel

airbag



A person wearing a backpack and winter gear is walking through a vast, snowy, and mountainous landscape. The scene is overcast and has a blueish tint. The person is positioned on the left side of the frame, moving towards the center.

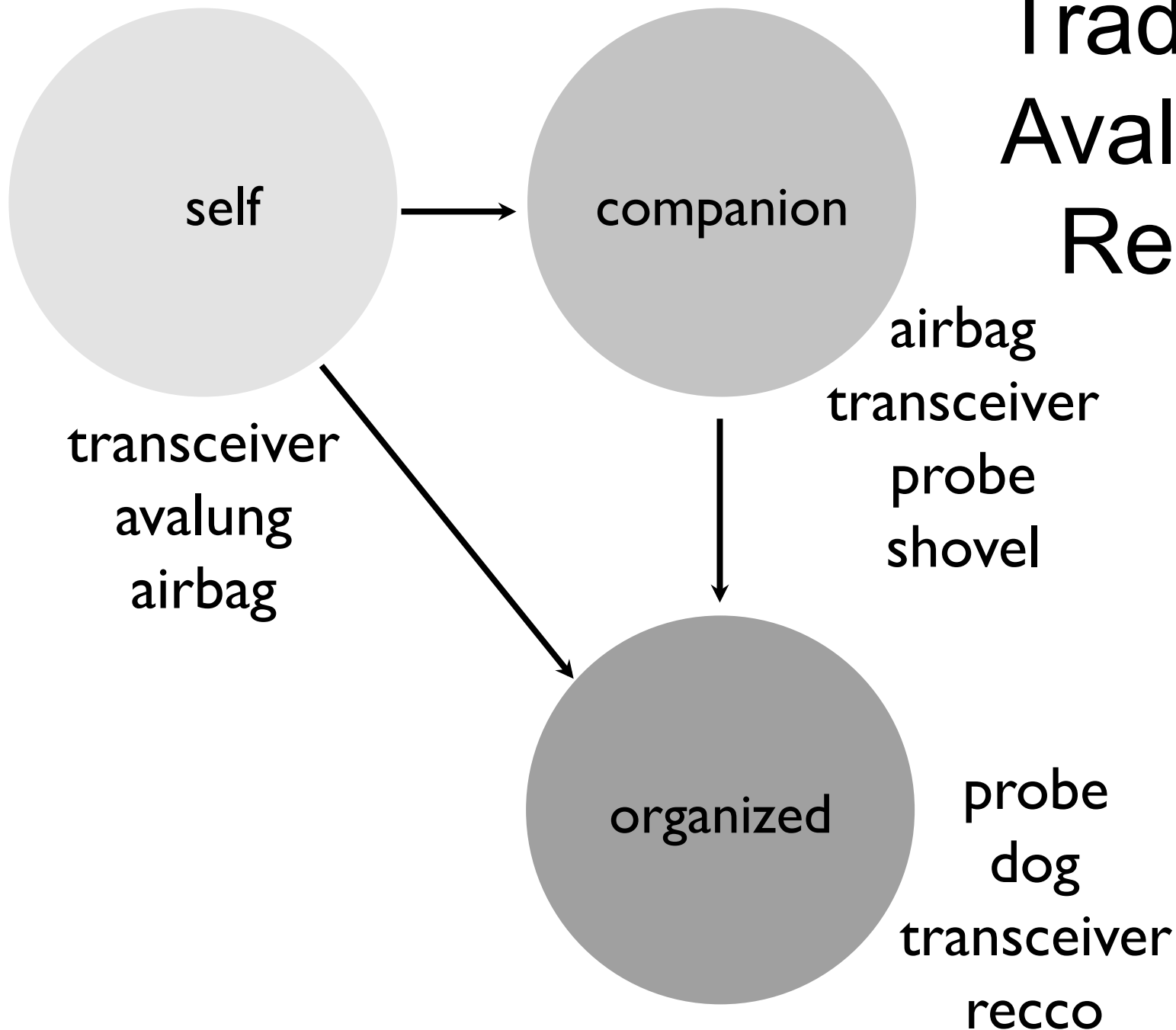
**In Vision Zero rescue is  
everyones' problem!**

**Companion**

**Individual**

**Organized**

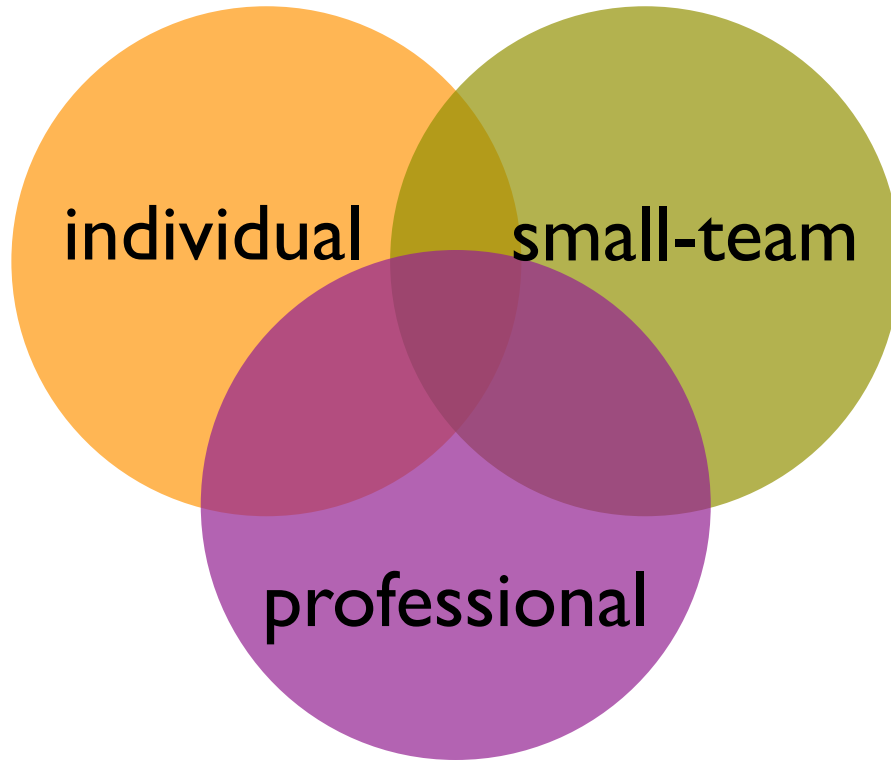
# Traditional Avalanche Rescue





protection  
notification  
rescue

notification  
rescue  
medical<sub>basic</sub>



rescue  
medical<sub>advanced</sub>  
transport

# Modern Rescue

## Systems Approach

- Holistic •

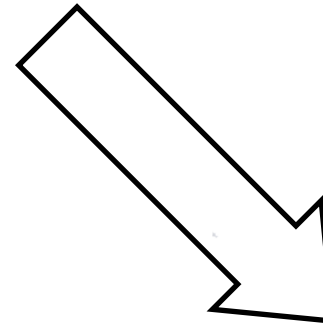
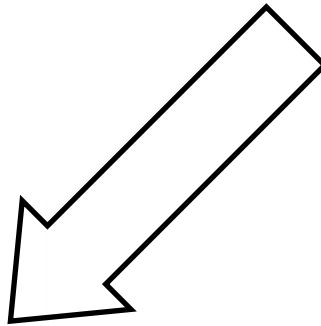
Multiple  
Combined-  
Strategies



# Multiple Combined-Strategies Solution

- Since no technology (or device) is optimal, all are embraced, and it is the combination of strategies that produces the best safety outcome.

# Conclusion



**Road Deaths**



**Mtn-Rescuer Deaths**

# Conclusion



## Vision Zero:

- requires a holistic approach.
- generates new ideas.
- questions conventional thinking.
- removes limiting biases & old-fashioned methods and attitudes.

# Future Work?

That is my challenge to us.

## Acknowledgements

Magnus Granhed

Johan Sauer

Didier Tichadou



# To help mountain rescuers



it is not about,  
“What can we do?”



Vision Zero is about,  
“What else can we do?”