Vision Zero: Applying road safety to mountain rescuers

Dale Atkins
## Mountain Rescuer Accidents


<table>
<thead>
<tr>
<th>#</th>
<th>year</th>
<th>killed</th>
<th>state</th>
<th>cause</th>
<th>setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1964</td>
<td>1</td>
<td>CA</td>
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<td>training</td>
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<td>2</td>
<td>1966</td>
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<td>CA</td>
<td>fall on ice/snow</td>
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<td>3</td>
<td>1968</td>
<td>1</td>
<td>CA</td>
<td>fall from rappel</td>
<td>sar</td>
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<tr>
<td>4</td>
<td>1969</td>
<td>1</td>
<td>CA</td>
<td>flood – drowning</td>
<td>sar</td>
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<tr>
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<td>CA</td>
<td>flood – drowning</td>
<td>sar</td>
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<td>1</td>
<td>CA</td>
<td>flood – drowning</td>
<td>sar</td>
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<tr>
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<td>8</td>
<td>1978</td>
<td>4</td>
<td>TN</td>
<td>helicopter crash</td>
<td>sar</td>
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<tr>
<td>9</td>
<td>1978</td>
<td>1</td>
<td>AZ</td>
<td>flood – drowning</td>
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<tr>
<td>11</td>
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<td>1</td>
<td>CO</td>
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<td>sar</td>
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<td>1</td>
<td>NH</td>
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<td>CO</td>
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<td>2</td>
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<td>VA</td>
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<td>HI</td>
<td>helicopter crash</td>
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<td>WA</td>
<td>fall on ice</td>
<td>sar</td>
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<td>3</td>
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<td>sar</td>
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<td>CA</td>
<td>fall on ice</td>
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<tr>
<td>22</td>
<td>1998</td>
<td>1</td>
<td>NV</td>
<td>ice fall</td>
<td>training</td>
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<tr>
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<td>4</td>
<td>UT</td>
<td>helicopter crash</td>
<td>sar</td>
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<tr>
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<td>1</td>
<td>AK</td>
<td>fall on snow/ice</td>
<td>sar</td>
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<tr>
<td>25</td>
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<td>1</td>
<td>AZ</td>
<td>walked into heli rotor blade</td>
<td>sar</td>
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<tr>
<td>26</td>
<td>2009</td>
<td>2</td>
<td>NM</td>
<td>helicopter crash</td>
<td>sar</td>
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<tr>
<td>27</td>
<td>2012</td>
<td>1</td>
<td>WY</td>
<td>helicopter crash</td>
<td>sar</td>
</tr>
<tr>
<td>28</td>
<td>2012</td>
<td>1</td>
<td>WA</td>
<td>fall on snow/ice</td>
<td>sar</td>
</tr>
<tr>
<td>29</td>
<td>2013</td>
<td>1</td>
<td>NV</td>
<td>fall from from hoist</td>
<td>sar</td>
</tr>
<tr>
<td>30</td>
<td>2014</td>
<td>1</td>
<td>WA</td>
<td>fall on rock</td>
<td>sar</td>
</tr>
<tr>
<td>31</td>
<td>2014</td>
<td>1</td>
<td>CO</td>
<td>medical condition</td>
<td>sar</td>
</tr>
</tbody>
</table>

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.
Similarities

Roads

Mtn-Rescuer

- significant hazards to people
- most accidents victim-caused
- most victims have training & skills (experienced?)
- individuals viewed as responsible for their own safety
Differences

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

**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
Stop Deaths

- 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.

“paradigm shift”
### How Dangerous Is Driving

Deaths per 100,000 people

<table>
<thead>
<tr>
<th>Country</th>
<th>Deaths per 100,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sweden</td>
<td>3.0</td>
</tr>
<tr>
<td>UK</td>
<td>3.7</td>
</tr>
<tr>
<td>Norway</td>
<td>4.3</td>
</tr>
<tr>
<td>Switzerland</td>
<td>4.3</td>
</tr>
<tr>
<td>Japan</td>
<td>5.2</td>
</tr>
<tr>
<td>France</td>
<td>6.4</td>
</tr>
<tr>
<td>Canada</td>
<td>6.8</td>
</tr>
<tr>
<td>USA</td>
<td>11.4</td>
</tr>
</tbody>
</table>

(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

Minnesota
Oregon
Washington
West Virginia
Chicago
New York City

American Traffic Safety Services Association
Vision Zero Aviation Safety Award
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.
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.
<table>
<thead>
<tr>
<th>Traditional Thinking</th>
<th>Vision Zero</th>
</tr>
</thead>
<tbody>
<tr>
<td>focus on accidents</td>
<td>focus on fatalities and serious injuries</td>
</tr>
<tr>
<td>excessive mechanical forces on humans</td>
<td>reduce mechanical forces to human tolerances</td>
</tr>
<tr>
<td>perfect human behavior</td>
<td>accommodate human failings into designs</td>
</tr>
<tr>
<td>enforcement and education – regulatory driven</td>
<td>enforcement and education – market forces (demand) driven</td>
</tr>
<tr>
<td>individual responsibility</td>
<td>shared responsibility</td>
</tr>
<tr>
<td>people don’t care about safety</td>
<td>people demand safety</td>
</tr>
<tr>
<td>reasonable risks</td>
<td>unreasonable risks</td>
</tr>
<tr>
<td>single strategy solution</td>
<td>multiple combined-strategies solution</td>
</tr>
<tr>
<td>risk reduction</td>
<td>risk elimination</td>
</tr>
<tr>
<td>saving lives is expensive</td>
<td>saving lives is cheap</td>
</tr>
<tr>
<td>Traditional Thinking</td>
<td>Vision Zero</td>
</tr>
<tr>
<td>---------------------------------------------</td>
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Focus On Fatalities And Serious Injuries

- Mountain rescuers should seek more forensic and medical study of resucer-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

• 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?
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.
In Vision Zero it’s the car.

Solutions?

- **Avoidance**

- **Detection, automatic braking** to reduce speed to where car’s internal safety systems are effective.
In traditional thinking, who’s problem is this?

Companion

Traditional Tools
- transceiver
- probe
- shovel
- airbag
In Vision Zero rescue is everyone's problem!
Traditional Avalanche Rescue

- Self
  - transceiver
  - avalung
  - airbag

- Companion
  - airbag
  - transceiver
  - probe
  - shovel

- Organized
  - probe
  - dog
  - transceiver
  - recco
Modern Rescue

Systems Approach

• Holistic •

Multiple Combined-Strategies

protection
notification
rescue

notification
rescue
medical\textsubscript{basic}

individual

small-team

professional

rescue
medical\textsubscript{advanced}
transport
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

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

it is not about,
“‘What can we do?’