multi-victime avalanche accidents

Human factors

a four years experience

G. Zen-Ruffinen - R. Richard – P.Fauchere
Air-Glaciers / Maison du Sauvetage
Sion

Mass-casuality accidents in mountains
ICAR medcom form 2015

type of accident	country CH	year	total N °casualities	dead	severely injured	injured	problems
winter	Valsorey	26.03.2011	11 caught 10 burried	5	4	2 ?	residual danger too many helicopters
	Ayer Barneuza	01.04.2011	7 caught 4 burried	3	0	?	lack of medical material (AED)
	Bec Etagnes	13.02.2013	6 caught	2	0	4	pediatric victims
	Masserey	05.01.2014	6 caught 4 burried	4	0	0	psychological adversity medical material
	Pte Ronde	09.01.2014	6 caught 1 burried	1	0	5	meteo-logistic no beacon=40 rescuers terrestrial
summer !!	Pte Mourti	19.07.2014	6 caught 3 burried	2	1		unexpected no beacon
	Col des Mines	29.01.2015	5 caught 1 burried	1	0	0	meteo no beacon relational diff
	Pigne d'Arolla	27.03.2015	6 caught 4 burried	1	0	1	meteo accu LUCAS
	Pte Tsavolyre	12.04.2015	4 caught 3 burried	2			
	Gd St.Bernard	21.04.2015	6 caught 4 burried	4	0	1	meteo access

COMPAGNIE D'AVIATION 1951 SION

Valsorey 26.03.2011

Repartition victimes

1. 13h50 sititng – stunned   GSC 15
   Petzl evac.

2. 13h58 part.burriedi (hidden)   GSC 15
   Petzl evac.

3. 14h01 enseveli complet (pied visible) GSC 12
   Petzl evac.

4. 14h07 enseveli complet   GSC 12
   Combi-carrier evac

   14h10 enseveli complet   GSC 15
   Combi-carrier evac

   14h20 enseveli complet   GSC 15
   Combi-carrier evac

   14h30 enseveli complet   GSC 5
   Combi-carrier evac → CHUV

   14h44 enseveli complet   Naca 7

9. 14h46 enseveli complet   Naca 7

10. 14h49 enseveli complet   Naca 7
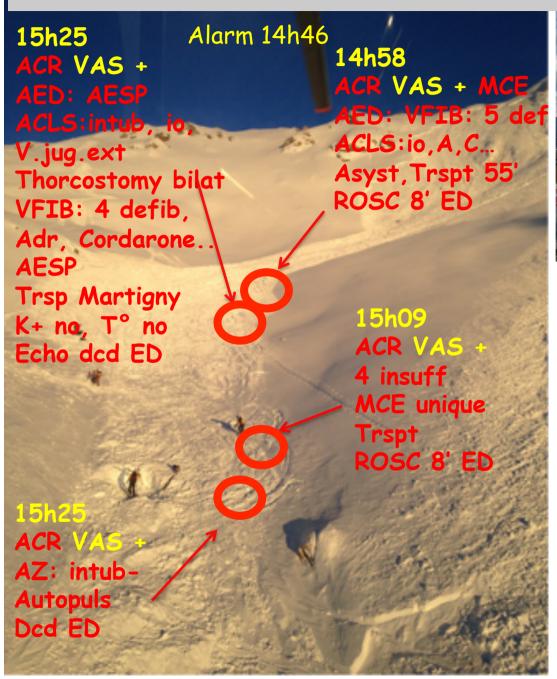
11. Non retrouvée   →   18.05.2011

Mourti 19.07.2014

Grd St.Bernard 21.04.2015

PC arrière PMA

petite noria

PC front

«Toute» petite noria

Pre-Triage

Grande noria > 35 min

Inconsc VAS +
Descendu à ski….

ACR VAS + MCE
Trsp sledge-B3-
PMA:intub-Lukas
Hosp K+15

ACR VAS + MCE
Trsp sledge-B3-
PMA:intub-Lukas
Hosp K+15

ACR VAS + MCE-
Fastrack
Trsp sledge-B3-
Hosp K+4-6 /CEC

ACR VAS ?
(vomit)
dcd

multi-victime avalanche accidents

a four years experience

human factors !!

time is pressing
multi-victim = several severe patients in one single intervention
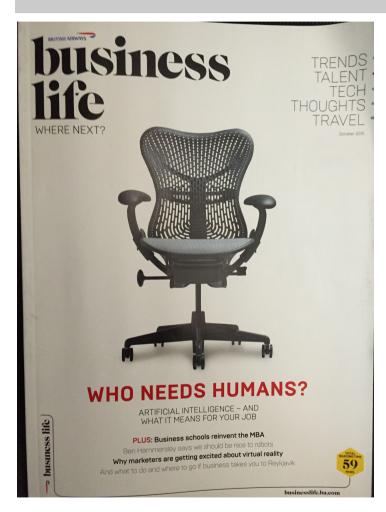logistical challenge

why human factors ?

training

… you can anticipate everything…

Human Factors
Victim

- level of experience

- level of material

- risk behavior..

HF: dispatch center 911-112-144

- lack of avalanche accidents knowledge
- no daily business = supplemental stress
- difficult localisation
- difficult communication
- lot of rescue services (guide-heli-dog-..)
- time is brain…

HF : rescue service

- intern « dispatch-center »
- lack of avalanche accidents knowledge
- no daily business = supplemental stress
- difficult communication
- lot of team members (guide-heli-dog-..)
- time is brain...
- there are other missions on-going
- anticipation : number of helicopters
  - fuel

HF: rescuers HF « by victim »

- psychological state of the implicated
- age of victims
- personal acquaintance rescuers-victim
- victim's equipment (beacon-AirBag…)
- burrial time (rapid access vs terrestrial…)
- stress of dispatch center repercussion

HF : rescue team
pilot

- type of helicopter

- weather conditions
- difficult localisation
- difficult access

- experience of rescue team
- number of helicopters :
- number of rescuers :
- number of rotations :
- type of rotations: sling, winch, dogs..

- vitim's number and medical conditions

HF : rescue team guide

- weather conditions
- avalanche localisation
- difficult access
- residual risk : recco flight
- comprehension of mechanism : witness inquiry
- cumulation of fonctions : multi-tasking management, technical, medical..

- communication : rescue channel
- experience of rescue team:
- localisation : beacon, Recco, dog
- extraction : technical, medical

- number and type of rescuers : management
- type of intervention: sling, winch,
- anticipation: night mission ?

- every avalanche has its own dynamic (vs highway MVA)

HF : rescue team medical

- access to the site : personal mountain experience, terrestrial, sling,

- access to the victime :
  - localisation phase
  - extraction phase
  - rapid access to head

- lack of equipment :
- hostile environnement for BLS-ACLS
- inadequacy of equipment : wind-cold-insufficient number

- unclear victims conditions :
  - patent airways, time, T°?
  - health conditions: either severe (REA=1doc+AED/pat) or minime

- anticipation: dispatch to hospital, no direct communication, via dispatch center

HF : task specialists

- task specialists :
  - dog handler
  - ski-patroller
  - mountain rescuers :
    - mountain guides, probers

- task specialists :
  - non-professionnel
  - not experienced
  - rare occasions to be dispatched

multi-victim avalanche
level of performance

Levels of performance		Latency [sec]	Example	
			Emergency medicine	Mountain rescue
Skills-level	with training	≥ 0,06	Installation of an i.v. line	Using the winch hook
	without trainig	≈ 0,3		
Rules-level	with briefing	≈ 2	Expected resuscitaion in the ED	Radio communication
	without briefing	≈ 15	Unexpected resuscitaion in the field	Assess the avalanche risk
Knowledge-level		> 45	Gascow Coma Scale	Looking for the right route

V.Lischke, Training Center, Bad Tölz, 2012

HF in multivictim avalanche (1)

- MVA stratégies highway vs avalanche :
  - in 5 y never engaged MVA-container
  - professional (routine, organized) vs non-professional (rare, no pre-established hirarchy, relationship between diff groupes)

- time is life

- geography
  - acces
  - localisation
  - extrication : small noria by helicopters

- technique saves life :
  - technical kits are ready,
  - confidence in technical skills = garant of success ?

HF in multivictim avalanche (2)

- ACLS comes second :
  - 1 medical kits/patient not ready

    doc, AED,ACLS,carrier, 1+-Autopuls

- communication
  - diff channels between type of rescuers
  - helicopters: number, diff compagnies, language
  - via dispatch center, not directly

- multi tasking management :

  - … we can not anticipate everything …

… but we have to deal with it…