RESCUE SYSTEM
FOR DEEP CAVE PITCHES

CNSAS (Italy) – Cave Rescue
STRUCTURE OF DEEP UNDERGROUND PITCHES

UNDERGROUND PITCHES:
> 600m HIGH AND > 50m WIDE.

Vrtiglavica, cave Kanin Mountains, Western Julian Alps - Slovenia
300 m icefall in a 501 m pitch

Brezno Pod Velbom, Kanin Mountains, Western Julian Alps - Slovenia
## BIG WALLS VS. DEEP UNDERGROUND PITCHES

<table>
<thead>
<tr>
<th><strong>SHARED</strong></th>
<th><strong>DIFFER</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Verticality.</strong></td>
<td><strong>Cave’s pipe structure.</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Escape options.</strong></td>
</tr>
<tr>
<td><strong>Risks of flooding.</strong></td>
<td><strong>Rainfalls and hail.</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Wind gusts.</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Temperature variations.</strong></td>
</tr>
<tr>
<td><strong>Risks of rock fall.</strong></td>
<td><strong>Day light.</strong></td>
</tr>
</tbody>
</table>

Deep underground pitches are similar to big wall flood lines, during nighttime.
CAVE RESCUE SPECS:

- EXTREME REMOTENESS.
- OBLIGATION TO HAUL.

IS NOT FEASIBLE TO:
- TRANSPORT HEAVY AND VOLUMINOUS GEARS.
- USE MACHINERY

OUR FOCUS: MINIMIZING GEARS AND OPERATORS

Abisso Casermette
Kanin Mountains, Western Julian Alps – Italy
1. static EN 1891 type “A”;  
2. no rope rub → rebelay;  
3. anchors bombproof;  
4. rebelay → minimize risks.
HOW TO RIG THE PITCH

3 OPERATORS TEAM
1) Chooses counterweight positions.
2) Rigs counterweight belays.

Gear needed:
- 60 m and 20 m ropes
- 2 pulleys – slings – anchors
COUNTERWEIGHT DYNAMICS

OPERATOR AND STRETCHER ARE TOGETHER AT THE BELAY

THE OPERATOR CLIMB UP THE HAULING ROPE
TEAM MANAGEMENT

Method B
OPERATORS ON EVERY COUNTERWEIGHT

Method A
THREE OPERATORS
Method A
THREE OPERATORS

RED SHUTTLES
UP ROPE

GREEN HAULS
STRETCHER

BLUE FOLLOWS
STRETCHER
STEP 1: HAULING
“ANIMATION”

Method A
THREE OPERATORS

RED REACHES NEXT COUNTERWEIGHT
STEP 2: CHANGE COUNTERWEIGHT

Method A
THREE OPERATORS

1. TO NEXT COUNTERWEIGHT

2. ITALIAN HITCH locked
STEP 2: CHANGE COUNTERWEIGHT

Method A
THREE OPERATORS
STEP 3: EXCHANGING TASKS
“ANIMATION”

BLUE CLIMBS OVER NEXT COUNTERWEIGHT

GREEN FOLLOWS STRETCHER

Method A
THREE OPERATORS
REPEAT Hauling “Animation”

BLUE SHUTTLES UP ROPE

Method A THREE OPERATORS

REPEAT EVERY COUNTERWEIGHT

RED HAULS STRETCHER
INITIAL SET UP

Method B
OPERATORS ON EVERY COUNTERWEIGHT

RED SHUTTLES UP ROPE

GREENS HAUL STRETCHER

BLUE FOLLOWS STRETCHER
Step 1: HAULING “ANIMATION”

Method B OPERATORS ON EVERY COUNTERWEIGHT
Step 2: CHANGE COUNTERWEIGHT “ANIMATION”

- Method B OPERATORS ON EVERY COUNTERWEIGHT

- COUNTERWEIGHT READY TO HAUL
- COUNTERWEIGHT HAULS
- STRETCHER CONNECTED TO BELAY WITH LOCKED ITALIAN HITCH
- GREEN LOWERS

ICAR
Method B
OPERATORS ON EVERY COUNTERWEIGHT

RED SHUTTLES UP ROPE

GREEN HAULS STRETCHER

REPEAT EVERY COUNTERWEIGHT

REPEAT HAULING “ANIMATION”
## Comparison Between the Two Systems

<table>
<thead>
<tr>
<th></th>
<th><strong>PRO</strong></th>
<th><strong>CONS</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Every Counterweight</strong></td>
<td>Faster</td>
<td>• More operators subjected to rock fall.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Human factor.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• More skilled operators needed.</td>
</tr>
<tr>
<td><strong>3 Operators</strong></td>
<td>Minor Risks</td>
<td>Operators have to be very skilled.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Heavy duty job.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Risks related to fatigue.</td>
</tr>
</tbody>
</table>
THANK YOU

OUR ENGLISH VERSION OF CAVE RESCUE HANDBOOK IS FREE TO DOWNLOAD AT:

https://formazione.cnsas.it/download/handbook/caving-rescue/

or Google “CNSAS ENGLISH HANDBOOK”
EXTRE SLIDES
RIESENDING
GERMANIA
TIME-TABLE

Seite 24

Rettungseinsatz Riesendinghöhle vom 8.06. bis 19.06. 2014

202 Höhlenretter: 89 Italiener, 42 Österreicher, 27 Deutsche, 24 Schweizer und 20 Kroaten.

Zum Vergleich: Der Münchner Olympiaturm mit seinen Krappe 300 Meter würde nicht mal ein Drittel der Tiefe erreichen.
ICEFALLS IN CAVE
SEQUENCE
PITCHES
WEATHER, WATERFALLS AND FLOODING
SEQUENCE OF DEEP UNDERGROUND PITCHES

• **SEQUENCE OF PITCHES IS A COMMON FEATURE.**

• **RESCUE OPERATIONS ARE SIMILAR TO SINGLE VERTICAL PITCHES.**
CORDE FISSE
SPECS
NORMATIVA
**EN 1891 static ropes**

Personal protective equipment for the prevention of falls from a height - Low stretch kernmantel ropes - This European Standard applies to low stretch textile ropes of kernmantel construction from 8,5 mm to 16 mm diameter, for use by persons in rope access including all kinds of work positioning and restraint; for rescue and in speleology. Two types of low stretch kernmantel rope are defined: A and B. The European Standard specifies requirements, testing, marking and information to be supplied by the manufacturer including instructions for use of such low stretch kernmantel ropes. NOTE 1: It is possible that rope not conforming to this European Standard may also be suitable for the activities described above. NOTE 2: Ropes used for protection during any free climbing activity in rope access, rescue or speleology should take account of other standards, e.g. EN 892. Dynamic mountaineering rope may also be used for protection during rope access and work positioning.
Example of our alternating teams

*Rescue in Riesending-Schachthöhle (Untersberg – Germany)* 8 – 20 June 2014

Rilievo in cui siano evidenziati i tratti di lavoro dei 2 team che si sono scambiati lavorando in profondità ed i punti dei due campi dove hanno dormito
SVINCOLO DA SOSTA
Method A
THREE OPERATORS