European Cave Rescue Meeting 2011

Starigrad Paklenica, Croatia

15 th – 18th September 2011

Organized by Croatian Mountain Rescue Service

Cave Rescue Commission

Dates : 15 – 18 septembre 2011 A Starigrad Paklenica, Croatie

Translation from French to English using Google Translate by Joe Sdyney, UIS-Oceania

On the topic: Materials - Techniques and tests.

During the meeting doctors who gathered last year in Austria have also a session to continue working on the theme of medicine. The group is led by Ulrich (8 countries). At the same time a group has worked on the theme of rescue dive with representatives from Croatia, France and Italy. On communications, radio underground, England and France are working on prototypes of radio Nicola 3 for England and "Pimprenelle" for France. The two prototypes being made by Olivier Lanet and Peter Allwright, they take a working session to check the compatibility of the devices. Saturday morning in the dining room we check the compatibility of the two devices and an attempt is made in caves on Sunday morning. Another device made by Felix, Switzerland, with a keyboard allows digital transmission of written messages between stations underground and surface. The devices can act as a relay and effective over a radius of 200m.An antenna operating as a tag serves as a relay for the transmission and may have a function of geolocalisation.

Tests techniques.

On Friday 16 we conduct tests of effort and strength of technical situations in natural terrain. On Saturday, the records are converted to graphics allowing a return and a first interpretation. All test results will be sent later to all participants.

The selected site in the park allows the installation of a zip line 30 feet long at a height of 20 m. Italian cavers have a dozen dynamometers that can be connected to a computer via cable and simultaneously record tensions in the implementation of a workshop. The site was equipped the day before by cavers Croats and Italians.

We brought two dynamometers and an anchor puller which finally will not have seen the utility resources provided by the Italian team.

A series of tests will be made on the day with three repetitions for each configuration.

The first situation was to measure the tension on a zip line with a loading of a stretcher and his time on the zip line. The measurements were made simultaneously at both ends of the rope carrier.

The second situation was to position a stretcher on a zip line and measure what happens on the three anchors when one of them breaks.

The third scenario simulated the breaking of the rope carrying a zip-up and ensures the resumption of power by ropes used to pull and restraint of the stretcher. These two ropes are connected in "head stretcher" and not justified to head and foot stretcher.

The fourth situation measured the tensions caused by a workshop of casualty evacuation by counterweights on a zip line. The three persons, regulator, and the victim counter are suspended on the zip line.

Videos on Friday night with the screening:
- The "Tyrolean Pierre Rias, world record at Vercors 2008" (subtitled in English), film 29 minutes of Christian Dodelin,

- Then the film and Tommaso Biondi Andrea Gobetti "La Lunga Notte" recounting the rescue of a Croatian caver in Piaggia Bella in the Marguareis Mountain in Italy, from 8 to 12 August 2007. Comment and testimony of the victim, present at the gathering.

Meeting and discussion around a European association cave rescue on Saturday afternoon.
For 2 years the idea of grouping the various cave rescue teams in Europe, with official recognition, is gaining ground. A draft statute for an independent association was developed by the Croats and sent before the meeting. Dodelin Christian, said that the group here was formed at the origin (4 years) with the aim to strengthen ties and mutual understanding between the countries of the alpine karst. The expansion of our work and thematic meetings with other European countries are following reflections emerge.

- It is necessary to be a cave rescue entity grouping all European countries.
- This group will be the interlocutor of the European authorities on the subject cave rescue.
- This group will provide links and analysis on all the themes of cave rescue. It should be noted that there is already an embryo and willingness around the medical and diving. The exchanges are also common for communication. It remains to enhance the statistical aspects concerning the analysis of accidents caused by the different countries.

Everyone is convinced of the necessity of a group which will also be the interface for Europe and the UIS (Union International of Speleology).

Most countries present at the meeting are in line with mountain rescue and caving and instead want an autonomous association. We insist on the side of the French delegation for recognition through the FSE (Federation Caving European) under the status of commission.
Difficult experiences of some countries with the structures cavers need to mature the project and to document what is possible.

Thus Christian Dodelin committed to producing the conditions and opportunities for integration with the FSE. We will have two possible solutions in parallel (integration as creation of a commission or association) and the ability to better assess these two options before making a decision. Everyone agrees on one thing: the desire to retain the flexibility of our current operations and be active in representing the structures approaches cave rescue from the European.

We all recognize that in the present, many countries can hardly be representative since the federation’s cavers are not consistently present and associated or, more we are only a few European

countries present. Nine countries, with someone of them represented by the mountain rescue: Austria, Bosnia, Croatia, Italy, France, Great Britain, Montenegro, Serbia and Slovenia.

A meeting to further this discussion will take place in Italy a weekend in May 2012 on the subject after receiving elements and arguments that have to provide Christian Dodelin.

Next meeting planned emergency the 19-20-21 October 2012 in France in the Jura on the topics: diving and removing obstruction with explosive. As doctors want to take advantage of these gatherings to meet, they will also take these subjects to study the risks and pathology.

SCHEDULE: First test results:

Test configuration.

The sensors are connected to a laptop via cable. They are positioned and protected according to the measures and targets identified for each test. The measurements were reproduced three times in the same configuration.

Is not in laboratory conditions, the knots are not routinely pre-tightened, but the fact that the same rope was asked all day in the same space and under
multiple constraints gives measurements produced values close to maximum stress. Particularly because of the high heat above 40 ° in the sun, but also by the sequence of tests conducted do not allow the rope to resume its elasticity gives initial adverse conditions. 80 kg dummy is placed in the stretcher.

Computer and connection box dynamometers.

Dynamometers prior to the establishment

The measuring equipment was provided by the Italian cavers.

The head of the Italian group, responsible for implementation and coordination is Giuseppe Conti.

Caving equipment (ropes, mooring, carabiners, ascenders, descenders, pulleys) are EC and correspond to the manufactured material classic. This is used equipment under normal conditions of use.

Results and discussions.

Out of the three anchor points in a node distribution tensioned by a rope carrying
a load zip (TSA stretcher with a dummy load close to 100kg).
A rope pulling and holding the stretcher connects the two points of departure and arrival for his trip on the rope carrying the zip line.

The distance between the two attachment points of the zip line is 30 meters. The line is a little over 20 meters high.

The load cells are placed on each anchor point of the distribution and between the karabiner and the rope carrying the zip line.

The element that simulates the breaking point is a red string joined to a dynamometer in a protected envelope blue and yellow.

We have red value of 310 kN corresponding to the initial tension of the rope of Tyrolean loaded weight of the stretcher. After rupture of an anchor that value increases to 260 kN due to the loss of tension on the rope carrying the zip line.

For the three anchors, the distribution of the load of 310 daN is unevenly with respective values of 78daN, 112 daN and 135 daN. The load distribution is uneven and the accumulated tension measured is at the highest point, barely higher than the voltage requested by the rope of the zip line.

After rupture of an anchor, the weight is distributed over the two remaining points. Efforts oscillate between 50daN 250daN at the time of receipt of the shock to stabilize at 60 daN 205daN and to distribute the total load of 260 daN.

First observations:

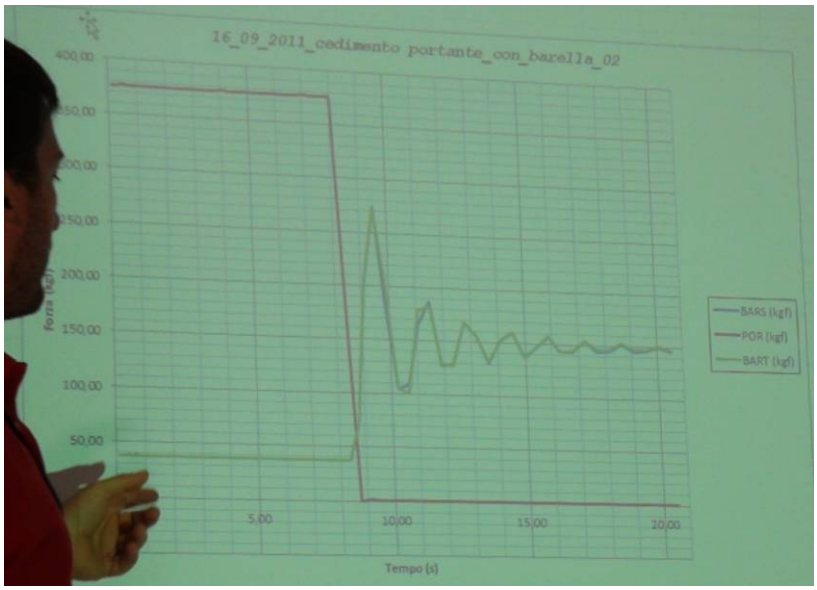
- The values are well below our tests because of the length of the zip line that absorbs stress to a greater extent: by 30 yards when we had that 2 meters in the laboratory, when the SSF had conducted its own tests.
- The shock force at the time of the break does not lead to the carrier, superior value and the initial tension is in evidence to the rope.
- The mooring react and break down the voltages induced unevenly depending on many parameters (friction, placement of the node of attachment of the ring load balancer, angles formed at the time of tensioning and then after the break ...) . The sudden tension in each strand in all cases remain in values very acceptable and can lead to slip the knot.The mooring react and break down the voltages induced unevenly depending on many parameters (friction, placement of the knot of attachment of the ring load balancer, angles formed at the time of tensioning and then after the break ...). The sudden tension in each strand in all cases remains in values very acceptable and can lead to slip the knot.
- For the anchors, whether natural, of bolts or studs, the stresses are between 50 and 250 daN. This confirms our work in 1994 in tests conducted by the SSF in the laboratory Petzl France.
- For the victim, watching film of the stretcher during the break will add only a few swings and a loss of dynamic height of 3 to 4 meters in the report of its initial position in space. The risk is only to hit an obstacle in moving the load if such a break is anchoring to occur.

- "From the results of tests made by the SSF in 1994 and 1996: 2.3.1.After rupture of one of the anchorage of the knot distribution, the charge of one of the two other anchorages is on average at the time of shock, 5 (for a dynamic rope) to 10 times greater than the static load before breaking. But in all cases that force remained acceptable up to 260 daN, with a mass of 100 kg For comparison, a caver on descender on the rope stopping abruptly causes to be collected in an effort to tie about 200 daN (with peaks even more important, but not significant for the rope temporarily requested). With knots that dispatchers correctly and whose tie is claimed, the tests of 1996 resulted in an initial load of 180 daN and 2 meters in the mooring of values for the maximum impact force of 460 daN. "

Out of the rope carrying of Tyrolean with a stretcher and the victim (100 kg). The load is also connected by a tow rope and restraint.

Dynamometers are positioned on the two attachment points (load balancer knot) on each end of the stretcher. A rope appears above the stretcher it is not involved in the measurements and tests and is only there to ease the re-establishment of the exercise will be done three times in succession.

At the left, the stretcher with measurement material and, at right tensioning of the rope with the positioning of a carrier ring rope to facilitate the cutting of the part connecting the zip line to the main mooring.



In red we see the stress on the rope carrying the zip line for a value of 380 daN, indicating an initial tension of 250 daN obtained on a self-locking descender.

Cut that rope, the other two ropes with only initial tension of 40 daN, then pass to a value of 150 daN with a peak of 270 daN at impact.

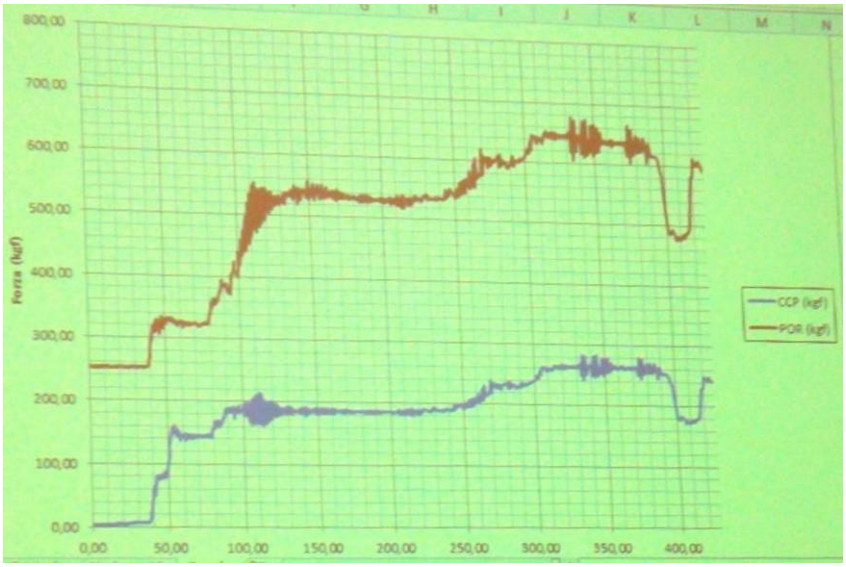
Observations and conclusions :

- The values and impact forces recorded are therefore much lower than those generated at the time of loading of the stretcher on the so-called Tyrolean. This is due to a simple problem of translation of the load a bit like a pendulum
- The only major risk in case of accidental breakage of a zip line, in this configuration is the horizontal movement of an obstacle is encountered during the sudden descent of the stretcher of 3 to 4m for this test case 30m length.

Measurement of forces generated by a workshop evacuation weight against a zip line.

The implementation of the workshop was done with a pre-tensioning of the zip line. Then the two cavers (regulator and counterweight) have been positioned by rotation of the pulley on the zip line to the middle. The manoeuvre of pulling the stretcher was then able to start until the arrival of the ground caving balances.

Dynamometer was placed at the beginning of the workshop (we see the cable connecting the computer to the right), the other load cells are placed on the zip line to measure the effects of the manoeuvre.



The graph shows restitution in blue the stresses generated by the 3 antagonists (regulator, counterweights, stretcher) with 190daN maximum in the phase of positioning on the zip line. Then ensued support stretcher and climb it until the return of the counterweight to the ground. The measurements give values of 280 daN and peaksof 270 to 290 daN. The drop to 190 daN is the back ground of the counterweight; this value rises to 230 daN in the control phase of the descent of the stretcher on the ground.

In this configuration, the Tyrolean had an initial tension of 250 daN and additional stress related to the exercise gave values of 620 daN when the management of three players with oscillations, related to their actions, ranging from 600 and 680 daN.

Observations and conclusions.

- These figures reflect measurements taken and the tests confirm that we made in the SSF in 1996. The results, however, remain lower in the extreme since with distances shorter Tyrolean (6m), we obtained values up to 740daN.
- The parameter on which to act if we want to reduce tensions is clearly that of the initial tension of the zip line.
- The ability and strength of the rope and mooring systems with the load balancer is quite able to withstand the forces generated, as what had been widely demonstrated the SSF during its test campaigns.
- Once again it is the psychological setting remains the major obstacle to the adoption of these techniques, tested, designed and developed by the SSF. The discussion we had during the release of this test campaign demonstrated it.

Presentation of a prototype of stretcher by the Italians:


The assembly of plates of Kevlar gives exceptional rigidity to the stretcher.

However, its base covered with a PVC cap, is a weak point of inducing risk of grip and tear.

Presentation of communication device transmission graphic Felix (Switzerland):


As the TPS there is a connection to ground through an antenna. A direct reading of messages on screen, is the major advantage of this tool with a call sound to indicate an incoming message. Outside the box contains a roll of paper and a mini printer for printing of all messages. In a way, the fax underground release.

Reviewed by Christian Dodelin and Bernard Tourte