Recommendation REC L 0007 of the Commission for Avalanche Rescue

of October 10, 2008

about the Determination by Equipment Manufacturers of the Search Strip Width to be Used with Transceivers

The commission for avalanche rescue of the International Commission for Alpine Rescue,

Having regard to the need of consumers to be provided with a reasonable and fair indication of the width of a search strip to be used with a transceiver (or avalanche beacon),

Whereas:

1. a unified method for determining the width of a search strip is needed.

2. when using transceivers to search for fully buried avalanche victims, the search strategy depends on the search strip width which influences the search time until the first signal from the buried subjects can be received by the rescuer.

3. the width of a search strip depends on technical characteristics of the avalanche transceivers, the avalanche scenario as well as the rescuer's behaviour.

4. the larger the signal search strip width, the shorter the search time and therefore the higher the survival chance of the buried subject.

5. if the search strip width is chosen too large, the probability to miss a buried subject increases, which makes time-consuming multiple searches necessary – and decreases survival chances.

6. since the search strip width depends on range – a transceiver specific property - it is essential that all manufacturers of avalanche rescue bacons provide consistent values for the search strip width and the use of their transceiver during signal search.

7. this will allow consumers to make optimal use of their transceiver in order to increase the survival chances of their companions.

Has adopted the following recommendation:

1. All manufacturers of avalanche rescue beacons shall determine the so-called "realistic maximum range" as specified in the Appendix (see below).

2. The signal search strip width to be marked on the transceiver is then
    (a) about equal to 1.2 (± 0.1) times the realistic maximum range for transceivers without digital signal processing (DSP),

(b) about equal to 1.3 (± 0.1) times the realistic maximum range for transceivers with one receiving antenna and with DSP, and

(c) about equal to 1.4 (± 0.1) times the realistic maximum range for transceivers with two or more receiving antennas and with DSP.

3. In the user manual the manufacturer shall specify the type of cooperation required by the rescuer (for example, the need to slowly rotate the transceiver during signal search).

This recommendation has been proposed by the Avalanche Commission at its meeting in Chamonix (France) on October 9, 2008. It is subject to consultation with the members and after revisions shall be adopted by the General Assembly 2009.

The commission for avalanche rescue of ICAR:

The president
Hans-Juerg Etter

Appendix

Procedure to Determine the "Realistic Maximum Range"

(Genswein and Schweizer, 2008)

To determine the "realistic maximum range" the following procedure must be followed:

1. Test setting and transmitter: Transmitter at 457 kHz ($\pm$ 10 Hz) and 2.1 μA/m at a distance of 10 m, coaxial antenna orientation, interference free environment, no conducting parts nearby.

2. Receiver setup: The measurement must be repeated with 10 receivers of the same brand and type. The mean value of the 10 results counts as the final result.

    (a) Analog receiver setup: Receiver in co-axial antenna orientation. The signal-to noise ratio must be at least 6 dB. In practice, this means that there is a clearly audible, distinct search tone.

    (b1) Digital receiver setup for distance criterion: Receiver in coaxial antenna orientation (main antenna). During 5 subsequent minutes, 80% of the pulses must be recognized and indicated in each one of the five 60 s windows. The variance of the measured distance must not exceed $\pm$10% of the mean distance.

    (b2) Digital receiver setup for direction criterion: Start at the distance evaluated as described above. Turn receiver 45° clockwise from coaxial position and turn it on. Then, turn on transmitter: Direction indications must be within $\pm$30° within 60 s. Turn receiver off. Repeat procedure by turning receiver 45° counter clockwise from coaxial orientation and turn on transmitter: Direction indications must be within $\pm$30° within 60 s.

Reference:

Genswein, Manuel and Schweizer, Jürg; NUMERICAL SIMULATION OF THE SURVIVAL CHANCE OPTIMIZED SEARCH STRIP WIDTH; Proc. International Snow Science Workshop, Whistler B.C. 2008, pg. 891 - 898