

A Systematic Approach to Optimize Avalanche Beacon Design for Minimum Search Time

Rolf Matzner

Ortovox GmbH, RPC Engineering GmbH, Greifenberg, Germany

The time required to search a buried person using an avalanche beacon contributes significantly to the overall rescue time. This paper investigates the technical requirements and psychological demands with respect to minimal search time. The earlier ones define a beacon's technical specification, the latter ones the design of the user interface. The first search phase is mainly characterized by the search strip width defined by receiver sensitivity. Even the time required to get the beacon ready to receive is subject to optimization. Once the first signal is detected, confusion caused by multiple transmitters costs valuable time. Hence a reliable and user-friendly multi-burial detection and signal isolation is crucial. Pin-pointing finally imposes the highest mental workload on the searcher. An intuitive user interface freeing the searcher from the need to compare numbers promises the largest gain here. For multi-burial accidents the influence of these beacon characteristics on search success and search time is discussed. This analysis includes numerical simulation of multi-burial search as well as a qualitative discussion of user interface requirements based on the accident reports and statements of the persons involved. The results may serve as a starting point for the development of a more generalized framework.