

## **Pitfalls in development of avalanche accident risk reduction tools**

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We present a new avalanche accident prevention tool for recreational backcountry users: the 7CF. We evaluated the new tool's effectiveness on hundreds of avalanche accident records in the USA and Canada and found that the new 7CF tool has the equivalent risk reduction (sometimes called "prevention value") to the Avaluator Accident Prevention Card (Haegeli & McCammon, 2006) used in Canada (see Uttl et al., 2008a,b; Uttl et al., 2009a,b,c,d). However, the new tool requires significantly less user knowledge and training and relies only on the easily recognized clues. Thus, in comparison to the Avaluator's Obvious Clues Method (Haegeli & McCammon, 2006), the most significant advantages of the new 7CF tool include the reliability of clue detection and the ease of use. To illustrate, our research demonstrates that even users with no prior avalanche terrain experience are able to correctly recognize the presence and absence of all the 7CF clues with 99.9% accuracy. The 7CF tool is available for any interested users for free and is released under GNU General Public License, meaning that anyone is permitted to copy, change, and distribute the new tool. However, the 7CF tool is subject to some of the same limitations that plague all of the avalanche accident prevention tools developed and evaluated using the avalanche accident records and the risk reduction strategy. We discuss some of these limitations and illustrate them using the 7CF, the Avaluator's Obvious Clues Methods, and other tools.