

SNOW DOUGHNUTS, BEACON CHECKERS, BLAST TRAILERS AND OTHER LOW COST TOOLS FROM THE FIELD

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ABSTRACT

This presentation will describe a variety of tools and programs from a practitioner's toolbox that have been and continue to be developed. In this age of increasing costs and decreasing budgets, it is more important than ever that Avalanche Professionals, responsible for the safety of themselves and others, think outside the box. Sometimes the simplest is the best.

The Snow Doughnut section will describe how the use of a camera can act as a tool to promote and or direct public perception of a particular forecasting or control program and can also be used to teach a large number of people in a short period of time. The Beacon Checker section will describe the use of older beacons to promote worker safety in a very cost effective and user friendly way.

The Blaster Trailer section will describe the use of commercially made explosive rounds (Avalanche Guard) and current technologies to develop a relatively low cost, mobile explosive delivery system. Application is for a highway setting and so this device is towed, however, principle could be adapted for other venues.

The Red is the Edge topic deals with identifying and marking hazard areas along a highway corridor to aid avalanche, maintenance, rescue, or law enforcement workers in directing the public to safe locations during high avalanche activity.

KEYWORDS: Snow Doughnut, Blast Trailer, Safety, Public

1. INTRODUCTION

Plagiarism is defined as: the act of plagiarizing an idea or plot. As an Avalanche Professional working for a public agency, the ultimate goal is not to make a profit necessarily but to achieve a goal as cost effectively as possible. In our case, the goal is to keep our fellow workers and the travelling public safe from the dangers of Avalanches. In today's world of tight purse strings, this goal is becoming increasingly harder to do. Mother Nature has no budget. For all general purposes, winter will come to most parts of world around the same time each year. The purpose of this paper is to pass along some ideas that have been developed within our program in the hope that they may help another program succeed in its own goal of keeping their workers and their public safe from Avalanching.

2. THE SNOW DOUGHNUT

Nowadays, most every Avalanche Professional in the field carries a digital camera of some sort. The camera is used to record unique events, document snow and weather formations or record other interesting phenomena that may be seen throughout the day. These photos can also be used to educate others about Avalanches and the dangers that can come with them.



Figure 1: Snow Doughnut on Washington Pass spring 2007.

For a publicly funded organization such as a D.O.T or Avalanche Center whose job it is to keep the public safe, photos can also be an extremely valuable tool in maintaining and even steering public perception in a positive direction. If the people writing the checks feel that you are including them in your everyday life and have their best interest in mind, they are less likely to question you when you need to stop their progress to the local ski area, tell them they should not be in the backcountry or ask them for money. One of the biggest problems when dealing with the public is that, most of the time, they have no idea what you are trying to accomplish. The more they understand, the easier it is to deal with them.



Figure 2: Perfectly formed Snow Doughnuts are a rare site.

Case in point, while on a routine springtime re-con of a highway that is closed during the winter, Washington Pass (SR20) in Washington State, we came across a perfectly formed snow doughnut. Kin to the Pinwheel but far more rare, the Snow Doughnut soon became an International Star. With the attention pointed directly on our particular program, we found ourselves in the unique position of having a very attentive audience.



Figure 3: Snow Doughnut was used by British Tabloid to compare with soccer star whose last name was Doughnut.

We had the opportunity to spread our message without first trying to get their attention, which in most every attempt to train someone, is the first big hurdle you must overcome. Suddenly we had space in every major newspaper in the state, air time on National Public Radio (www.nrp.org search, (snow doughnuts are the real thing), spots on Good Morning America and the Today Show and even space in the British Tabloids. (Although this had nothing to do with snow).

Most every Avalanche Professional is an Avalanche Educator. A well shot photo can afford them the opportunity to teach a large group of people in a short period of time or to explain there particular program and why it is impacting the public. The photo buys the credibility. It becomes the hook.

The obvious conclusion is to carry a camera and not be afraid to use it, build a relationship with your public relations person and nurture it. Pass as much good information to the public as you can. Information and education saves lives.

3. THE BEACON CHECKER

Diesel fuel is \$5.00 a gallon. The public is buying less fuel because the price is so high. Our budget is mostly made up of taxes collected when the public buys fuel. Bottom line, we're screwed. As a publicly funded agency, D.O.T Avalanche Control Personnel are always looking for cost effective ways to protect workers. Cost is always a consideration and because of ethics laws, donations from private companies are a hard sell.

Equipment operators working on mountain passes in Washington State all wear Avalanche Beacons while working. One of the challenges is to first get these workers to actually wear the beacons. Then the challenge is to make sure that the beacons are working properly.



Figure 4: Total cost of Beacon Checker was around \$5.00.

Workers come and go at all times of the day and night. Last year, we changed out all of our beacons to a digital beacon in an effort to make it easier for them to operate. When we were at the last ISSW. We saw a Beacon checker made by one of the major beacon manufactures costing \$900.00. Others go as high as \$1500.00

We made our checker with a used beacon, set on the lowest receive setting. Velcroed it to a piece of plywood and placed it near the door. A small sign explains "someone out there loves you; do you have your beacon on?"



Figure 5: Workers pass the Beacon Checker as they go out to clear the roadway.

As the worker walks past the beacon, they see and hear the receiving beacon. You can buy a lot of batteries for \$900.00. The only real hard part (not even) was to train the workers to look and listen for the receiving beacon. After a while, interest in beacons and Avalanche safety in general was on the rise. We have the beacon checker installed in three maintenance sheds that maintain two mountain passes affected by 282 slide chutes.

4. THE BLAST TRAILER

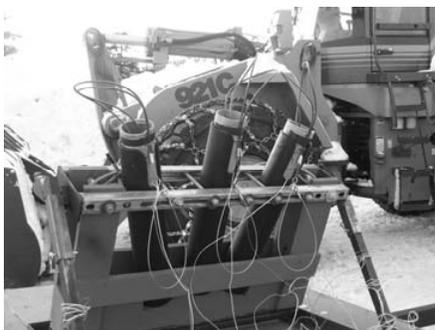


Figure 6: Major cost of Blast Trailer was the spun steel tubes.

We first saw the Avalanche Guard, (then called the Avalanche Blaster) at ISSW 2002 in Penticton. That fall we purchased the demo they had on display at that ISSW. It has worked well for us and is a welcome addition to our program.

We could use several more boxes, but again cost is always a consideration with a DOT. With our penny pinching minds a flying, we developed what we are calling the Blast Trailer. The trailer uses pre-manufactured Guard charges. Total cost to build the trailer has been just over \$500.00. Another commonly used term for a D.O.T Avalanche Professional is Pirate. We are very apt at begging, barrowing and stealing.



Figure 7: Axle and wheels were salvaged from the junk yard and bed was welded in one afternoon.

Because of the proximity to personnel and expensive trucks, spun steel was used for the tubes and the electric squibs are detonated with a 30' length of wire.

The Blast Trailer was built for a particular Avalanche Path that has proven to be a problem child over the last several years. Its location prohibits us from performing effective hand control or hitting the starting zone with our M60A3 Battle Tank from the bottom of the valley.

The ultimate goal will be to mount the guts of the trailer on a tower at this location along the road. (Summer 2009) This will provide a more readily available and reliable platform for launching the Guard charges onto the slope. Shooting all three tubes at once proved a little much for the wood frame so the tower edition will most likely be made of steel and have a few more updates



Figure 8: Large destructive slide at location now controlled with Blast Trailer.



Figure 9: Blast trailer has actually been used in several additional locations other than the one it was built for.



Figure 10: Concept photo of blast tower.

5. RED IS THE EDGE

The problem was one of personnel. They kept changing from year to year. Each winter we would have several new equipment operators working to maintain the highway affected by Avalanches.

A program was developed for these operators, rescue personnel and law enforcement officers to assist them in knowing where on the road they are in danger of being hit by a slide and where the safer locations along the road are, if they had to move the public out of harms way.



Figure 11: Poles are placed on one direction of travel to eliminate confusion

Orange poles were placed at the edges of the area affected by a particular slide path. Between the poles with the red tape on them is the danger location. "Red is the edge, go to Green". When the @\$% is hitting the fan, plow drivers or the state patrol can now tell people to go until they go past a pole with green on it. This program is not for public use. It was thought that this would cause too much confusion and miss-information problems. I-90 Snoqualmie Pass has a similar program with green and red striped poles.

The response to this program on Stevens has been extremely positive. One operator told us, "this is the neatest thing since canned beer; I often wondered how we were supposed to keep the public safe when we didn't even know where the safe areas were"

Slide guides were also developed for the 47 miles of roadway on SR2 over Stevens Pass effected by 282 slide paths that can dump snow on the road. These guides are available at all of the sheds and are handed out to operators before each winter. Smaller versions to be kept in the trucks are coming soon.



Figure 12: Slide guide shows aerial photos of all slide chutes. Area directly under slide path along the highway is colored red giving the operator a visual of where the danger area is in relation to the mile post marker.

6. OTHER TID BITS FROM A D.O.T MAGIC BAG

Some other things that have been working well for us are on Stevens Pass (SR2)



Figure 13: Charges are pre made before going into the field and are hung using nylon cord and chain hooks. All but one of our trams are gravity powered using Detonation Cord to belay the charge into position.

We have had very good results using 1 lb cast primers to ignite 50 lb bags of ANFO hung from our bomb trams. The cone shape and high speed of the primer seem to enable a 90-95 % burn of the ANFO. Also the directional charge when primed from the top produces a substantially larger concussion onto the snow surface.

Hand charges used on cut banks and small chutes consist of 1 gallon plastic jars filled with ANFO and primed with a 1 lb cast booster. This produces a very nice concussion at a low cost. We are able to get 7 jars from one 50 lb bag of ANFO. The small line loop allows the controller to place

charge well up on the slope when controlling from the highway.. (Scottish shot-put)



Figure 14: Seven hand charges can be made from one 50 lb bag of ANFO.

A train of thought that is used by our program at times is what we like to call the "proactive controlling method". The theory is: If there is no available snow to slide, then the danger to the highway worker or the travelling public from Avalanches is greatly reduced. We will, when able to, control our main, big producer chutes before high traffic weekends even if we may not expect to have an Avalanche hit the road. Cleaning out the chutes before a forecasted storm enables us to hold more of the storm snowfall during the daylight hours when the traffic is the greatest. We then will control the chutes during the night when traffic is at its lowest. This process has proven itself many times over the last several winters. Ultimately Mother Nature is in control and we do react to her whims when we have to.

7. CONCLUSIONS

I always tell people that some of my best ideas have come from someone else. The economy may change, budgets may go up or down, but the need to keep people safe from the dangers of Avalanches will always remain as long as people travel into, or through Avalanche Country. Avalanche Professionals need to do whatever they can to continue their important work of Avalanche Safety. We must continue to think outside the box and look to our fellow professionals for ideas that will work in our own program. Our hope is that these ideas will spark a fire in someone else and help them in our common effort.