

FHWA BUY AMERICA WAIVER REQUEST

Technologie Alpine de Securite' (TAS) Vela Avalanche Barrier, Hybrid Structure

WYDOT Project Number: RS09216

Project Title: Design and Performance Evaluation of a Semiflexible Snow Barrier for Avalanche Protection

Date Submitted: _____

Submitted to:

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Project Description:

The equipment to be purchased under this waiver will be utilized by the Wyoming Department of Transportation (WYDOT) for a State Planning and Research Program research project, which is authorized under Title 23 of the United States Code, Chapter 5, Sec. 505. The purpose of the project is to evaluate the performance of the Milepost 151, near Jackson, Wyoming, snow supporting structure (SSS) installation, provide an initial basis for development of design guidelines for future constructed snow defense measures at the Milepost 151 location and other locations within the western United States, and to design parameters and establish domestic guidance documentation. The research project

will assess the performance of Vela avalanche barrier hybrid structures (hereinafter referred to as Vela snow supporting umbrellas (Vela SSU)) at avalanche starting zones, specifically installing several Vela SSUs at the Milepost 151 Avalanche site.

The Vela SSU is manufactured by *Technologie Alpine de Security*' (TAS), a French based company. Vela SSUs are semi flexible snow supporting structure that utilizes an interwoven fabric of steel netting as the snow-supporting surface. The Vela SSU is lighter weight than what had previously been used at the Milepost 151 avalanche starting zone; is adaptable to any terrain condition because of the three-point bearing/connection to the group; minimizes construction costs and disturbance to the site at installation; and minimizes visual impacts to the surrounding landscape because of the limited number of large components (as compared to rigid snow bridges). Additional technical information on the TAS product line and the Vela SSU can be found at: <http://www.tas.fr/en/products/18-produits-avalanches/543-vela-a-en>.

The visual attributes of the Vela SSU are consistent with the USDA Forest Service National Environmental Policy Act (NEPA) requirements. NEPA has specific requirements for SSSs in the Milepost 151 Avalanche starting zone that is situated on Federal land, administered by the USDA Forest Service's Bridger Teton National Forest unit. NEPA requires that the Milepost 151 avalanche starting zone retain its present level of visual quality, even after the deployment of any form of snow supporting structures. This is the principal criteria governing Forest Service permitting for the eventual use of any SSS for avalanche hazard reduction at this site.

The proposed research trial of the Vela SSU arises from the following needs. There is a long history of use of constructed avalanche defense systems across Europe, whereas in the United States the last 50 years of avalanche mitigation has focused on mitigating danger by artificial release of snow avalanches via detonation of hand charges in the starting zone or by impact in the starting zone by projectiles fired by artillery. More recently, WYDOT has embraced the concept of limiting the ability of avalanches to release by retaining the starting zone snowpack in place with snow supporting structures (SSS). This approach is termed "constructed avalanche defense". Strictly speaking, SSS are any type of structural system installed across a potential avalanche-starting zone that has a purpose of holding the snow in place so that release is precluded, and SSS are classified as either rigid, flexible, or semiflexible.

In the last five years, WYDOT has deployed a series of rigid "snow bridges" at the Milepost 151 Avalanche near Jackson, Wyoming (151 Avalanche starting zone) and this system has eliminated the natural large snow slab avalanches that historically reached U.S. Hwy 89/191 at a frequency of once or twice per winter season. WYDOT is now looking at additional alternatives to the rigid snow bridges for this avalanche prone area. At this time, there are no design standards, either European or domestic, which specifically focus on SSUs (semiflexible SSS), and their deterrence of avalanches at starting zones. This research project is set up to allow assessment of Vela SSUs, and determine if they can improve upon the current state-of-the-art in constructed avalanche defense within the U.S.

This research project will assess whether WYDOT would be able to continue to move away from active control of avalanches with explosives during intense storm periods, which in turn will cut down on the man hours needed in monitoring conditions at avalanche sites. The Vela SSU will be procured for an implementation trial and evaluation basis in hopes to use it full time in avalanche areas. It should be noted that even though Vela SSUs have been used domestically in just a few areas, they have not yet been tested for use at avalanche start zones. The research will also develop a generic, broadly applicable, structured process to optimize the choice of avalanche hazard management methods and technology for a given highway application, including an assessment of the state of the art Vela SSU for avalanche control. This transportation-planning tool may also be used in other avalanche prone areas.

Project Cost: \$138,781

Waiver Item: Vela Hybrid Structure – Avalanche Barriers

Waiver Item Cost: \$36,000

Cost is based on an assumed unit cost (materials and fabrication) of \$4500, with a maximum allowance for shipping of \$1500 per unit.

County of Origin, Waiver Item: France.

The SSU can be purchased from MND USA, PO Box 2167, Eagle, Colorado, 81631, 1-724-710-0222, but is manufactured and shipped from France.

Reason for Waiver Request:

The semiflexible unit is only manufactured in France, and as such, WYDOT and the contractor will not be able to purchase the units needed without the waiver. FHWA, in partnership with the National Cooperative Highway Research Program (NCHRP), have set out winter maintenance programs. They are ever seeking safety technology for implementation domestically. Over the previous two decades, WYDOT has pursued implementation trials and evaluations of various European avalanche hazard management technologies to be used at avalanche starting zones. WYDOT has implemented domestic measures and would like to compare these with what is available internationally to ensure WYDOT is using best practices to control active avalanches. A collaborative work process has been initiated with personnel from InterAlpine Engineers and the avalanche hazard management team from the Jackson WYDOT maintenance facility to design a system of SSUs to augment the previously installed rigid snow supporting structure deployment. Only six units (maximum) of the Waiver Item will be procured and subsequently submitted to implementation trial and evaluation in exactly the same vein as noted above. If the outcome of this research were not promising, one would anticipate that no additional Vela SSU units would be procured, from domestic or foreign sources. Conversely, if the outcome of this research is promising, WYDOT may purchase more units in the future.

Efforts made by WYDOT to locate a domestically manufactured product:

Since the Vela SSU is a novel, state of the art SSS identified by WYDOT for research trial and evaluation, there is no other alternative available. Hence, manufactures or suppliers of this specific technology, foreign or domestic, are also not available.

Analysis of re-design of the project using alternate or approved equal domestic product:

As noted above, and because this is a research effort to trial and evaluate this specific, new novel and state of the art technology, there are no alternatives or equivalent domestic products.

Additional background information:

For many decades, the Wyoming Department of Transportation (WYDOT) has managed the danger to motorists traveling on roadways adjacent to known avalanche paths using active defense measures. These measures typically require winter maintenance staff to forecast potential for avalanche activity and when the probability of slides becomes significant, enact road closures and use artillery or explosives to artificially release avalanches. If crews are successful in triggering a slide, snow-moving equipment is brought in to clear the debris before the road is reopened. This approach requires immense personnel resources and carries the inherent risk involved with detonation of artillery/explosives. The alternative to active control is passive, avalanche starting zone constructed defense that operates stand-alone with no need for WYDOT staff during winter, and that virtually eliminates danger to the traveling public in mountainous areas.

Please see the attached proposal for this research project for further details on the research project.