



## **Preliminary measurements and surveys at the Italian avalanche test site Punta Seehore.**

Monica Barbero (1), Fabrizio Barpi (1), Leandro Bornaz (2), Mauro Borri-Brunetto (1), Eloïse Bovet (1), Enrico Bruno (3,4), Elisabetta Ceaglio (3,4), Bernardino Chiaia (1), Valerio De Biagi (1), Daniele Fassin (5), Michele Freppaz (3,4), Barbara Frigo (1), Danilo Godone (3,4), Margherita Maggioni (3,4), Oronzo Pallara (1), Luca Pitet (6), Valerio Segor (6), Franco Torretta (5), Davide Viglietti (3,4), Arnoldo Welf (5), Ermanno Zanini (3,4)

(1) DISTR, Politecnico di Torino, Italy, (2) SIR, Aosta, Italy, (3) Di.Va.P.R.A. Chimica Agraria e pedologia - LNSA, Università di Torino, Italy, (4) NatRisk, Research Centre on Natural Risks in Mountain and Hilly Environments, Università di Torino, Italy, (5) MonterosaSki SpA, Gressoney-La-Trinité, Aosta, Italy, (6) Direzione assetto idrogeologico dei bacini montani, Regione Autonoma Valle d'Aosta, Italy

Within the Operational programme 'Italy - France (Alps - ALCOTRA) 'Project "DynAval - Dynamique des avalanches: départ et interactions écoulement/obstacles" the experimental avalanche test site "P.ta Seehore" is operative within the Monterosa Ski resort in the Aosta Valley (northwestern Italian Alps). The main goal of the project in 2010 was calibrating in laboratory, installing and testing on site the instrumented obstacle previously designed, to measure impact forces of the avalanches, and going on to survey on site the artificially triggered avalanches.

The correct position of the obstacle was determined thanks to the experiments carried out during winter 2009/2010 and the available historical data; therefore in summer 2010 the concrete foundation of the mast was built, above which the instrumented obstacle was installed in autumn 2010.

The galvanized steel obstacle is composed of two masts of about 4 m of height supporting 5 instrumented horizontal plates that measure the impact forces of the avalanches; in particular, the data are registered by 10 loading cells, 4 accelerometers, 4 thermocouples and a pressure transducer. The on-board transducers and data logger are remotely operated via an optical fiber connection with a computer located in a control room located in a safe and comfortable location accessible in all weather conditions. Even if most of the avalanches are artificially triggered (Daisy-bell and Carica Vassale), the system records also natural events. Previously, for the structural identification of the mast, many dynamic and static laboratory tests were performed in order to calibrate FEM numerical models. To evaluate the erosion, deposition and the front velocity, laser scanner measurements and multi-picture analysis are performed. In order to define a benchmark network, three reference points were installed in the site and several natural benchmarks were located and measured on the slope by a GPS-RTK survey, assuring centimetric precision in positioning. To detect physical and mechanical snow properties in the release, track and deposition zones, filed surveys are performed. The perimeter of the avalanche is outlined by using GPS devices coupled with snow depth measurements.

Thanks to the installed instrumentation and surveys performed during Winter 2010/2011, the first available data are presented.