



## **An application of seismic methods for subsoil geological model reconstruction in an unstable slope: the case of Pieve S. Stefano (Arezzo, Italy)**

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More and more often, continuum codes for modelling unstable areas are pretty diffused in modelling slope landslide phenomena. These modelling codes imply deep understanding of subsoil and geometrical and physical-mechanical properties. Very often the good understanding of subsoil geological model is difficult to get. Geognostic classical survey of subsoil, (including boreholes, penetrometric tests) due to monodimensional feature, often does not give sufficient information to obtain a good conception of the observable (like occurrence of sliding surfaces). Is it possible to use more powerful and more effective methodologies? By our experience, we consider correctly applied geophysical methods and overall seismic survey a powerful tool. Unfortunately seismic methods are not very common in problems concerning applied geology. We are going to discuss Pieve Santo Stefano site survey, concerning a schoolhouse on an unstable slope; that slope keep track of ancient instabilities now in slow evolution. The study carried out within VEL (Valutazione Effetti Locali) project by Regione Toscana, was finalized to local seismic hazard response. The geophysical survey was carried out to get dynamic physical-mechanical characteristics of subsoil and a good reconstruction of geological model. In consideration of geological setting of seismic bedrock made up by argillites with marly-limestone levels and on the mud-clay superficial covering, we used P and SH waves seismic refraction method. In addition the use of HR SH waves reflection seismic survey has been employed to highlight bedrock/coverage setting and occurrence of discontinuity related to sliding and/or breaking surfaces. 4 P and SH waves refraction lines (in all 460 m), 3 SH waves seismic reflection lines (in all 286m) and 2 downholes were conducted. 2 boreholes has been used to calibrate the survey results and to integrate data collected for evaluation of pseudo-static and

dynamic stability evaluation by numeric modelling.