Introduction

A landslide is the last stage of a failure process, started some time ago somewhere in the slope, which can be considered fully accomplished only when both edges of an often thin persistent zone of rupture, spreading into the outcrop (typically a shear or a tensile zone depending on material), eventually reach the ground surface. At that time no further reserve of strength is available and conventionally infinite strains can eventually took place within the zone of rupture.

The mechanics of the failure process is always complex, being affected by a number of factors, as the slope geometry, the outcrop lithology and/or structure, the initial conditions (both state of stress and pore pressures), the boundary conditions (or triggering factors, according to a simplified view of the problem), the rate of stress change and the soil properties. With a few exceptions, slope failure is then a progressive process which can follow variable mechanisms and rates revealed by the landslide type that is roughly categorized through classic landslide classifications (see Varnes, 1978, Cruden&Varnes, 1996 or the more recent update by Hungr et al. 2013).

An important feature which still more contributes to landslide classification is the mechanism of post-failure movements, which can be by fall, topple, slide, flow, spread, or by a combination of these styles. Again, different factors contribute to the movement pattern: slope geometry, geological settings, rock and soil properties, failure mechanism, pore pressure regime and potential changes induced by the failure itself or by subsequent movement. It is well known and widely recognized that the post-failure pattern is a key aspect which affects the landslide intensity, thus the hazard and risk and both the procedures to adopt and the resources to provide for risk mitigation.

Therefore, a landslide has always to be viewed as the result of a mechanical process covering the pre-failure, the failure and the post-failure stage (Leroueil et al., 1996), and that mechanism (or pattern) and mechanics of the entire process cannot be separated (Picarelli, 2000). Without a clear view of this close relationship any landslide cannot be completely understood and its potential consequences mitigated. This should be a major aim of investigations, including site surveys, site investigations, laboratory testing, monitoring results, numerical experiments and analyses.

(L. Picarelli, B. Abolmasov, Introduction to A5 Session, WLF3, Beijing 2013)