THE MOSQUE MOUNTAIN ROCKSLIDE, SUSTUT WATERSHED, FORT ST. JAMES, NORTHERN BRITISH COLUMBIA, CANADA

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Abstract

This paper documents a large rockslide, 1,200 m long, 320 m wide, with an estimated thickness of 20 m giving a volume of $5x10^6$ m^3. The landslide occurred in interbedded sandstone, shale, siltstone and conglomerate rocks of the Upper Cretaceous-Paleocene Tango Creek Formation. The rockslide is located on the east slope of the Mosque Mountain ($56^0$27'18"N and $127^0$20'42"W) in the Sustut watershed, northern British Columbia.

The rockslide moved rapidly. The debris traveled about 480 m down slopes ranging from 20^0 to 35^0, made an obvious smooth turn and terminated at a small swamp on the valley floor. The rockslide debris dammed two small streams and buried the swamp.

The Mosque Mountain rockslide has two separate zones: a major lower zone and an upper retrogressive zone. The rockslide in the major lower zone moved rapidly along bedding planes dipping towards northeast at an angle of 20-25^0. After reaching the valley bottom, confinement by the valley sides forced the rockslide debris to turn and travel northward. Subsequent retrogressive movement in the upper zone occurred on slopes ranging from 30-35^0.

1991 air photos show the upper zone covered with loose landslide debris, from an earlier phase of movement, but the lower zone, underlain by intact bedrock, appears stable. The old landslide debris on the upper slope is also visible on 1957 air photos, the earliest available in the area. A small tree covered bench, between the two zones moved slightly rotationally during the recent event. The trees on the bench are still growing but are obviously back tilted. The retrogressive movement of the old landslide debris did not overrun this forested bench. Most of the debris from the retrogressive movement ran over a portion of the main scarp to the northeast.

Several photographs taken from a helicopter in July 2001 show features related to the rockslide event that are comparable to those visible on the conventional air photo imagery. The mechanism of rockslide movement in the lower zone and the subsequent retrogressive movement of the loose colluvial deposits from the upper zone were determined from the comparison of these images and field investigation.

The recent rockslide occurred in interbedded sandstone, siltstone and shale. The old landslide occurred in sandstone and conglomerate with limited weak beds of shale. The clast lithology of the debris shows clear differences: the recent landslide debris consists of mainly sandstone, siltstone and shale, whereas the older debris consists of mainly sandstone and conglomerate. Like some other large rockslide, this rockslide may contain several major blocks formed of a number of smaller blocks. This situation generates uncertainty when estimating the volumes of large landslides.

Increasing pressures are being placed on remote mountainous areas for resource extraction, settlement and recreation. Rockslides, such as the one we describe, pose tremendous threats to recreation and transportation facilities in these areas. Identification of these types of landslide hazards is critical.