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Quantiative risk assessments for landslides in British Columbia

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No Canadian province uses legislated, quantitative risk acceptance criteria for geohazards on which approving officers can base their decisions for urban development permits. In British Columbia, the existing risk acceptance "standards" at both the local and provincial governmental level are disjointed and sometimes meaningless where they fail to define the all-important adjective "safe". The Association of Professional Engineers and Geoscientists of British Columbia (APEGBC) published guidelines on landslide assessments for legislated residential developments in B.C in 2006 and as an updated version in 2008. These guidelines formed an important step in assuring higher quality assessments by qualified professionals. The document specifies that qualitative or quantitative methods may be used to determine the level of landslide risk and compare it to regional policies or, in their absence, to comparable jurisdictions. While this effort is commendable, risk tolerance standards were not included in the guidelines because APEGBC is not mandated to enforce risk acceptance criteria. We compare levels of landslide safety (hazard acceptance criteria) for existing guidelines in B.C. and elsewhere to quantitative measures for a number of hypothetical cases. We argue that provincial risk acceptance standards should be developed as part of a quantitative framework for landslide risk assessments in proposed and existing developments. We propose a 1:10,000 year annual probability of loss of life for an individual most at risk for existing developments and a 1:100,000 year annual probability for proposed developments. Societal risk tolerance thresholds can be defined on a plot showing the cumulative frequency of N or more fatalities (F-N curve). We propose that provincial thresholds for societal risk should follow the interim risk tolerance criteria of the Hong Kong Geotechnical Engineering Office (1998) as recently adopted by the District of North Vancouver and applied within the province of Quebec. These thresholds are consistent with international standards and balance the costs of risk mitigation with the requirement that landslide risks to a development are no larger than other involuntary risks faced by individuals and society.