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# Landslide Risk Management in Australia 2012

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## ABSTRACT

Through its National Committee, the Australian Geomechanics Society recognises the contribution of Landslide Risk Management (LRM) to the well-being of the Australian community. In continuation of this commitment since 1985, in 2011 the Society conducted a “Risky Roadshow” seminar series throughout the nation. The main objective of the seminar series was to provide, and thereby empower, landslide practitioners and regulators with knowledge and tools required to implement best practice LRM. The seminars were particularly targeted toward building capability at the local government and regulator level. A suite of educational resources and tools based on AGS (2007) was developed and then presented.

The seminars build upon the highly successful, and both nationally and internationally recognised, AGS Landslide Risk Management guidelines and commentaries published in 2000 and 2007. It has been appropriate to build upon the guideline outcomes to the benefit of the Australian community. Further, an interactive website is being developed as a legacy of the seminar series and through that to provide education empowerment in LRM.

The paper briefly explains previous activities that have led to the current status of LRM throughout the nation and provides an overview of the current activities nationally.

*Keywords:* landslide risk management, LRM, Australia, national, status 2012

## 1 INTRODUCTION

Since 1985, the Australian Geomechanics Society (AGS) has developed technical papers and guidelines for the management of landslide risk associated with hillside development. The latest activities have been associated with a nationwide roadshow in 2011 and the current development of an interactive website for empowerment by practitioners, regulators and the general public in landslide risk management matters.

## 2 HOW DID WE GET TO WHERE WE ARE?

Briefly, the steps along the way in the development of a meaningful landslide risk management (LRM) framework for the nation have been:

- 1985 (Walker et al), as an AGS Sub-committee, developed a technical paper on hillside construction in Sydney (over a matter of several months). This has subsequently been recognised as likely to be the first international use of the term “risk” in association with hillside development.
- 1993 sub-committee re-convened to review and update the 1985 paper, and did so as per the conventional AGS approach as volunteers.
- 1997 – Thredbo Landslide occurred on 30 July with 18 fatalities and brought to the attention of the Australian general public the issues and challenges associated with landslides.
- 2000 – AGS (2000) published (following a 7-year gestation from 1993).
- 2000 – hardcopy of AGS (2000) distributed to each LGA and selected State, Territory and Commonwealth departments throughout Australia.
- 2000 - Coroner Hand determined his inquiry into the Thredbo landslide. Amongst many recommendations, Coroner Hand strongly recommended the adoption of AGS (2000) by regulators involved in regulation of hillside construction.
- 2002 – nationwide “Risky Roadshow” to promulgate AGS (2000) to practitioners and regulators.
- 2004 – non-compulsory LRM Guideline developed as a reference document to the Building Code of Australia (BCA).

- 2005 – International Conference on LRM held in Vancouver (ref: Leventhal & Walker, 2005), followed by distribution to the membership of AGS of modified conference paper (Leventhal & Walker, 2005a) explaining the status of LRM framework at that time and the strategies adopted for implementation of the principles of AGS (2000) into legislative framework.
- 2005 – Landslide Taskforce convened, leading to development of AGS (2007) suite.
- 2005-2006 – development of proposed NPER (LRM) guideline with details provided to membership of AGS, published in *Australian Geomechanics* (AGS, 2006) and forwarded by AGS National Committee to the National Engineering Registration Board (NERB) for implementation in government areas where practitioners are required by legislation to demonstrate competence – unfortunately, still waiting for this outcome to be realised.
- 2006 – international workshop on LRM held in Barcelona (by invitation) where Australia represented and contributed to workshop through its leadership in LRM issues. Led to international versions of AGS (2007a & b) published by JTC-1 in 2008.
- 2007 – AGS (2007) published as a suite of guidelines that provide an update of AGS (2000) in recognition of shortcoming therein and improvements in international risk management.
- 2007 – CDROM copy of the suite of AGS (2007) distributed to each LGA and selected state and commonwealth government departments throughout Australia.
- 2007 – landslide susceptibility issues addressed by revision of Pittwater LGA landslide policy within its building development protocols.
- 2007 – Geoscience Australia published “Natural Hazards in Australia”, with Chapter 8 dealing with landslide risk management with major contribution from AGS.
- 2007 – Hong Kong Landslide Disaster Management workshop on landslide disaster management where Australia represented and contributed to workshop through its leadership in LRM issues.
- 2008 – international guideline and commentary for LRM in landuse planning published in international technical press (Fell et al, 2008 & 2008a). These were both significantly based upon AGS (2007a & 2007b).
- 2010-2011 – contribution to, and on-going discussions with, Tasmanian Government in regard to provisions in State regional planning schemes for LRM.
- 2011 – Risky Roadshow 2011 to promulgate AGS (2007) to both regulators and practitioners presented by AGS nationwide. Success of the Risky Roadshow 2011 across the nation demonstrated through 479 registrations and request to deliver seminar in Townsville.
- 2011 & 2012 – on-going discussions with Queensland Department of Community Safety in regard to their updating of State Planning Policy 1/03, “mitigating the adverse impacts of flood, bushfire and landslide”, whilst particularly noting that Queensland is the only state government that has legislation that addresses LRM issues within its natural hazard management process.
- 2011 & 2012 – development of LRM Education Empowerment website (current activity, target mid-2012) to empower regulators, practitioners and the general public.

The tools that we have at hand as of today include:

- (i) AGS (2007a & 2007b) – landslide zoning and commentary;
- (ii) AGS (2007c & 2007d) – practice note and commentary; and
- (iii) AGS (2007e) – Australian GeoGuides

Through AGS (2007) we have a process for Landslide Risk Management which steps through:

- Risk analysis;
- Risk estimation;
- Risk assessment; and
- Risk management.

### 3 LRM PROJECT STATUS

The status of the Landslide Risk Management activities is:

- The nation-wide seminar series (Risky Roadshow 2011) was successfully conducted. It was a stand-alone activity solely under AGS control.
- The interactive Education Empowerment website development task is in progress. It has funded assistance under the National Disaster Mitigation Program (NDMP) with the outcomes of the Roadshow 2011 provided *gratis* to the project by AGS.
- The Queensland Department of Community Safety has requested AGS contribute to review of their natural hazards (bushfire, flood and landslide) State Planning Policy through the SPP 1/03 Review Landslide Advisory Group. This task may now be an issue undertaken with the Queensland Reconstruction Authority.

### 3.1 Nation-wide seminar series (Risky Roadshow 2011)

The seminar series was conducted in five tranches:

Melbourne – Tuesday, 08 March, 2011;  
Hobart – Thursday, 10 March, 2011;  
Adelaide – Tuesday, 05 April, 2011;  
Perth – Thursday, 07 April, 2011;  
Wollongong – Tuesday, 10 May, 2011;  
Sydney – Wednesday, 11 May, 2011;  
Brisbane – Tuesday, 31 June, 2011;  
Newcastle – Wednesday, 01 June, 2011;  
Townsville – Monday, 20 June 2011.

The initial planning was for four tranches to be conducted – Melbourne / Hobart; Adelaide / Perth, Wollongong / Sydney; Brisbane / Newcastle. At the request of Townsville Council and local practitioners, an additional tranche at Townsville was conducted.

Each seminar occupied a full day, with the morning session focused on regulator requirements and the afternoon session focused on practitioner needs. National level organisation was the responsibility of the sub-committee, with local organisation for each venue the responsibility of Chapter points-of-contact. The support of the local organisers is recognised with thanks.

The national roadshow received strong response from practitioners, and variable response from regulators. There were 479 registrations throughout the nation. Feedback forms were distributed at each venue to gauge audience response and to improve the presentations. The presentations benefited from this feedback and were progressively modified throughout the program. On average, about 43% of registrants provided feedback. It is fair to say that the feedback was very positive as to the quality and relevance of the presentations.

The seminars were presented by Bruce Walker and Tony Miner, with support of those activities provided by Tony Phillips, John Carter and Andrew Leventhal.



The poster features the Australian Geomechanics Society logo at the top left and the Sydney Coastal Councils Group logo at the top right. The main title is "Landslide Risk Management Roadshow 2011 National Seminar Series". Below the title, the dates and locations for each tranche are listed: Melbourne, 08 March; Hobart, 10 March; Adelaide, 05 April; Perth, 07 April; Wollongong, 10 May; Sydney, 11 May; Brisbane, 31 May; Newcastle, 01 June; and Townsville, 20 June. The sessions are: 9:00am – 12:35pm Session 1: Landslide Zoning and Planning; 1:30pm – 5:00pm Session 2: Landslide Risk Analysis and Evaluation. Gold sponsor (Sydney venue): GHD GHD GEOTECHNICS; Platinum sponsor (Roadshow): coffey geotechnics SPECIALISTS MANAGING THE EARTH.



Figure 1: Presenter Tony Miner (right) with Peter Tobin, and Bruce Walker at the Wollongong seminar.

### 3.2 Case Histories

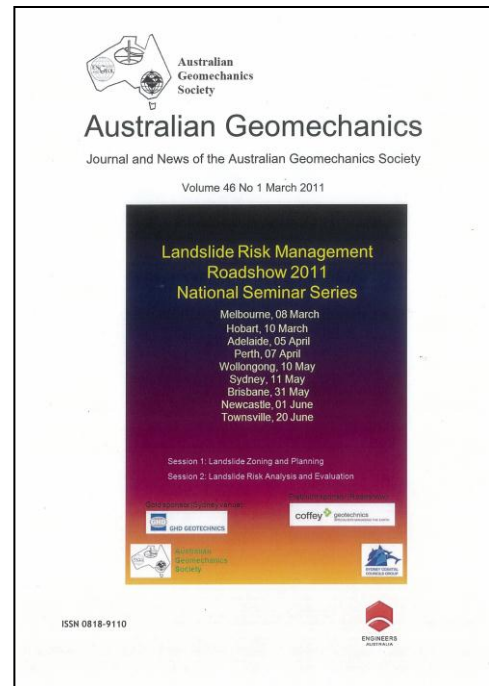
Case histories are an important facet of the seminar series and interactive website. The case-histories were published within Australian Geomechanics V46N2 June 2011, as a stand-alone volume recording the use of AGS (2007) in landslide risk management throughout the nation. The case histories were subject to review by the members of the Sub-committee.

Selected case histories were variably presented within the seminars, usually with local relevance, and the case histories will be linked from the interactive website.

### 3.3 Education Empowerment Interactive Website

An interactive web-based site is being developed to provide LRM education empowerment facilities, particularly based upon Australian experience. The website will provide ready access to the facility for practitioners, regulators and the Australian public, as well as accommodating international interest.

Visitors to the site will be introduced to LRM. The outcomes from the national Roadshow seminars, including the final presentation material and a full copy of the presentations by the speakers (as recorded at the Sydney seminar), will be modified for suitability for this task.



At the time of writing (Dec 2011):

- The outline of the structure for the framework for the EE Website has been developed.
- The web site mechanics and the 3 web site access points i) regulators, ii) practitioners, and iii) public) are being developed.
- Top 10 education elements for each of the above streams has been scoped.
- Web site page information and question templates have been scoped for consultation.
- Additional information, images and graphics are being sourced for web site production.
- Prof John Carter has provided advice on best education approaches and the process for online capacity building.
- The format and conceptual layout has been approved by the SCCG, our sponsor for the NDMP funding of this project.

Upon development of the website material, the site will be hosted through the AGS website. This will also afford AGS the opportunity to obtain leverage from the website, and to update and modify the site as it sees fit in the future.

By the time of the ANZ 2012 conference, it is anticipated that the LRM education empowerment website will be operational.

### 3.4 Queensland Government

The Department of Community Safety of the Queensland Government has approached AGS to contribute to the review of their State Planning Policy addressing natural hazards (bushfire, flood and landslide). [It is noted that Queensland is currently the only state with a policy that addresses landslide management (Qld Govt, 2003).] The DCS was establishing a SPP 1/03 Review Landslide Advisory Group, and sought the involvement of AGS in this review.

### 3.5 Other Governments within Australia

The authors are aware of the Local Government Areas and Regulators listed in Table 1 and Table 2 that have adopted LRM (with reference to AGS 2000 or AGS 2007) within natural hazard management policies. It is noted that the interest raised by the LRM Roadshow 2011 offers an opportunity for recognition of the LRM processes [as embedded within AGS (2007)] for incorporation within legislation throughout the nation. The intent of this would be to simplify procedures - through adoption of one protocol nation-wide, rather than a protocol per local government area. This is a potential opportunity for AGS to provide benefit to the broader Australian society, in line with the AGS constitution.

Table 1: Summary of NSW Regulators' policies in relation to landslide risk management and geotechnical issues as an example of the type of policies in place (as of 2011).

Regulator	Policy Title	Date	Comment
<b>A: LANDSLIDE RISK MANAGEMENT</b>			
NSW Department Infrastructure, Planning & Natural Resources	Kosciusko Alpine Resorts Geotechnical Policy	Undated	The first policy was based on AGS2000. First published in about mid-2003 and after advice from/consultation with GHD-Longmac.
Pittwater Council	Geotechnical Risk Management Policy 2009	2009	First adopted as an 'Interim Policy' in June 2003, with amended versions since then. Based on Kosciusko but with refinements.
Wollongong City Council	Wollongong City Geotechnical Control Plan	12 July 2006	Similar to Pittwater, but with 'local' variations. Supersedes an earlier version from 1990s or earlier as based on Warringah Shire concept.
Gosford City Council	Gosford city Council Development Control Plan No 163 – 'Geotechnical Requirements for Development Applications'	29 February 2003	Prescriptive for report content.
Warringah Shire Council	Draft Local Environment Plan	2009	Draft LEP includes a 'landslide risk map' prepared by Coffey 2006 based on slope angle, and a Geotechnical report addressing LRM to AGS2000 is required for some zones.
Manly Council	Development Control Plan for Landslip and Subsidence 2001	Issued 2001, updated March 2003	Based on AGS2000 and zoning maps prepared by Coffey Geosciences in 1999, using slope angle predominantly.
Baulkham Hills Shire Council	Not sure if a formal policy in general		There is a policy for getting an independent peer review appointed by Council from a panel of peer reviewers for areas of known 'landslide hazard' usually being areas identified by a development suitability zoning study completed in late 1970s.
Wingecarribee Shire (Bowral area)	DCP44 – Requirements for the erection of buildings	Draft 2006, Final/adopted?	Requires 'Geotechnical Risk Assessment' report by suitably qualified consultant. Lists information to be provided. 'Risk' basis not defined.
Ryde City Council	Not sure		Not sure how extensive but is based on zoning maps prepared by Coffey.
Lake Macquarie Shire Council	Not sure		Not sure how extensive but is based on zoning maps prepared by Coffey.
RTA (now Roads & Marine Services)	Guide to Slope Risk Analysis Version 3.1	NSW 2001	RTA system is based on AGS2000 but tailored to suit roads, using a qualitative assessment scheme based on quantitative evaluation of terminology. Primarily considers risk to life, but risk to property also covered.
RailCorp	Geotechnical Risk Assessment and Hazard Management Guidelines TMC401, Version 1.1	Issued December 2009	Qualitative 'ranking' system, appears based on AGS2000, but tailored to suit rail, and primarily based on risk to life.
<b>B: GEOTECHNICAL ISSUES</b>			
Woollahra Municipal Council	Guidelines for preparation of Geotechnical and Hydrogeological Reports	Adopted 9 September 2002	Aimed at issues associated with: development in the alluvial areas with high groundwater levels; temporary excavation support; and effect of vibrations such as from rock excavation.
Ku-ring-gai Council		About 2007	Similar to Woollahra Council.
Mosman Municipal Council	Significant Rock Faces and Retaining Walls Policy	3 April 2007	Limited as per title.
North Sydney Council	Unsure whether formalised		
Clarence River/Maclean Shire Council			Council has considered adopting policy similar to Pittwater.

Table 2: State based LRM regulator policies

State	Regulator	Scheme
Queensland	State Government through Department of Community Safety	Queensland remains the only state in Australia with a state-wide policy for LRM.
	Gold Coast City Council, Townsville, Cairns McKay, Ipswich, Sunshine Coast Regional Council	Constraints Codes and Overlays
South Australia	Goyder Regional Council, Peterborough	No formal planning instrument, though identified under natural hazards risk assessment
Tasmania	West Tamar, City of Launceston, City of Hobart, Sullivans Cove, Glenorchy, Kentish, Municipality of George Town	Some provision within Planning Schemes (but variable)
Victoria	Yarra Ranges, Colac Otway Shire, Mornington, Alpine resorts, Baw Baw, Bass, Sth Gippsland, Murrindindi, Bayside, Frankston, Cardinia, Moreland	Erosion Management Overlay
Western Australia	Stirling	Reference made within planning scheme

#### 4 CONCLUSIONS

The success of the 2011 AGS nation-wide LRM Roadshow highlights the interest and relevance to the general community, regulators and practitioners alike. Significant gains have been made, but on-going work and development, including increased public awareness, on-going training and education, together with consistent planning policy across the nation, is still needed.

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