Coastal safety and risk management – an imperative for Queensland

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Abstract

The 13,347km (Geoscience Australia 2008) coastline of Queensland (6,374km related to islands) and the 714 accessible beaches that receive an estimated 30 million visitations each year, while an attraction for living and visiting, have inherent and largely unpredictable risk.

Surf life saving is well known for its extensive volunteer lifesaving network, Australian Lifeguard Service and support services such as rescue helicopters and jet rescue boats. However, it has only been in recent years where Surf Life Saving Queensland has received recognition for its extensive coastal safety and risk assessment services for the whole coast and not just beaches.

Drowning prevention on the coast is best addressed through the adoption of hazard risk management techniques, actions and mitigants. The coastal safety and risk assessment techniques developed by Surf Life Saving, and which use a range of hazard, population and other data inputs to underpin risk analysis and evaluation are now being rolled out across Queensland.

For more than 10 years Surf Life Saving has developed and integrated a number of programs, resources, experts, best practices and guidelines to create a holistic coastal safety solution. The core components include the Australian Beach Safety and Management Program – ABSAMP, the Australian Coastal Public Safety Guidelines, coastal public safety risk assessments, a coastal risk assessor training program, a Lifesaving Service Level Calculator and the Incident Reporting Database. Where appropriate, these components are underpinned by relevant Australian and international standards such as signage and risk management.

Surf Life Saving Queensland has also expanded its coastal safety capability through a relationship with Coastalwatch that has seen the analysis of beach and water conditions and usage using real time information input into lifesaving operations to assist with planning, readiness and response.

This presentation will outline the Surf Life Saving coastal safety and risk assessment methodology and the associated benefits to all levels of government, coastal management agencies, private developers and tourism operators in the reduction of the risk of injury or death, and in the protection of Australia's coastal lifestyle and the significant economic value this brings to our nation.

Introduction

The 13,347km coastline of Queensland, 6,374km of which is related to islands (Geoscience Australia 2008), and the 714 accessible beaches that receive an estimated 30 million visitations each year, while an attraction for living and visiting, have inherent and largely unpredictable risk.

Surf life saving is well known for its extensive volunteer lifesaving network, Australian Lifeguard Service and support services such as rescue helicopters and jet rescue boats. For example over the past 100 years Surf Life Saving Australia (SLSA) has saved over 530,000

lives at Australia's beaches and continues to rescue more than 11,000 people every year (SLSA 2007).

Tragically, each year more than 80 (National Coastal Safety Report 2007) lives are lost and many hundreds of people suffer injuries – from minor incidents to serious trauma and permanent disability in accidents relating to our coast. Of the 11,748 beaches now identified by the Australian Beach Safety and Management Program (ABSAMP), only approximately 3.4% have a lifesaving service provided by the lifesaving clubs affiliated with SLSA and patrolled by lifeguard services provided by SLSA and local governments across Australia.

However, it has only been in recent years where Surf Life Saving Queensland (SLSQ) has received recognition for its extensive coastal safety and risk assessment services for the whole coast and not just patrolled beaches.

Background

Traditionally, coastal management has been primarily concerned with hazards that impact property, structures and the coastal environment. The impact of beach hazards on public safety has long been ignored in coastal management policy.

In the mid 1990s SLSA adopted the principles of risk management and created an aquatic safety and risk assessment tool which at the time was largely based on safety signage, further developed in response to a major incident in Victoria in January 1998 which resulted in the drowning death of four children. The risk assessments were adopted in a random manner, in particular by those coastal managers who were leaders in their field or by those responsible for the coast and who were under pressure from increasing insurance premiums and needed to do something.

Over the past few years it has become good practice for responsible coastal managers to conduct public risk assessments to assist them to determine what measures (not just signs) are required to mitigate and manage risks associated with the coastal areas for which they are responsible. However, until recently in Australia, and most parts of the world, there has been no recognised best practice, guidelines or standard for coastal public safety risk assessments, resulting in inconsistent control measures being implemented across Australia.

SLSA identified the need for a robust risk management based process for assessing and addressing risk along Australia's coastline and has been progressively introducing the coastal public risk assessment process across Australia.

Methods

SLSA together with the State Life Saving centres has been providing coastal public safety risk management services to land managers for a number of years. The actual risk assessment process, that is consistent with the framework of the Australian Standard AS 4360, has traditionally involved the on site collection of data and images, recording this information in writing on paper forms and then transcribing this information into a format that can then be used in the production of the risk assessment report for analysis.

The coastal public safety risk assessment applies spatial data, the ABSAMP beach classification system and beach hazard rating, residential and tourist populations, beach usage and activity, plus records and results from an extensive on-site assessment of the coastal zone. The result is a detailed report that provides:

- Identification of coastal hazards e.g. sub-surface reefs, channels and rips, tidal impacts

- An assessment of the risk that the identified coastal hazards pose to public safety
- Risk mitigation strategies and remedies for identified threats to public safety
- Assessment of safety signage requirements relating to warnings, regulations and lifesaving services according to identified hazards
- Recommendations on the necessary lifesaving services including personnel, training, coverage, communications and rescue equipment and emergency back-up.

  SLSA together with SLSQ has also developed and tested the Lifesaving Service Level Calculator, designed to assist in the determining of personnel and equipment requirements for lifeguard operations. This calculator uses a number of inputs in the determination of service levels, for example:
  - Beach hazard rating
  - Peak visitation
  - Peak visitation frequency
  - Type of user
  - Incident History
  - Remoteness

- Benchmarking against Australian and international standards and best practice guides such as the Australian Coastal Public Safety Guidelines
- Other risk treatments and controls

ABSAMP is the most comprehensive study ever undertaken on the beaches of any part of the world's coast. Detailed information on more than 11, 700 beaches in Australia has been amassed. The main aim of the program is *"to have a comprehensive, standardised and scientific information base on all Australian beaches with regard to their location, physical characteristics, access, facilities, usage, rescues, physical and biological hazards, and level of public risk under various wave, tide and weather conditions that will enable an expansion and improvement in the management and safety services of all Australian beaches"*.

Data on each beach has been acquired from a range of interrelated sources including topographic maps and aerial photographs, aerial and ground site inspections, beach conditions and morphology, and other published data. This data now resides in a SQL database with web based graphical user interface and supported by a range of systems to ensure the data remains relevant, up to date and accessible by users who have interest in coastal science and safety.

In late 2007, and following an extensive two year research project, SLSA released a consultation version (1st edition) of the Australian Coastal Public Safety Guidelines. The Guidelines have been designed as a comprehensive guide encompassing the knowledge from a range of guides, regulations and standards from across Australia around the world to assist coast and beach managers and operators in providing a safe aquatic based coastal environment for all users.

Recently Surf Life Saving Australia completed a pilot with two information technology partners which has seen the development of technology based tools and systems to assist in the collection, collation and analysis of hazard, population and risk related data.

The hardware, which was provided by Tough Corp, NSW included the *Ricoh 500SE GPS-ready Digital Camera,* a ruggedized camera that geo-codes photos automatically, so that they are ready for use in a Geographical Information System (GIS), and the *Getac E100 Tablet PC*, a ruggedized touch screen tablet computer with built in Global Positioning System (GPS).

The software used was *Topo Pro for Australia*, which was provided by Rapid Map, Victoria. The software is user friendly allowing the central creation and manipulation of forms and reports/tables. The system allows all changes to be synchronised to multiple clients in the field. The system is backed by a Microsoft SQL Server with reporting services capability.

The pilot, which was conducted in collaboration of Surf Life Saving New Zealand, has provided identifiable efficiency benefits as well as providing data outputs in a form that can be imported to client based GIS systems such as ARCGIS.

In 2008 the Queensland Sate Government announced a $1 million Smart State Innovation Projects Fund grant for CoastalCOMs– a Gold Coast firm developing technology that will help improve beach safety. CoastalCOMS would partner with Coastalwatch, Griffith University, Surf Life Saving Queensland and Surf Life Saving Australia to develop the technology for the project, CoastSAFE Alive.

Utilizing shore mounted video camera networks we provide comprehensive real-time and predictive coastal information including:

- Observed Wave Height
- Surf Quality and Dynamics
- Wind and Weather
- Beach State
- Beach Usage / Boat Usage
- Shoreline Positioning

CoastalCOMS monitoring and data services are specifically designed to meet the needs of:

- Federal State Authorities / Planning Commissions
- Coastal Cities and Councils
- Surf Life Saving and Lifeguards
- Harbor Authorities and Port Districts
- Coastal Management Professionals/ Coastal Engineers
- Tourism Bureaus

Results

To date across Australia SLSA has completed in excess of 200 risk assessments, with notable activity in Queensland including the islands managed by Voyages, and North Stradbroke Island.

Currently surf lifesaving collects all incidents and injuries from its operations across Australia in its Incident Reporting Database. It is now investigating systems to map this incident data with risk mitigation strategies to identify correlation between risk, risk treatments, beach types and hazards, and populations.

Extensive monitoring systems are being progressively introduced or enhanced to track the trends in beach attendances, injury rates and rescues and related services provided by lifesaving services.

Conclusions

Drowning prevention on the coast is best addressed through the adoption of risk management techniques, actions and mitigants resulting in safety solutions to all levels of government, coastal management agencies, private developers and tourism operators.

Risk assessment techniques that use a range of hazard and population data inputs to underpin risk analysis and evaluation are vital to addressing public safety treatments at beaches and along the coast.

SLSA has determined that the only way we can truly make a difference in coastal safety and risk management is to take a holistic view underpinned by risk management principles, an evidence based approach, developing and referencing guidelines and standards and the introduction of intelligent information systems.

Surf Life Saving Queensland is a member of the SLSA Australian CoastSafe group developing and delivering a range of coastal public safety risk management services and safety solutions to coastal land managers, the outputs of which are a comprehensive assessment and identification of the risks to public safety and detailed recommendations on how to manage those risks.

SLSQ is firmly focussed on the saving of life and reduction of injury along the entire coastline of Queensland through use of an integrated risk management approach, and through cooperation and collaboration.

Take Home Messages

1. A risk management approach to coastal public safety is vital in improving safety and reducing the incident of injury and death on the coast.

2. Drowning prevention on the coast is best addressed through the adoption of risk management techniques, actions and mitigants resulting in safety solutions to all levels of government, coastal management agencies, private developers and tourism operators.

3. The coastal public safety risk assessment, that includes a broad range of data inputs underpinning the identification, analysis and evaluation of coastal risk, is an ideal tool to address public safety risk treatments and controls at beaches and along the entire coastline in an effective and efficient manner.

4. The use of emerging technologies is facilitating the efficient collection and reporting of data in a format that will integrate to a range of client management systems. This will enable risk treatment options to be actioned according to risk priority and resource availability.

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