

# A Practical Model for Managing Beach Safety Focusing on Tourist Drownings in Koh Samui, Thailand

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**Abstract**—This paper aims to investigate management of beach safety with a focus on tourist drownings in Samui. The data collected in this investigation will then lead to the proposal of a practical management model suitable for use in Samui. Qualitative research was conducted in the following manner: nine stakeholders from local government organizations and tourism businesses were interviewed in-depth. Additionally, a best practice case study from Phuket was applied to analyze beach safety. Twelve foreign tourists were also interviewed. Then, a focus group comprised of 32 people was used to determine practical solutions for enhancing tourists' safety on the beach in Samui. A steering committee to coordinate between public and private organizations was proposed to manage and enhance tourists' safety. A practical model is proposed to increase the safety level of tourists in Samui

**Keywords**—Beach safety, drowning, tourists, Samui.

## I. INTRODUCTION

**D**ROWING is a concern in many countries around the world, and the number of tourist deaths from accidental drowning around the world has noticeably increased. The World Health Organization (WHO) reported that the estimated number of drownings around the world is 372,000 people every year, which comes to approximately 42 drowning deaths every hour of every day [10]. Additionally, it has been reported that drowning deaths have increased by approximately 39–50% in Australia, Finland, and the USA. Risk factors are age, gender, and alcohol use in adolescents and adults. Some 91% of documented fatal drownings occur in low and middle-income countries around the world. Southeast Asia is ranked No. 2, followed by the African continent. The World Life Expectancy Organization revealed that Thailand is ranked No. 41, with a drowning death rate per 100,000 persons (age standardized) of 6.88 putting the country in the red/serious area. In comparison, the death rate of Malaysia is 34.3, 2 times less than Thailand, while, Singapore is only 4.8 and the lowest among ASEAN countries [15]. As a consequence, every tourist destination has tried to figure out various solutions to improve the safety level for tourists.

Safety is a priority for tourists in making travel decisions. It is found that perception and risk attitude affect 24% of

tourists' decisions. If tourists experience safety issues in a destination, this will result in a negative attitude [14]. Furthermore, fatal and non-fatal drownings negatively affect tourist destinations within the global mass media, especially in social networks [14]. If no serious measures are taken to protect tourists from drowning, tourism in Samui may suffer.

The island of Samui is a popular tourist destination in Thailand that is located in Suratthani, the southern part of Thailand. Chaweng and Lamai beaches are popular destinations with beautiful long, white sandy beaches. Foreign tourist numbers have increased at these beaches, and the drowning rates are rising. Chaweng police station [5] reported five tourist drowning cases in 2014. Most of them involved males and occurred in the month of March. The number of tourist drownings has since reached 10 cases, and most of the fatal-drownings have been male. The incidents frequently happened during the tourist season between January and April and in December. Two additional cases occurred in January 2016.

There are various preventative measures that can be implemented: education, public relations, signage, rescue equipment, first aid, lifeguards, as well as safety management programs from previous studies [1], [4], [6], [9]–[11]. However, solutions should be tailored to Samui's context and current situation. Therefore, it is necessary to analyze the beach safety management situation, leading us to propose a suitable model and measures to enhance tourists' confidence in the beach safety on the paradise island of Samui.

## II. RESEARCH OBJECTIVES

1. To study the situation of beach safety management on Samui Island.
2. To investigate tourists' attitudes toward beach safety management on Samui Island.
3. To propose a practical model to enhance beach safety levels.

## III. LITERATURE REVIEWS

### A. Causes of Tourist Drownings

Previous studies have shown that there are many reasons for tourist drownings. The risk factors are similar around the world. WHO revealed that swimming ability, drowning awareness, protection measures, supervision, and water knowledge are the main factors [10]. Similarly, [6] concluded that tourist drowning is caused by many factors, such as beach

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familiarity, swimming skills, communication, and local destination knowledge. A paper [1], studied Australian tourists and found that beach tourists who ignored warning signs and red flags and did not swim in the swimming zone were from other areas and foreigners. In contrast, local tourists followed the rules and regulations on the beaches. Additionally, tourists from other areas and abroad cannot detect rip currents as well as the locals. Additionally, from this paper it is also found that the choice of swimming zone depended on the age, gender, and swimming ability of the tourists. Tourists aged 20 years to 39 years tended to swim in bigger waves three times more often than those aged 60 and above. In addition, the Life Saving Association of Sri Lanka [9] reported that the main reasons for tourist drownings are a lack of beach guards, beach safety issues, poor swimming ability, lack of area familiarity, consumption of alcohol, lack of advertising, and tourism activities. Furthermore, the Royal Life Saving in Australia [13] indicated that drowning factors consist of two issues: identification risks and management risks. The identification risks consist of three parts. Firstly, the physical aspects include waves, currents, rip currents, water depth, warning signage, safety signals, etc. Secondly, the human factors are composed of behavioral risks, alcohol consumption, and calling for help. Lastly, the process issues include equipment, activities, etc., while management risks include planning for emergency cases, inspection and control of areas, monitoring sea conditions, and reporting cases. In Brazil, there was a clear correlation between the drowning accident and the knowledge level of tourists about the natural environments [2]. Rip current is the main factor of drowning accidents. It is also found that number of tourists on beaches also impacted the occurrence of drownings, as tourists tended to move to outside safety zone if they considered the beach to be crowded.

In the case of Thailand, drownings are caused by various issues and are similar to other places, for example, a tourist's lack of safety awareness, ignoring warnings and alcohol consumption. Additional factors include a tourist's lack of knowledge with regard to the beach's geographic properties, drowning prevention methods, no assistance available for drowning victims, and a lack of communication. Finally, management conditions, including adequate equipment, staff, reliable safeguards, and advertising are still the main causes of drownings in Thailand [4].

#### *B. Tourist Drowning Protection Measures and Management*

Many papers from different fields have revealed various methods to increase beach safety levels. Effective solutions are dependent upon the context of each area, with different areas requiring different measures. Marine safety measures in Singapore focused on laws and regulations, beach safety education, supervision by stakeholders, and environmental design changes [12]. Additionally, 12 measures are proposed to enhance the level of tourist safety on beaches that focused on service and cooperation between governments and private organizations [6]. There were 12 strategies to expand service areas and time: integrated and coordinated services, camera safety surveillance, the Westpac lifesaver helicopter rescue

service patrols, jet rescue boat patrols, rescue water craft patrols, personalized customer service, centralized communication, innovation, and the development of better lifesavers. Furthermore, in another paper it is concluded that tourist drownings are separated into three stages: pre-event, event, and post-event [8]. The pre-event stage involves protection, including education, publications and public relations, beach guards, and warning signs. Safety equipment, swimming ability, and beach regulations related to alcohol consumption, are included in the event stage. Finally, post-event is related to tourists' registering at their embassies, analyzing beach conditions, life insurance, and knowledge prior to travelling, etc. However, each stage is vague, and some issues should be included or addressed in other stages. For example, the pre-event stage should include education and advertising for tourists prior to travelling and their visit to the beach, while the event stage should look at preparations on the beach, including beach guards, equipment and other facilities, analysis of the swimming area, and the posting of warning signs. The post-event should start with helping those who are in danger of drowning, treating the patients, and coordinating stakeholders until the patients can safely return home. The Royal Life Saving in Australia issued eight strategies to cover beach safety: the provision of safe coastal environments, coastal safety signs, general operations of beaches, lifesaving services, lifesaving equipment and facilities, emergency management, storage and handling of dangerous goods, and coastal tourism safety [13]. Reference [3] studied related papers and found that drowning rates noticeably decrease by 80 % through advertising in various media, education on beach safety, and analysis of rip currents. Creation of swimming zones is a measure to reduce and protect swimmers from drowning [7]. Lastly, introducing and restricting warnings, warning signs, and having a main organization taking full responsibility for beach safety are recommended. Similarly, [11] suggested that public organizations should clearly set measures to protect and assist victims, and tourists should know the conditions of the beaches, sea, waves, and rip currents.

Moving to the measures in Thailand, [4] studied safety management in Phuket, Thailand, and revealed five measures: 1) a safety management plan, including planning, directing, and coordinating; 2) human resources, including beach guard volunteers, beach guards, and warning signs; 3) education and advertising; 4) Issuing laws and regulations; and, 5) cooperation between public and private organizations were proposed to address drowning problems in focused in Phuket.

From the previous literature cited above, we can conclude that beach safety management in this paper consists of three main functions — planning, directing, and coordinating — according to [4]; however, as evaluation is essential to improve safety, it is included as a fourth main function. The safety measures include a process consisting of three stages: the preparation stage, the incident stage, and the post-incident stage. The preparation stage is vital to reduce the drowning rate [3], [10]. This stage includes education, creating awareness, warning signs, swimming zones, analyzing rip

currents and sea nettles, safety equipment, training guards and stakeholders about detecting and assisting victims, and fostering cooperation among local people, businesses, and governments in order to avoid incidents and enhance tourists' confidence in beach safety. The incident stage includes helping victims in the area, applying first aid, and transporting victims to hospitals. Lastly, the post-incident stage includes providing treatment, coordinating with immigration, the appropriate consulate, insurance companies, and providing translators and repatriation.

#### IV. RESEARCH METHODOLOGY

This paper is a qualitative study that combined in-depth interviews, a case study, and a focus group in order to achieve the research goals. Firstly, six people from the local government and three representatives from tourism businesses were interviewed to determine the circumstances of beach safety management on Samui Island. In the case of the second research objective, twelve foreign tourists were interviewed via structural questionnaires to investigate their knowledge about beach safety and recommendations for protection measures. A best practices case study in Phuket was also applied to gain more knowledge about beach safety management. All interview information was analyzed by applying content analysis. Finally, the gathered information was presented to a focus group of 32 people from related public and private organizations to arrive at solutions to increase beach safety levels on Samui Island.

#### V. RESEARCH RESULTS

##### A. Beach Safety Management Situation

Information obtained from interviewing both public and private organizations on beach safety management in Samui shows positive signs towards enhancement of safety levels, as demonstrated in the cooperation among various public and private stakeholders. The public organizations which provide support for marine and beach safety are marine police, police, district officers of Samui, the Samui municipality, the Department of Disaster Prevention and Mitigation in Samui, and local hospitals. Additionally, the marine department supports many facilities, such as first-aid training, beach guard skill training, life jackets, and warning signs. Hotels, resorts, jet-ski entrepreneurs, and local vendors at nearby beaches are good networks of surveillance in tourist drownings and demonstrate a willingness to join in safety projects. Some hotels have their own procedures to protect against drowning. For example, Centara Grand Beach Samui has a clear safety procedure, full-time lifeguards, and safety equipment including life jackets, first-aid supplies, full-time nurses, and cars to transport victims to hospitals. Furthermore, the full-time lifeguards have clear responsibilities, such as analyzing rip currents, giving warning signals, warning and preventing tourists from swimming in dangerous areas, as well as providing help to victims.

##### B. Current Safety Measures

The preparation stage is still weak. According to Table I, it was found that most tourists did not have/know information about drowning in Samui. Moreover, many tourists did not know the meaning of the warning signs near beaches. For example, a tourist said,

*'I don't know the meaning of red and yellow colored flags, and sometimes there are both red and yellow flags at the same time in the same areas.'* Some tourists said, *'I cannot read the English-Thai signs'*, as well as, *'I did not understand what the lifeguards were saying.'*

Thus, language barriers, inadequate education, advertising and public relations directed at tourists are the main factors hampering the effectiveness of the preparation stage. Another cause of drowning is the swimming ability of tourists, with some tourists believing that their swimming ability is very good when the waves are not too big. This is particularly true for tourists who come from countries that have big waves for surfing. While safety equipment, such as life jackets, ring buoys, jet skies are still inadequate in beach areas, elements noticeable from the interviews with both public organizations and tourists. Lastly, tourists do not adhere to the warnings given by the lifeguards at private hotel beaches. This matter is concordant with the information obtained from interviewing lifeguards supervising private beaches in Samui and Phuket. The interviewed lifeguards in both Phuket and a hotel said that *"tourists do not follow our recommendations because we are not public officers or policemen. Tourists do normally believe polices"*. This suggests that foreign tourists would be more likely to follow and comply with the warnings of lifeguards who were public officers or policemen.

TABLE I  
ATTITUDES OF TOURISTS IN SAMUI TOWARD TOURIST DROWNING

Interview	Issues	Frequency
Nationality	Germany	2 (17)
	Australia	2 (17)
	United Kingdom	2 (17)
	Switzerland	1 (8)
	France	1 (8)
	Italy	1 (8)
	United States /USA	1 (8)
	Denmark	1 (8)
	Taiwan	1 (8)
	• Tourists do not know the problems of drowning in Samui	9 (75)
Causes of drowning	• Tourists do not follow warnings	4 (33)
	• Tourists do not have safety information or warning signs in Samui	5 (42)
	• Swimming ability	5 (42)

Moving to the incident stage, the private lifeguards we interviewed mentioned both strengths and weaknesses. One area of strength is the help provided by jet-ski operators, who can detect and act fast to rescue victims from dangerous areas. There have been many rescues as a result of their efforts and actions. However, an area of weakness is in the difficulty of accessing incident areas/beaches, because some organizations do not allow ambulances to access to beach areas.

Lastly, the post-incident stage is still faced with some obstacles. According to the interviews, coordination among

related organizations such as hospitals, embassies, funeral homes, and insurance companies is still lacking. There is a need for a person to be able to communicate fluently, to clearly know the processes and to monitor cases.

### C. Solutions for Enhancing Beach Safety in Samui

Solutions were determined from tourist interviews and the focus group. In the case of tourists' recommendations, according to Table II, it was found that tourists' recommendations focused on the preparation stage, starting with education, public relations, establishing swimming zones, and providing full-time lifeguards and warning signs.

TABLE II  
RECOMMENDATIONS OF TOURISTS IN SAMUI REGARDING TOURIST DROWNINGS

Tourists' Opinions	Frequency(%)
1. Having public safety equipment such as life jackets and ring buoys	1 (8)
2. Warning signs near beaches	6 (50)
3. Setting swimming zones	1 (8)
4. Advertising and education from government and accommodations	2 (17)
5. Advertising and education from airlines and tourist agents	1 (8)
6. Cooperation from local people	2 (17)
7. Having lifeguards	6 (50)

Interestingly, one recommendation proposed by the focus group was the creation of a steering committee (consisting of both public and private organizations) to bridge the gap between the public and private entities, as well as to propel safety management in Samui to be focused in the same direction among the varied stakeholders. A model for drowning management and protection measures are revealed from the focus groups, see Fig. 1. Regarding the preparation stage, the focus group suggested that education and public relations should be compulsory. Participation from both the public and business organizations should be stressed. Businesses related to tourism, such as airlines, ferries, accommodations, tourist agents, and tour guides, should provide tourists in Samui with safety information. Setting danger zones or rip-current area warnings should be considered, and regulations or laws should be issued. Public lifeguards and safety towers were also proposed. Furthermore, it was suggested that businesses, especially accommodation near beaches, should set their own safety policies and provide their guests with information about beach safety. Due to the layout of Samui, there are few public access beaches. Most businesses are set along the beaches, and it is therefore difficult for public organizations to manage them. This is in contrast with the beaches in Phuket where public access is the norm. Regarding the incident stage, jet-ski entrepreneurs and others will compose surveillance networks. However, public lifeguards should also be a priority to help victims. Lastly, regarding the post-incident stage, providing translators in important languages such as English, Chinese, and Russian was also recommended to deal with the victims' relatives, consular matters, insurance, etc. (see Fig. 1)

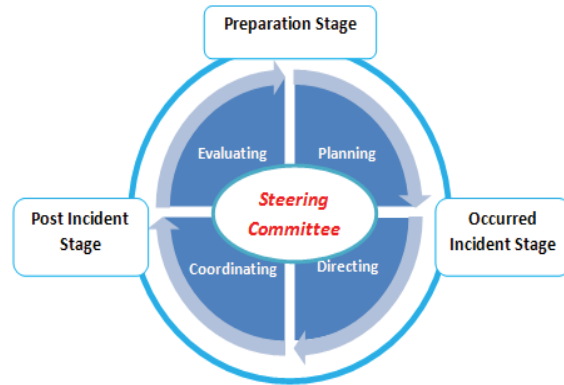


Fig. 1 Proposed model of drowning management and measures

## VI. DISCUSSION AND CONCLUSION

The results showed that the risk factors of tourist drownings on Samui Island are in accordance with previous studies [1], [4], [6], [9]-[11]. Lack of awareness and knowledge of the dangers of the local waters are the main cause of tourist drownings in Samui. Prevention is the best cure, and therefore, providing tourists with basic safety information and warnings should be a priority to enhance levels of safety in Samui. The previous study confirmed that there is the close relationship between tourist's knowledge of the natural environment, the beaches and the waters, and the incidents of drowning [2]. Therefore, the issue of providing tourists with beach and rip current information, as well as creating awareness about drownings in Samui should be urgently addressed. Increasing the supply of safety equipment should also be encouraged at both public beaches and private facilities. The placement of full-time public lifeguards should be considered by state-run organizations. It is also clear that the establishment of public lifeguards is necessary [3], [8] and can significantly reduce the rate of drownings and is the best preventative and prognostic factor for survival [8]. Interestingly, participation is a key success factor in Samui. There is high level of involvement from both private and public organizations, and as a consequence, it is easy to enhance the level of beach safety for tourists in Samui. However, there is no main center to coordinate all of the organizations and stakeholders; the measures taken to prevent drownings are not cohesive and the directions currently available for tourists could be confusing. In order to promote drowning safety measures and management strategies, a steering committee composed of public and private organizations is proposed. The public organizations would include marine police, police, district officers of Samui, the Samui municipality, the Department of Disaster Prevention and Mitigation in Samui, the local hospital, and the marine department. The Hotel Association, Safety and Rescue Association, Samui Association, jet-ski entrepreneurs, etc., would also be included in the steering committee. The responsibilities of the committee would consist of planning, directing, coordinating, and evaluating programs to develop a cohesive strategy, with the goal being zero drownings in Samui. Lastly, the participation of all



stakeholders is a key success factor to propel the committee.

The limitations of the proposed model should be considered before application in all areas. Firstly, the current situation of tourist drownings should be considered before applying the model. The opinions and the consensus of tourism stakeholders should also be considered before addressing the issue of tourist drownings, as it is a sensitive area, and deals with many organizations and is related to benefits for the tourism industry; however, safety should be the first priority when making any decision.

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