

# RESEARCH AND PRACTICE IN HUMAN RESOURCE MANAGEMENT

Ang, M. T. & Hosie, P. J. (2006). High End HRD: The Civil Defense Academy of Singapore, *Research and Practice in Human Resource Management*, 14(1), 70-111.

## High End HRD: The Civil Defense Academy of Singapore

Meng Tse Ang & Peter J Hosie

### ABSTRACT

**Substantial increases in global terrorism, major criminal activities, and natural disasters have highlighted the need for organisations to prepare for and manage crises. Consequently, organisations are now compelled to adopt human capital building initiatives that utilise high-end human resource development (HRD) to provide a safe working environment and to protect the interests of society and business. A world class training facility, the Civil Defence Academy of Singapore, which provides realistic and premium quality simulated learning experiences to respond to and manage crises, is featured. The philosophy and practices informing this approach represent a unique way of powering the human capital required to deal with crises in the Asia Pacific and internationally. Crisis response and management principles developed through well conceived and executed HRD are discussed. These are fundamental to prepare for the protection of human and organisational assets.**

### INTRODUCTION

During the last decade, there has been a remarkable rise in the global significance of services (Nankervis, Milton-Smith, Miyamoto & Taylor 2005). This growth has been associated with dynamic changes in the world economy, customer expectations – as well as demands – and the opportunities offered by new technologies (Haynes & Thies 1992, Aggarwal 2003). Both the primary industry sector (agriculture and mining) and the secondary industry sector (manufacturing) in the global context have transformed due to labour costs and developments in the production process (Berry 1980, Heskett, Sasser & Hart 1990). Rapid escalation in demand for services has also resulted in an increase in the range and sophistication of human resource development (HRD). The growth in HRD, as a response to rises in the global incidence of security and crisis management, is particularly noteworthy (Hosie & Smith 2004).

Firstly, this article makes the distinction between services and goods. Subsequently, the nature of services is explored and related to HRD, with a description of security management as an important aspect of crisis management presented, and the need for quality HRD, in the form of training, identified. An important aspect of managing crises is the four stage model of crisis management. The 'preparation' phase of this model is emphasised as the component of management to promote actively in organisations through HRD by instituting high quality training (Heath 1998). This approach to crisis management positions within the contemporary crisis and security management literature (Hosie & Smith 2004).

Specifically, a case study of a premier training institution, the Civil Defence Force Academy ('the Academy') of Singapore, is presented as an exemplar of systematic preparation to manage emergency responses to crises through simulation training. The discussion includes the philosophy and androgogy supporting the design and development to power human capital in crisis management and response. Integrating crisis management concepts and practices achieves deep learning experiences. A discussion of the areas where major criminal activities, terrorist events and natural disasters are likely to threaten the physical security of Asian international communities is considered. Lastly, the implications for using high quality simulation training for crisis management and response in the Asia Pacific and globally are presented.

## HRD AND SERVICES MANAGEMENT

The distinction between services and goods lies in the roles of both the service providers and the service consumers or clients. This distinction is important to the conceptualisation of a new service within organisations, such as crisis response and management. Zeithaml (2000), and Mudie and Cottam (1999) have identified four aspects that distinguish services from manufactured goods: these aspects are intangibility, inseparability, variability, and perishability. These aspects of services assist in discerning the fundamental difference between them and goods for the consumer or client. Thus, the strategic management of services requires organisational managers to delineate the services provided through the development of measurable criteria and associated service operations (Beaumont & Sohal 1999). This is particularly the case of a seemingly intangible service like crisis management (Bounfour 2003).

Some descriptions of services include such specifiers as 'personal performance' (Levitt 1972); 'a product which is a process' (Henkoff 1994, Shostack 1987); or 'a deed, an act, or a performance' (Berry 1980). In addition, Heskett (1987: 119) has identified the elements of strategic management systems in the services industry:

- Identification of a target market segment;
- Development of a service concept;
- Codification of an operating strategy to support the service concept; and
- Design of the service delivery system

These components of the services industry translate into overall business management strategies, supported by internal operational, marketing, financial and human resource management (HRM) plans and functions. Such descriptions portray a service as an activity, a benefit, level of satisfaction, or process and a deed, and imply a dynamic interaction between providers and customers or clients (Nankervis, et al. 2005). Inevitably, the dynamics of these interactions has led to a rise in the demand for tertiary services, such as HRD.

A number of unique properties separate services from tangible goods. The condition of intangibility of services is an appropriate aspect of the services provided with the absence of material products being a contributing factor (Bounfour 2003). However, the characteristic of inseparability refers to the link between the production and the consumption of services (Gronroos 1991). The service provider and the service customer are actively involved in the delivery process of a service, as the input and output of the service occur simultaneously. Services are inherently diverse and customised and can be characterised by variability as a function of their delivery (Levitt 1976, Chase 1991). The diversity of services will necessarily evoke the need for a complex strategic management planning process to deliver the services successfully. Finally, services can be considered as perishable as the service cannot be stored or reused, but rather can be considered as experiences, encounters, actions, and events. Given these four characteristics of service, then the development of service criteria assessment is an important function derived from customer or client perceptions. To define and evaluate the quality of a range of services several models have been developed (Brady & Cronin 2001), which are inclusive of customer (external) and service provider (internal) perspectives of the service function.

The outcomes and processes of services differ from the traditional products of manufacturing and mining, through the unique nature of the relationship between the service provider and the customers and clients (Gummesson 1993). The concept of crisis management as a service needs development as a means to enhance the quality of life of the recipients of the service. In this context, the management of crises provides a service to the clients (the public) by a provider (government or consultant) in order to protect and restore the function of an organisation or the public domain. The expectation of enhanced tertiary sector service quality is high by consumers of services from organisations expecting innovative and value added performance required to gain a competitive edge. HRD developed to respond to and manage crises within this context is an important aspect of services management. This serves to lay the foundation for the nature of learning to respond to and manage this sector of the service industry for protecting people and organisations.

The effective management of the relationship between provider and client involves a services paradigm (Gummesson 1993), which attends to the nature of the services offered. This relationship has components of market demand, stakeholder relationship management, marketing, finance, and HRM strategies. A service paradigm needs to ensure a balance between human input and technology, between cost and revenue, and between customer perceived quality and productivity (Gummesson 1993). Sophisticated management of crises as a service requires a detailed knowledge of the goals and functions of the organisation, in order to maintain effective activities within the domain of an establishment. High rates of the incidence of global terrorism and major criminal activities and natural disasters have determined the need for quality professional education in security risk and security technology as components of crisis management (Caudron 2002). Developing the capacity of human capital to respond to and manage crises has become a major risk mitigation issue for organisations and nation states.

## **A DANGEROUS WORLD**

In the current international political climate, terrorist events, major criminal activities and natural disasters have become significant in planning to prevent, delay, or reduce the consequences of crises on organisational functioning. From a broad context, the development of crisis management and response has been in response to the occurrence of natural disasters such as floods, earthquakes, and fire. The rise in the occurrence of terrorist events in the international context has heightened the exposure of supposedly safe facilities to terrorist attack, particularly if they are of national significance. Reducing, or eliminating the effects of terrorism on the functioning of organisations reduces or averts the consequences of a crisis.

The need to respond and manage crises caused by terrorist attacks on persons and facilities, in the national and international domain, has never been greater. Terrorist tragedies, major criminal activities and natural disasters in the international context of Kenya in 2001, New York and Washington (9/11) in 2001, Bali in 2002, Morocco, and Saudi Arabia in 2003/2004, Iraq in 2003/2004 and in Indonesia during 2004/2005, have demonstrated the need to prepare fully for the protection of people and facilities. These events have focused national and international attention on the necessity to prepare for and to empower professional personnel to deal with crises on behalf of management, government, private organisations, and community services (Smith 2001, 2002, Caudron 2002).

To become proactive in crisis management, it is necessary to restructure the corporate culture of organisations as a means of protecting assets and people. A key aspect of crisis management should be the promotion and support of crisis leadership principles by HRM professionals (Mitroff 2004). An important aspect of making these shifts in corporate cognition can be achieved by the adoption of well conceived and developed HRD as a component of the preparation for crisis management to eliminate, or reduce the effects of major incidents on organisations. In response to the increases in global terrorist events and international criminal acts, high quality HRD, in the form of training for crisis management, is in demand (Caudron 2002). The provision of a safe working and living environment is necessary, where the enhancement of the interests of people, business and government and the aversion of crisis management is required.

## **WHAT IS CRISIS MANAGEMENT?**

A crisis presents a risk to the assets of the establishment, putting the assets of the people, the information, and the property of the organisation under threat (Caudron 2002). These assets can have local, national, and international significance in their function, and consequently, may be an important consideration for the protection of a nation's infrastructure. The management and response to crises in organisations is crucial for effective institutional functioning. Disruptions to the operation of establishments and the influence on employees can dramatically affect corporate productivity. Such disturbances to organisations can take many forms including accidental and deliberate causes, initiated from within the organisation, as well as from external organisations.

Disasters can be categorised as natural or man made. Natural disasters include storms, floods, tsunamis, fires, pollution, and epidemics, while man made disasters can emanate from accidents and hostile acts, such as fires and explosions. Attacks on the people, information, and property of organisations can be prevented or the impact minimised through a well conceived and thoroughly tested crisis management plan. Such planning needs to leverage from quality HRD initiatives to maximise the power of human capital available to organisations.

## **Expecting the Unexpected**

Crises eventuate from disasters that are an unexpected event requiring specific arrangements or specific actions. Reilly (1993: 45) stated "... effective crisis management requires organisational responses which are outside the firm's ordinary repertoire of management activities". Essentially, crisis management planning is about preparing for events that the organisation has normally not previously experienced. Crises through disasters, such as the tsunamis, can occur without warning, often with effects that are severe and sometimes catastrophic on government, business, communities, and people.

Terrorist threats and natural catastrophes are high on the agenda for these never experienced events, and consequently, the application of a well considered response strategy is a vital component of a crisis management plan. The current threat of terrorism against government, commercial, and financial institutions enhances the need for crisis management for the continued operation of organisations. The ability to successfully deal with a disaster is an important management competency that has the capacity to avoid or reduce the consequences of the impact of the ensuing crisis.

## PREPARING FOR CRISIS MANAGEMENT AND RESPONSE

A prevention, preparation, response, and recovery (PPRR) four stage model of crisis management (Yates 2003) has been adopted by many organisations to manage unforeseen events within an establishment. This PPRR approach to crisis management, shown in Figure 1, is an iterative model that provides ongoing opportunities for learning. Preparedness is integral to crisis management and response as it forms the foundation upon which recovery of the operation can occur. The preparation phase of the PPRR model accommodates HRD in the management of crises and increases understanding of precursor events leading to a crisis scenario. Figure 1 shows the iteration logically commencing from preparation, to response, to recovery, to prevention in order to commence the cycle again with modified and improved aspects of the process illustrated in the PPRR Crisis Management Model.

**Figure 1 The PPRR Crisis Management Model (Hosie & Smith, 2004)**



This managerial and response approach to crises can be applied to facilities and organisations ranging from local enterprises to national infrastructure. In order to achieve a more professional approach to crisis management, organisations need to effectively plan, implement and prepare, especially for natural disaster threats, by assessing the risk to the organisation and evaluating the consequence of an event occurring.

### Risk Management

Security is defined as a stable, relatively predictable environment in which an individual or group may pursue its ends without disruption or harm, and without fear of disturbance or injury (Fischer & Green 2004). For government and private organisations, this means that the organisation continues its business and meets desirable goals without disruption or fear of disruption. Hence, the proliferation of terrorist incidents in national and international contexts impinges on this state of crisis management and response needed in organisations. Moreover, the evaluation of the risk of an event from terrorist activities or natural disasters is essential, and accordingly, a response instituted with the understanding that the risk might be realised.

The concept of risk is foremost when considering the protection of assets. Indeed, the likelihood of occurrence of the threat posing the risk will determine the need for intervention in the activities within a facility (Hosie & Smith, 2004). The consequence of an event occurring that will affect an organisation will determine the extent of human and organisational resources dedicated to this possible event. If the event will severely disrupt or cause dislocation to the normal operations of the organisation, then a risk management decision is necessary to determine the amount and type of resources deployed and the management of the possible event. By their very nature, crisis management and response carry some form of risk, and so the function of the personnel in this area is to conduct a risk analysis based on intelligence of the possible event and the consequences to the organisation if the risk is realised. The maintenance of risk management and risk reduction strategies for national infrastructure facilities at an enhanced level is crucial to be prepared for incidents that can occur without warning, with effects that are severe and sometimes catastrophic on the government, or the business community.

The components of threat and harm determine the levels of risk. Threat levels or the probability of incidents being realised, are determined by the subjective assessment of all relevant facts and the information derived from intelligence about the adversary. A threat level is allocated a rating of the likelihood of the threat eventuating. Harm is the amount of damage that may occur if the threat is realised, or considered as the criticality of the loss. Senior management, who understand the consequential impact of an incident from a realised threat, will best determine the level of harm that the organisation may incur.

## **Crisis Management and Response**

Communities and individuals have always used physical security methods to protect their valuables, which is a trend that continues in this era. However, as the tools and devices available to criminal and terrorist elements become more sophisticated, law enforcement agencies and crisis management professionals need to have a comprehensive knowledge and understanding of the crisis management threats and risks principles necessary to protect corporation and societal infrastructure. Thus, as the amount of crime and terrorism continues to increase, and affects the community in financial and social terms, so does the need for better strategies for protecting assets (Smith & Robinson 1999). In addition, organisational components of commercial, retail, and industrial organisations, as well as leisure facilities, all require a crisis management planning to protect the assets of employees and visitors, the managerial and financial information of the facility, and the material contents of the organisation. Consequently, a worldwide demand for high quality professional training in crisis management and response issues has emerged commensurate with the international escalation of terrorism (Hesse & Smith 2001).

As the perceived threats increase from terrorism and major criminal activities, professional crisis managers and consultants are in constant demand in national and international contexts. This situation reflects the demand for these services and products by business, industry and the broader community (Smith 2002). Effective crisis management and response training has become increasingly important to industry and governments because of the moral and legal responsibility of a company or government to ensure that the employees have been provided with appropriate training to undertake their work safely, to avoid compensation and risk liabilities (Hosie 1993, 1994).

The current high incidence of global terrorism, major criminal activities and natural disasters has determined the need for high quality professional training in crisis response and management (Caudron 2002, Hosie & Smith 2004). Consequently, the demand HRD for the protection of people and assets is high in the national and international contexts. Resources invested in HRM initiatives to change corporate culture through the training and the training of crisis management components reward organisations in both ethical and business perspectives (Mitroff 2004). The next section describes an example of a world class HRD Singaporean programme and facility for crisis response and management.

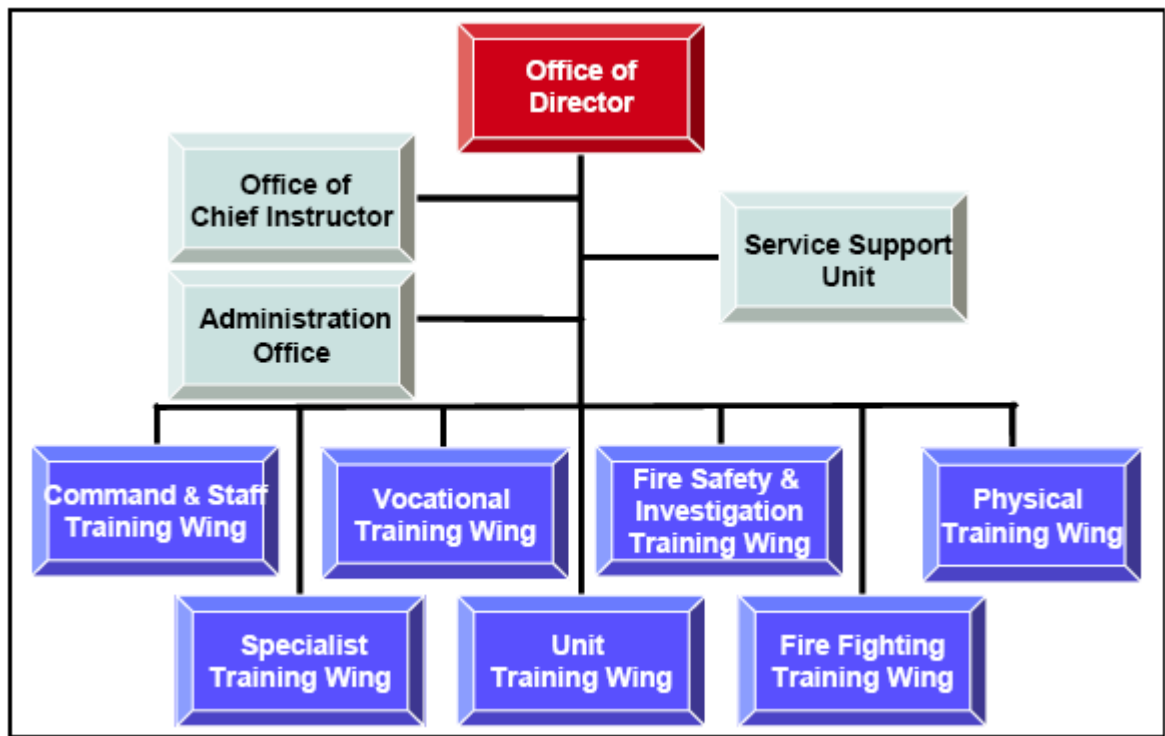
### **THE CIVIL DEFENCE ACADEMY**

The Academy is a premier training institution of the Singapore Civil Defence Force (SCDF). The Academy offers specialised training in the area of emergency response, encompassing fire fighting, rescue, emergency ambulance services, and incident management in a realistic, yet safe, learning environment. The salient vision of the Academy is to be a world class institution providing quality training through professionalism, operational excellence and service quality. This goal is being achieved through the Academy's mission is to equip Singaporeans and SCDF officers with the knowledge, skills and values to protect and save lives and property before, during and after an emergency.

### **Structure**

Figure 2 shows the Academy structure. The employment of this design has been to manage efficaciously a range of training experiences. The Director heads the Academy, assisted by the Chief Instructor's Office, a Service Support Unit and the Administration Office.

**Figure 2 Organisation Structure**



The frontline of the Academy consists of seven specialised training wings dedicated to specific areas of training: The Command and Staff Training Wing trains both junior and senior officers to assume the role of commanders in the SCDF. This wing also trains senior officers identified for staff officer appointments. A Specialist Training Wing is responsible for advanced specialist training which comprises three branches: the Fire-Fighting Specialist Branch, HazMat Specialist Branch and the Urban Search and Rescue Branch. The Fire-Fighting Training Wing trains National Service recruits to become fully fledged Fire-Fighters who are deployed to all the fire stations in Singapore. This wing also comprises a Ship Fire-Fighting Branch that trains both internal and external trainees on all aspects of Ship Fire Fighting. A Vocationalist Training Wing is responsible for training the vocationalists such as drivers, medics and signallers for the entire force. The Fire Safety and Investigation Training Wing specialises in providing Fire Safety and Fire Investigation training for SCDF personnel as well as members of the public and Fire Safety practitioners from the industry. A Unit Training Wing is responsible for all training pertaining to CD NS men (reservist forces who return for training for at least one week every year). The wing handles the training of up to Battalion sized units. The Physical Training Wing is responsible for the conducting of physical related lessons for all trainees in the Academy, as well as the conduct of the Individual Physical Proficiency Test, which all SCDF personnel must pass at least once each year.

## Training Philosophy

The philosophy of the Academy is that developing human capital is the main source of strength and potential of an organisation. Thus, a salient imperative is to correctly identify the talents amongst the people, subject them to a rigorous training regime, and finally by deploying them to appropriate work environments that will allow them to maximise their potential. The two key pillars – Train as operate and Training safety – are the basis for the training imperative of the Academy.

The training regime is realistic as training conditions approximate those encountered during actual operational situations. The provision of realistic training poses much of the challenge, as the normal operating environments of emergency responders are inherently dangerous. Very often, it is necessary to stretch physical and mental limits for trainees to gain the required confidence and competency. In addition, trainees are often pushed to think out of the box, look beyond the near future and react to unimaginable scenarios. This approach supports the very essence of dealing effectively with the reality of crisis incidents to which trainees must respond and manage. The judicious use of adult learning principles prepares trainees for the challenge to deal effectively with these yet to be experienced situations.

## Training Facilities

The Academy is one of the best equipped training institutions in the world. The modern lecture rooms are equipped with the latest audio and video equipment. The field training area is also fitted with state of the art gas fire simulators, which allow realistic training at the click of a button. The Academy is also able to cater to large numbers of resident trainees in the in house dormitories. There are 16 lecture rooms in the Academy. Inclusive is a Computer

Aided Instruction Room (CAI Room), a resource centre, clinical training rooms (Figure 3); and a multi purpose sports hall, as well as an auditorium (Figure 4) which has a seating capacity for 400 people.

**Figure 3 Lecture Rooms, CAI Room**



**Figure 4 Auditorium**



The various types of training simulators for rescue, fire fighting as well as HazMat (hazardous materials management) training are housed in the field training area. The following training simulators are included: an oil tank simulator (Figure 5); bullet tank simulator (Figure 6); chemical plant simulator (Figure 7); flange fire simulator training area (Figure 8); ruins (urban search and rescue) (Figure 9); silo (height and confined space rescue) simulator (Figure 10); ship fire fighting simulator (Figure 11); road traffic accident (RTA) training area (Figure 12); and a breathing apparatus maze (Figure 13). A major feature of the facility is the ten storey high fire and rescue training tower (also known as 'The Furnace') which is shown in Figure 14.



**Figure 5 Oil Tank Simulator**

**Oil Storage Tank fire fighting Simulator (Figure 5)**

The oil storage tank simulator measures seven metres in diameter and six metres in height. Oil storage tanks are a common at refineries. In the event of a fire breakout involving oil tanks, trainees are set the challenge to apply the correct extinguishing medium and equipment. This simulator also requires trainees to be aware of the logistical requirement in such operations, such as proper calculation of foam required and placement of monitors to provide effective extinguishment of fires.



**Figure 6 Bullet Tank Simulator**

### **LPG Bullet Tank (Figure 6)**

The LPG bullet tank simulator simulates a LPG tank impinged by fire. Trainees must react fast to prevent a boiling liquid expanding vapour explosion (BLEVE) from occurring. BLEVE exercises develop confidence and teamwork in trainees as they negotiate movement towards the tank to shut off the valve. In addition, the process allows trainees to learn correct actions to take when facing LPG incidents.

**Figure 7 Chemical Plant Simulator**



**Figure 8 Flange Fire Simulator**



### **Chemical Plant (Figure 7, 8)**

The chemical plant is a three storey complex which is used to train HazMat personnel as well as fire fighters to perform HazMat mitigation operations either at individual stations or in a scenario based exercise setting. At the first and second storeys, transfer of HazMat fluids occurs, requiring plugging and sealing operations of various flange leaks. At the third storey, there is a simulation of a spill fire involving overturned drums with flammable solvents and a BLEVE simulator cage. One of the LPG gas cylinders will be on fire producing a three metre vertical fire effect.



**Figure 9 Ruins Training Area**

### **Ruins Training Area (Figure 9)**

The ruins training area simulates a partially collapsed building with narrow crevices which trainees have to manoeuvre around to carry out urban search and rescue operations beneath the rubble. There is also a sophisticated network of interconnected tunnels built beneath the ruins area for confined space rescue training.

**Figure 10 Silo (Height and Confined Space Rescue) Simulator**





**Silo (Figure 10)**

This green silo simulator trains fire fighters on Advanced Confined Space Rescue of persons trapped. A silo normally stores animal feeds, grains and other goods. Procedures before entry to a confined space, such as using detectors and ventilation of the hole, are necessary training procedures undertaken before commencement of entry.



**Figure 11 Ship Fire Fighting Simulator**

**Ship Fire Fighting Simulator (Figure 11)**

The design of the two storey 110 sq m ship simulator replicates the interior of a ship. The construction of the ship fire fighting facility is mainly of metal with five compartments. Different types of fires, including flammable liquid leak fires, can be ignited. The mess deck, galley, switch room and store room are located at the middle deck, while the engine room is at the lowest deck. All compartments are accessed by means of water tight doors and hatches. The doors and hatches come in 'dogs' and 'wheel-type' so that trainees understand the different types of mechanism in opening the doors. As with a ship, access between compartments for trainees is through tight vertical ladders and steep staircases.

Computers in the control room vary the size and intensity of fires. All compartments can be smoke logged and flooded to knee high level to inject a further challenge into the training. The ship simulator is also equipped with safety features. Thermal imaging cameras, gas detectors, temperature probes and emergency pull cords are available in all compartments for the monitoring and safety of trainees. When the situation in the simulator becomes excessively dangerous, trainers can immediately terminate the session.



**Figure 12 Road Traffic Accident (RTA) Simulator**

### **Road Traffic Accident (Figure 12)**

The road traffic accident training area simulates traffic accidents by overturning cars and placing them in challenging and precarious positions for the rescuers to practise the safe and effective methods of extricating casualties in road traffic accidents.



**Figure 13 Breathing Apparatus Maze**

### **Breathing Apparatus Maze (Figure 13)**

The breathing apparatus maze is a 120 metres network of one metre by one metre tunnel in which the trainees have to crawl through on their hands and feet. There are various kinds of different obstacles such as vertical hatches, sliding panels, narrow pipes and the like within the maze. The breathing apparatus maze is easily reconfigurable to form different routes for every different type of training simulation. There are also lighting controls and smoke simulators, which allow for the control of the visibility in the maze.

**Figure 14 Fire & Rescue Training Tower ('The Furnace')**



**Fire & Rescue Training Tower ('The Furnace') (Figure 14)**

The 10-storey 'Furnace' stands at a height of 37.575m and is the centre of all indoor fire fighting and the development of human capital of rescuers conducted at the Academy. Built to withstand the burning heat of fires, up 1,000 degrees Celsius, the Furnace offers a range of fire fighting environments at the push of a button all under one roof. Fire and rescue trainees get to fight not only life like simulated residential apartment fires, but also a host of many others including fiery blazes in a ship engine room, hotel room, HazMat storage room and even a flash over fire in a Karaoke Lounge. Through a centralised control system, instructors have full control of the fire, heat and smoke conditions in the building. A network of closed-circuit televisions and thermal image cameras can monitor trainee safety.

**Figure 15 Dormitory & Training Pool**



**Figure 16 Gym**



The dormitory area (Figure 15) caters to residential courses and has a 600 bed capacity. A Medical Centre is co-located at the dormitory area with '24/7' medical staff on standby. Recreational facilities in the form of an Officers' Mess, gymnasium (Figure 16), basketball court, squash courts and training pool are also located at the dormitory area.

## **ANDROGOGY TO POWER THE DEVELOPMENT OF HUMAN CAPITAL**

Safety is of utmost importance in all training as the emphasis on safety extends well beyond the confines of the Academy. When properly inculcated during training, the attention to safety becomes second nature to the trainees and this means that they will instinctively think and operate safely as a matter of standard operating procedure. A process of 'overtraining' ensues these responses are effectively 'hard wired' into the psyche of trainees to endure long after the formal learning phase has been completed.

The Academy achieves many of its learning outcomes through constructivist learning practices (Steffe & Gale 1995). An exogenous constructivism approach has been adopted (Moshman 1982) which recognises the role of direct instruction, but also has an emphasis on learners directly constructing knowledge representations (Dalgarno 1996). The design in the form of physical learning simulations allows learners to explore aspects of the crisis management and response first hand. Academy courses feature high end simulations to present aspects of crisis management and response that are not normally available to students due to the nature of training required. Unique learning opportunities provides for students to observe and fully participate in realistic field scenarios using simulated learning experiences. These learning experiences satisfy the criteria for delivering high quality learning that is 'defensible' in terms of ensuring an effective universal standard of quality learning experiences (Hosie 1993, Hosie & Smith 2004).

A constructivist learning process applied with crisis management integrated into the courses ensures revisiting the PPRR components in various contexts. An iterative learning process incorporated into the PPRR conception of crisis management, uses the principle of 'double loop learning' (Argyris & Schön 1974, Senge 1990, Argyris 1993). The emphasis of double loop learning is on complex and unstructured problem solving which change as the problem solving capabilities of the learner advance. Planning, implementation, and review are part of the double loop learning process, which complement the PPRR model of crisis management. Ongoing learning is integral to the Crisis Management Model, with the central focus on preparation for the protection of assets in international and national arenas.

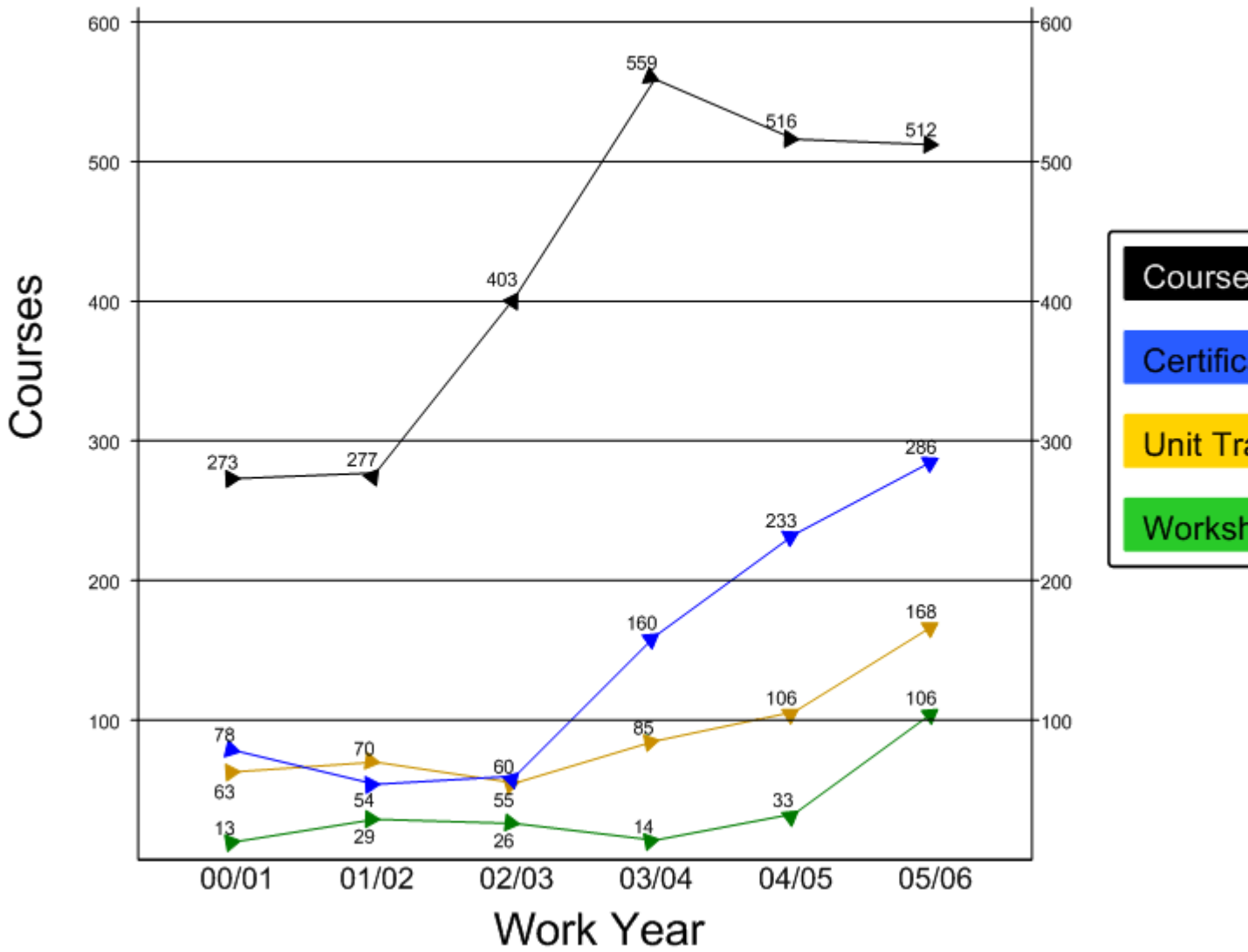
The need to develop the capacity of human capital to go beyond the provision of reactive and periodic learning experiences to the necessity of being constantly well informed and prepared drive this rapidly emerging trend to utilise cost effective and appropriate training technology. Responses to bioterrorism threats must be rapid and effective to avoid tragedy. As Caudron (2002: 30) accurately observed "... technology in all its various forms has taken up a permanent and vastly more influential residence within the training function". As the priorities for meeting crisis threats change by the minute rather than the day, institutions that are more efficient users of technology are likely to become 'learning organisations' (Senge 1990, Price 2001) with greater potential for survival.

The Academy applies a dedicated approach to the powering of the capacity of human capital to achieve their fullest potential. As a training institution that trains all newly recruited officers of the SCDF, the Academy is responsible for not only imparting the required levels of technical competency to the officers being trained, but is also entrusted with entrenching the right set of values and beliefs in these officers. Developing highly skilled people is at the forefront of the entire developmental process. In this setting, it is of paramount importance that the Academy sets the correct tone during the initial training stage. This is crucial for establishing the attitudes and behaviours shaped during this phase. Hence, a vital aspect of this process of developing desired attitudes is the necessity to achieve the 'deep learning' that reverberates and remains with the officers long after the formal training occurs.

## **Generating Human Capital**

Justifiably, in terms of the quality, scope and volume of trainees, the Academy is a powerful generator of human capital in the area of crisis response and management. The Academy conducted 512 courses for the work year (WY) 2005/2006, slightly less than in the peak of 559 in 2003/2004, as shown in Figure 17. More training courses were conducted during the period 2003/2004 and 2004/2005 to build up specific operational capabilities. Once the required number of existing personnel is trained, the number requiring training is reduced, as only new personnel need to be trained to maintain the operational capability. Regardless of this slight downturn in the training load, demand for these courses continues to grow at a rapid rate.

**Figure 17 Training Load**



From 1999 to 2006, the number of internal trainees (shown in Figure 18) rose from 16,321 to 32,520, while the number of external trainees rose even more dramatically from 1954 in 1999 to 8348 in 2005/2006. In 2005/2006, a figure of 40,868 people trained at the Academy, which is over twice those trained at its inception in 1999/2000.

**Figure 18 Training Volume**

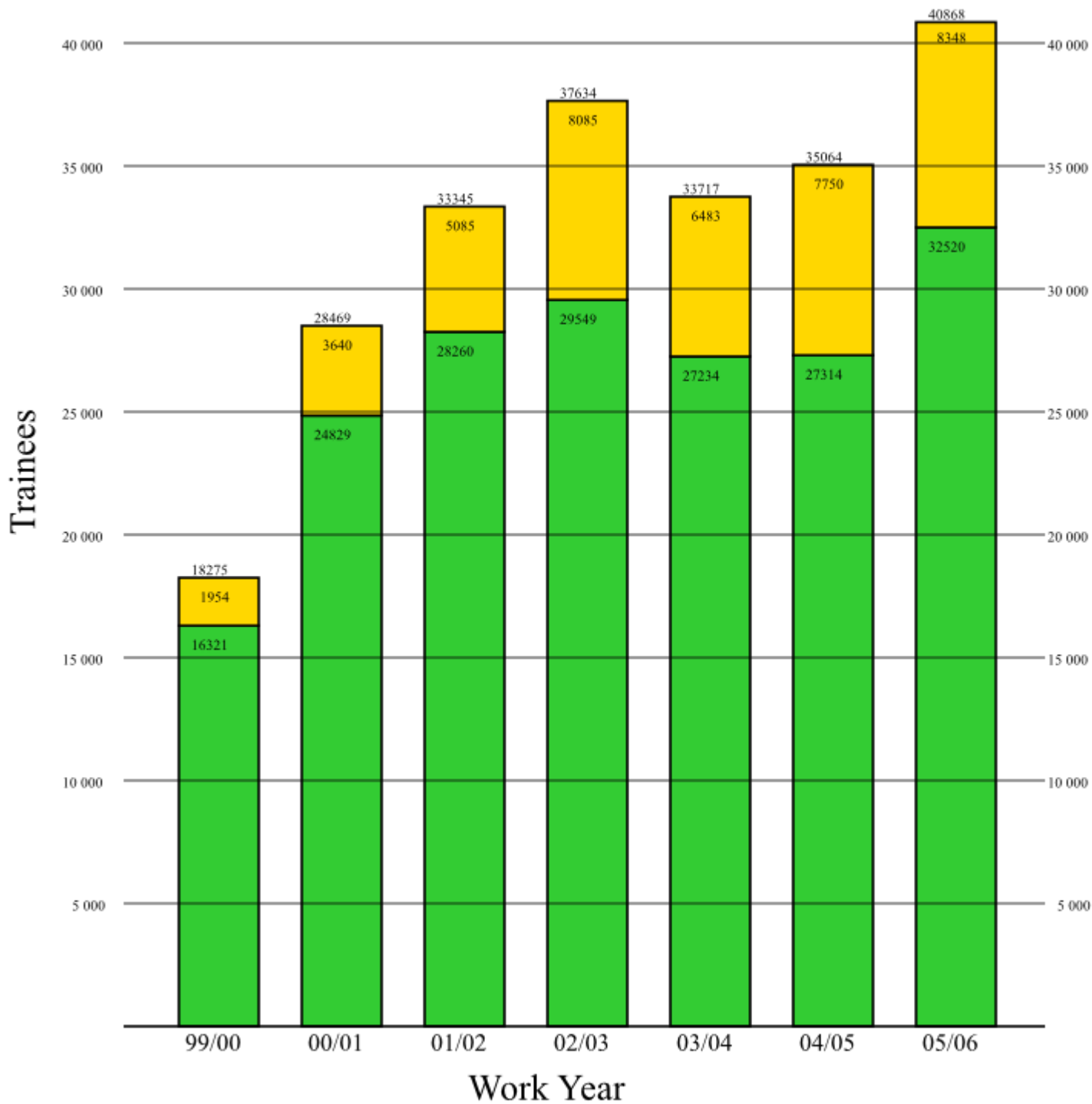


Figure 19, illustrates the strategic alliances the Academy has with international organisations involved in disaster assistance and coordination, providing regular professional training to international participants. Since 1999, the Academy has trained 542 international participants from diverse range of 54 different countries. The Academy was highly regarded by these international participants in terms of providing international standard training in emergency service operations.

**Figure 19 International Participants**



## Strategic Partnerships

The Academy and selected institutions and organisations have developed a close network of strategic alliances. Ngee Ann Polytechnic and the Academy jointly provide the Certificate in Fire Safety Engineering Course and the Fire Safety Manager Course. To enhance further emergency service operations, the Academy collaborates actively with local tertiary institutions on research projects.

A Memorandum of Understanding has also entered into with two foreign universities to conduct Masters Degree programmes through distance learning. A Masters in Fire Safety Engineering has developed in association with the University of Western Sydney, and a Masters of Science in Risks, Crisis and Disaster Management conducted with the University of Leicester. In addition, the Academy also actively collaborates with international organisations such as the United Nation's International Search and Rescue Advisory Group (INSARAG), the Asian Disaster Reduction Centre and the Japan International Cooperation Agency on matters pertaining to international rescue and training.

## INTERNATIONAL RECOGNITION OF QUALITY

Since its inception in 1999, the Academy has grown to become an icon within the international crisis response and management community signifying quality training and professional service (*SPRING 2005, World Fire Statistics 2004*). From an Academy whose original purpose was to fulfil the internal training needs of the SCDF, it has surpassed the initial targets and grown into an international standard emergency response training entity. More than 40,000 people, comprising SCDF personnel, members of other uniformed organisations, members of industry, and members of the public, train annually at the Academy.

## Training Quality

In a bid to ensure the alignment of the training quality at the Academy with the best in the international community, five of the key courses conducted at the Academy are accredited by the ISO, which has received ISO 9001 certification. The following courses have been certified by the ISO to be compliant with the standards set for quality management systems accepted around the world: Basic Officer Course; Emergency Response Specialist Course (Fire); Emergency Response Specialist Course (Paramedic); HazMat Specialist Course and Fire Fighter Course.

To ensure the quality of training the Academy adopted two key guiding principles, related to the high instructor to trainee ratios. The high instructor to trainee ratio (1:30 for lectures, 1:8 for field training) ensures that the instructors give trainees adequate attention and supervision and all safety procedures strictly adhered at all times. The equipment to trainee ratio (1 to 4) ensures that each trainee has sufficient opportunities to gain proficiency in the handling of a particular piece of equipment. As part of the Academy's effort to ensure the safety of all trainees, there is a thorough investigation for every training accident or incident, which takes place during training. The

Academy aims to keep the number of 'preventable' accidents below five.

In addition, the Academy checks constantly the quality of training through pre defined training performance indexes, as well as post course feedback from the trainees and their supervisors. On the average, over 90 per cent of the trainees from the Basic Officer Course, Emergency Response Specialist Course, HazMat Specialist Course and Paramedic Course are able to meet all the course objectives and achieve at least a 60 per cent score in their enrolled courses. More than eight per cent of the supervisors of the graduands 'agree' or 'strongly agree' that their officers have improved significantly after the course or have become more confident and competent to perform in the areas which they were trained.

In March 2004, the Academy received the ISO 9001:2000 certification by the International Organisation of Standardisation (ISO). This award is recognition of the quality management systems engaged by the Academy as being amongst the best of such facilities and training programmes in the world. ISO 9001 certification has established the Academy as having international standards of quality management systems. Effective training of Academy personnel has also translated into excellent operational results as depicted in the 'World Fire Statistics Information Bulletin' of the World Fire Statistics (2004) published by the United Nations Geneva Association. These statistics, issued annually with data gathered every three years on participating countries including the US, Canada, Europe and Asia Pacific. Singapore, rated the lowest in the world in terms of the cost of direct fire loss and lowest fire deaths (*World Fire Statistics 2004*).

In October 2005, the SCDF received the prestigious Singapore Quality Award (*SPRING 2005*) which recognises organisations that demonstrate the highest standards of business excellence. The universally accepted standards found in the US Malcolm Baldrige National Quality Award, the European Quality Award and the Australian Business Excellence Award provide the basis for the Singapore Quality Award. Further, accolades from the international participants are testament to the assertion that the Academy is, indeed, a world class training establishment.

## DISCUSSION

There are several areas in Asia Pacific region where security is threatened. Indeed, a number of planned and successful terrorist attacks already experienced in the region including the following incidents:

- the planned, but foiled, bombing plot on the American, Australian, British and Israeli embassies in Singapore (Kelley 2000);
- the car bombing of the Marriott Hotel in Jakarta (Elegant 2003); the Bali bombing (Shubert 2003);
- the bombing of the Australian embassy in Jakarta (Palmer 2004); and
- other various insurgent regional activities.

In all of these instances, both physical and human targets were exposed. Experience now indicates that all strategic installations are now potential terrorist targets. Embassies, consulates and other strategic installations, such as large container ports and petrochemical plants, are ready soft targets for terrorist and criminal attack. Moreover, container vessels manned by small crews operating in isolated locations in the Malacca Straits and South China Sea are amongst the latest threats (Ramachandran 2004). A key terrorism target is the 900 kilometre Malacca Straits located between Indonesia, Malaysia and Singapore. A quarter of the world's ship borne trade and half of its oil passes through the Strait. An attack on large vessels has the potential to disrupt world trade at an enormous economic cost and severely impact on societal welfare and the daily lives of people.

Arguably, an established model of practice, such as the PPRR (Heck 1991, Rosental & Pijnenberg 1991), as shown in Figure 1, should be the basis for crisis management training. To be effective, learning should be integrated with the prevention, preparation, response and recovery aspects of organisational responses to crisis management. As such, this learning needs to permeate the entire HRM function. The embedding of double loop learning into every cycle of an organisation's crisis management process ensures that deep organisational learning, and subsequent change in management policies and practices, occurs. This process entails initiating concerted management changes in a period of indifferent economic circumstances for some countries in the region.

## CONCLUSION

There has never been more of an imperative in the national and international domain to respond to and manage crises caused by terrorist attacks, major criminal activities and natural disasters. A service paradigm provides a productive conceptual framework for preparation to deal with crises. For instance, national infrastructure installations are potential terrorist targets, developing training for crisis management, in terms of preparation and response to critical emergencies is a critical aspect of dealing with such events. The potential to avert economic loss to organisations and nation states is substantial. There are international ramifications of considerable magnitude of



threats posed by international terrorist events, criminal acts and natural catastrophes. Consequently, HRM professionals are a key aspect of crisis management, and HRD policies and practices need to promote actively crisis leadership principles and infuse these into corporate consciousness. The adoption of well conceived and developed HRD initiatives, to prepare for crises and to eliminate or reduce the effects of major incidents on organisations and people, can shift corporate mindsets.

Preparedness in the PPPR Crisis Management model is vitally important for organisations concerned about terrorist events, criminal incidents, and natural catastrophes that can affect the survival and prosperity of people and organisations. Moreover, iterative learning is the central focus of the PPPR Crisis Management Model, which has the latency to mitigate risks implicit in preparing to avert crises by building on the capacity of institutional human capital. Thus, crisis management and response training is an important way of providing the competencies necessary for the protection of the assets of organisations and individuals through appropriate learning activities. Furthermore, the knowledge domain of crisis management and response embraces a large number of generic skills, which are transferable to a variety of careers in government agencies, social services and industry. In the process, human capital transforms into social capital.

The philosophy and practices informing the Singaporean Civil Defence Force Academy represent a unique approach to the development of the human capital required to deal with crises in Asia Pacific, and increasingly, for an international client base. The Academy features high calibre training in crisis and security principles underlying the protection of the assets of an organisation. Trainees apply crisis management and response practices to realistic simulations where the emphasis is on best practice through reducing the risk of asset loss and danger to the safety of employees from high threat situations. The systematic learning of a considerable skills inventory is required for the full preparation an institution's human capital to meet the considerable demands of crises.

Training delivered by this Academy is powering the development of international human capital in preparation for crisis response and management. Various standards and approaches that established by the Academy ensure trainees have quality training experiences. The rigorous simulation training employed by the Academy typifies deep learning experiences for preparing to deal with crises. In essence, the Academy is an exemplar of how to create a safe working and living environment that enhances the interests of people, business and government and averts the requirements for crises. The quality of training delivered by the Academy adds weight its claim to be a world class crisis response and management training facility.

An important aspect of the services approach to crisis management is the application of high-end HRD, in the form of quality training. Increases in the incidence of global terrorism, major criminal activities, and the pervasive threat of natural catastrophes highlight the need for organisations to prepare for crises through HRD. High quality and credible HRD initiatives in crisis management are in demand to meet these threats. Crisis management and nullification is, therefore, a vital challenge to the survival and prosperity of all people and property in all organisations and nation states. Sophisticated preparation to deal with crises is achievable through appropriately devised and delivered HRD to secure the future of the Asia Pacific and the broader international community. Clearly, inadequate preparation for potential tragedies will have dramatic and widespread consequences. Government entities and diverse types of organisations urgently need to jolt their collective consciousness to the evident and contemporary threats to their domestic and international security. Hence, corporate culture is required to become more proactive to deal effectively with threats to people and property. Complacency has no place in these circumstances. Fully utilising the potential of the available human capital within institutions has now become an essential part of the corporate repertoire to ameliorate the danger to people and property.

## **AUTHORS**

Lieutenant-Colonel Meng Tse Ang PPA (G) is the Director of the Singapore Civil Defence Academy. He has been in the business of Fire Fighting and Rescue for more than 16 years. His previous appointments include being the Director of Operations of the Singapore Civil Defence Force (SCDF) and a Division Commander responsible for the western portion of Singapore. He has also held senior staff appointments within the Ministry of Home Affairs.

E-mail: [Ang\\_Tse\\_Meng@scdf.gov.sg](mailto:Ang_Tse_Meng@scdf.gov.sg)

Dr Peter Hosie is a Post Doctoral Research Fellow at Curtin Business School, Curtin University of Technology. He has published over 50 articles and reports on Technologically-Mediated Learning and HRM/HRD. His work is cited in over 40 international articles, papers and reports. He has developed policy and conducted quantitative and qualitative research for a range of organisations primarily related to the application of new technologies related to education and training for a diverse range of organisations. Peter has also been involved in the delivery of many innovative HRD, education and training initiatives and has designed, developed and produced a wide range of learning resources, often utilising media.

E-mail: [Peter.Hosie@cbs.curtin.edu.au](mailto:Peter.Hosie@cbs.curtin.edu.au)

## REFERENCES

- Aggarwal, N. (2003, December 5th). Services industries team up for growth. *Straits Times*, A29.
- Argyris, C. (1993). *Knowledge for action. A guide to overcoming barriers to organizational change*. San Francisco: Jossey Bass.
- Argyris, C., & Schön, D. (1974). *Theory in practice. Increasing professional effectiveness*. San Francisco: Jossey-Bass.
- Beaumont, N., & Sohal, A. (1999). Quality management in Australian service industries. *Benchmarking*, 6(2), 107.
- Berry, L. (1980). Services market is different. *Business*, 30(1), 24-29.
- Bounfour, A. (2003). *The measurement of intangibles: the organisation's most valuable assets*. Routledge: London.
- Brady, M., & Cronin, J. (2001). Some thoughts on conceptualising perceived service quality: A hierarchical approach. *Journal of Marketing*, 65(3), 34-49.
- Caudron, S. (2002). Training in a post-terrorist era. *Training and Development*, 56(2), 25-30.
- Chase, R. (1991). The customer contact approach to services: Theoretical bases and practical extensions. *Operations Research*, 29(4), pp. 698-706.
- Dalgarno, B.J. (1996). Constructivist computer assisted learning: Theory and techniques. In A. Christie, P. James, & B. Vaughan (Eds.). *Making New Connections*. Proceedings of ASCILITE '96. Adelaide: University of South Australia.
- Elegant, S. (2003). New wave of terror? A deadly Jakarta bombing raises questions about the effectiveness of Indonesia's anti terror measures. *Timeasia*. (August), 18-25. Available <http://www.time.com/time/asia/magazine/printout/0,13675,501030818-474520,00.html>.
- Fischer, R.J., & Green, G. (2004). *Introduction to security*. (7th ed.). Elsevier Boston: Butterworth-Heinemann.
- Gronroos, C. (1991). Scandinavian management and the Nordic School of Services – Contributions to services management and quality. *International Journal of Services Industry Management*, 2(3), 17-25.
- Gummesson, E. 1993, Services management: An evaluation and the future. *International Journal of Services Industry Management*, 5(1), 77-96.
- Haynes, R., & Thies, E. (1992), Management of technology in service firms. *Journal of Operations Management*, 10(3), 388-397.
- Heath, R. (1998). *Crisis management for managers and executives*. London: Pitman Publishing/Financial Times.
- Heck, J.P. (1991). Comments on "The Zeebrugge ferry disaster". In U. Rosenthal & B. Pijnenberg (Eds.), *Crisis management and decision making*. Kluwer, Dordrecht.
- Henkoff, R. (1994). Service is everybody's business. *Fortune*, 129(13), 48.
- Heskett, J. (1987). Lessons in the service sector. *Harvard Business Review*, 65(1), 18-26.
- Heskett, J., Sasser, W., & Hart, C. (1990). *Service breakthroughs: Changing the rules of the game*, Free Press: New York.
- Hesse, L., & Smith, C.L. (2001). *Core curriculum in Security Science*. Proceedings of the 2nd World Conference on Information Security Education, 129-146.
- Hosie, P. (1993). Technologically mediated learning: The future of training in Australia. *Australian Journal of Educational Technology*, 9(1), 69-86.
- Hosie, P. (1994). Human resource managers and training – A peek into the future. In A. Nankervis & R. Compton

(Eds.), *Readings in Strategic Human Resource Management* (259–277). Australia: Thomas Nelson.

Hosie, P., & Smith, C. (2004). Preparing for crisis: Online security management education. *Research and Practice in Human Resource Management*, 12(2), 90-127.

Kelley, J. (2000). Malaysia site of Sept. 11 plotting, FBI report says, *USA TODAY*. Available [http://pgoh.free.fr/fbi\\_nyt.html](http://pgoh.free.fr/fbi_nyt.html) [2002, January 29th].

Levitt, T. (1972). Production-line approach to service. *Harvard Business Review*, 50(5), 20-30.

Levitt, T. (1976). Industrialisation of service. *Harvard Business Review*, 54(1), 63-74.

Mitroff, I. (2004). *Crisis leadership: Planning for the unthinkable*. Berkley: University of Southern California.

Moshman, D. (1982). Exogenous, endogenous and dialectical constructivism. *Developmental Review*, 2(1), 371-384.

Mudie, P., & Cottam, A. (1999). *The marketing and management of services*. (2nd ed.). Oxford: Butterworth Heinemann.

Nankervis, A., Milton-Smith, J., Miyamoto, Y., & Taylor, R. (2005). *Managing services*. London: Cambridge University Press.

Palmer, T. (2004). *At least eight killed in embassy attack*, ABC NEWS [on-line] <http://www.abc.net.au/news/newsitems/s1195760.htm>

Price, A. (2001). *The principles of human resource management*. Oxford: Blackwell Publishing.

Ramachandran, S. (2004). Divisions over terror threat in Malacca Straits. *Asia Times* [on-line]. [http://www.atimes.com/atimes/Southeast\\_Asia/FF16Ae01.html](http://www.atimes.com/atimes/Southeast_Asia/FF16Ae01.html) [2004, June 16th].

Reilly, A.H. (1993). The Technology of effective crisis management: More than the daily routine. *The Journal of Technology, Management Research*, 4(1), 45.

Rosental, U., & Pijnenberg, B. (1991). *Crisis management and decision making*. Kluwer: Dordrecht.

Senge, P.M. (1990). *The fifth discipline: The art and practice of the learning organization*. New York: Doubleday.

Shostack, G. 1987. Service positioning through structural change. *Journal of Marketing*, 51(1), 34-43.

Shubert, A. (2003). Bali bombing suspect admits role. *CNN Correspondent*. <http://www.cnn.com/2003/WORLD/asiapcf/southeast/05/29/bali.trial/> [2003, May 29th]

Smith, C.L. (2001). Security science as an applied science? *Australian Science Teachers Journal*, 47(2), 32-36.

Smith, C.L. (2002). Security science – An emerging applied science. *SCIOS*, 37(2), 8-10.

Smith, C.L., & Robinson, M. (1999). The understanding of security technology and its applications. *Proceedings of the IEEE International Carnahan Conference on Security Technology*, (26-37), Keynote Address, Madrid, Spain.

SPRING (Standards, Productivity and Innovation Board) Singapore (2005). *Four Singapore organisations clinch business excellence awards. Two educational institutions score a first this year*. Available [http://www.spring.gov.sg/portal/newsroom/news/speeches/05\\_09\\_29\\_SQAwinner.html](http://www.spring.gov.sg/portal/newsroom/news/speeches/05_09_29_SQAwinner.html)

Steffe, L.P., & Gale, J. (Eds.). (1995). *Constructivism in education*. Hillsdale, NJ: Lawrence Erlbaum Associates.

World Fire Statistics (2004). United Nations Geneva Association, International Association for the Study of Insurance Economics. (October, 20th). Available <http://www.genevaassociation.org/FIRE%20N%C2%B020%20-%20October%202004.pdf>

Yates, A. (2003). *Engineering a safer Australia: securing critical infrastructure and the built environment*. Canberra, Australia: Institution of Engineers.

Zeithaml, V. (2000). Service quality, profitability, and the economic worth of customers: What we know and what we need to know. *Journal of the Academy of Marketing Science*, 28(1), 67-85.