出國報告（出國類別：研究）

新加坡消防圖說審查、竣工查驗與消防人員訓練及勤務制度

服務機關：內政部消防署
姓名職稱：署長葉吉堂
專員洪銘謙
派赴國家：新加坡
出國期間：104年6月29日至7月3日
報告日期：104年7月27日

摘　　要

新加坡民防部隊負責新加坡消防安全、緊急救援、緊急救護、化災應變及防空安全等任務，其消防安全制度及訓練設施及觀念先進，為亞洲先趨，澳洲、韓國、中國大陸、中東國家均先後派員至新加坡觀摩學習。

本研究赴新加坡民防部隊、民防學院及消防局等單位研究其消防圖說審查及竣工查驗、火災預防、化學災害應變等機制。並參訪其訓練設施，及了解新加坡消防人員之勤務制度。

本報告書將研究所見詳實紀錄，並整理與新加坡民防部隊人員訪談之資料，綜整介紹其制度內涵及實施方式，以利讀者參考。最後並就行程所見提出心得建議。

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壹、目的

新加坡經濟高度發展且高樓林立，其建築型態及使用與我國類似，並以國際化及高行政效率聞名世界，值得我國借鏡。為研究新加坡消防檢查等火災預防執行方式，赴新加坡民防部隊、民防學院、危險物品部門等單位研究消防圖說審查、竣工查驗及消防安全檢查制度，以提升國內相關制度之管理效率。做為我國未來改進消防圖說審查、竣工查驗、消防安全檢查等制度之參考，以提升我國執行類似制度之行政效率。

貳、研究行程

日期	行程
104年6月29日	搭機抵達新加坡
104年6月30日	一、參訪民防部隊總部 二、會同新加坡民防部隊中央執法部門(Central Enforcement Department)辦理現場消防安檢
104年7月1日	一、參訪新加坡民防學院 二、參訪國家聯合戰術訓練中心Home-Team Tactical Training Centre(HTTC)
104年7月2日	參訪裕廊島消防局(Jurong Island Fire Station)
104年7月3日	搭機返國

參、研究過程

一、 新加坡民防部隊總部

(一)新加坡消防圖說審查與竣工查驗制度

新加坡民防部隊(Singapore Civil Defence Force，下稱民防部隊)為新加坡負責消防安全、緊急救援、緊急救護、化災應變及防空安全之權責機關。針對建築物消防安全圖說審查及建築物的消防安全竣工查驗，新加坡實施「自我管制」(Self-Regulation)制度，要求消防安全設計者自行聲明其設計符合消防法規，並由第三方人員複核其設計，大幅減少審查人力，並大幅提昇審查之行政效率。

1996 年以前，民防部隊審查所有申請建築物消防安全圖說的案件，檢視其是否符合消防安全法規。然而消防圖說審查及竣工查驗耗費大量人力，並且造成部分消防專業技術人員(新加坡稱為 QP，是 Qualified Person 的縮寫)將其設計責任置於民防部隊身上之弊病，因為如設計不符合法規，民防部隊就會退件，並且書面陳述不符規定的地方，使得部分消防專技人員於設計時不夠嚴謹，抱持民防部隊會替其挑出錯誤，設計不完全也沒關係的心態。

民防部隊為提昇人力運用效益及賦予消防專技人員必要責任，自 1996 年 7 月起至 1998 年 9 月止，採取「自行聲明」(Self-Declaration)制度，作為一個轉換至「自我管制」制度前的過渡期制度。在「自行聲明」制度期間，民防部隊僅審查消防圖說中特定的幾個重點，主要為建築完工後難以改善的部分，如建築安全梯和消防車進入的通道等，其餘由消防專技人員自行負擔設計責任。

1998 年 9 月後，新加坡實施「自我管制」制度，由專技人員對自己設計的消防圖說負完全責任，擔保設計的消防系統完全符合法規，再由註冊檢查員(Registered Inspector, RI)

負責審查其消防圖說。

註冊檢查員也是專技人員(QP)，要擔任註冊檢查員必需有十年以上的消防安全設計或裝置經驗，並為新加坡當地之登記合格之建築師或消防安全工程師。符合資格者向民防部隊提出申請，經審查委員會(RI Selection Panel)認可後，接受短期培訓合格，才能擔任註冊檢查員。

實施「自我管制」制度後，大幅縮短審查時間並節省大量消防人力。在實施「自我管制」制度前，75%以上的申請會被要求修改，審查及反覆修正長達數個月，大型建築案件甚至長達 2 年。而在實施「自我管制」制度之後，當專技人員的消防圖說由註冊檢查員審查合格，向民防部隊提出申請後，僅需 2 個工作天即可完成申請作業。

在「自我管制」制度中，民防部隊由電腦隨機抽查申請案進行審查(約為申請案件的 10%)，如果有審查認為不符合消防法規之案件，則要求專技人員說明，如專技人員說明不被審查委員會接受，則專技人員將會遭受處罰(罰款、暫停或撤銷執業資格、嚴重者可能處以刑責)。

全部的抽查案件中，僅有於 20%被要求要說明，最後遭受處罰的總計僅有 19 名專技人員(約佔全部案件的 0.6%)，審查合格率高達 99.4%。這可能是因為專技人員在必須自行負擔設計責任後，對自己的設計更加嚴謹，並且專業有所提昇之緣故。

建築完工後，其消防安全設備是否符合設計，由註冊檢查員負責檢查，檢查後向民防部隊提出檢查結果報告，以決定是否核發消防安全憑證(Fire Certificate, FC)或暫時性的消防安全認可(Temporary Fire Permit, TFP)。

(二)民防部隊指揮中心

新加坡民防部隊指揮中心負責新加坡境內各項災害搶救及緊急救護的指揮派遣任務。共有 4 組人員輪值，每組 16 名人員(含主管)。每次輪值 12 小時，輪值 12 小時後，休息 36 小時後再輪值 12 小時，以此類推。

輪值時分為派遣組及管制組。派遣組坐在螢幕牆前第一排，負責接聽電話並派遣車組人員出勤，車組人員出動後，轉由管制組(第二排人員)負責管制車組人員到達現場後之狀況。

圖 1-民防部隊指揮中心

上線人員數會顯示在螢幕牆邊的小螢幕上，如有重大災害發生，指揮中心人力不足接聽所有電話時，可通知各分區(Division)派遣人員協助接聽。新加坡民防部隊共有 4 個分區，每個分區都有一個接聽電話的席位，分區的接聽席位設備均與指揮中心相同。

新加坡大部分的交叉路口均設有監視器，由交通主管機關裝設，民防部隊有介接相關訊號，可隨時切換查看大部分交叉路口的交通狀況，亦可用來做為派遣時參考。其影像可於電視牆上播出。

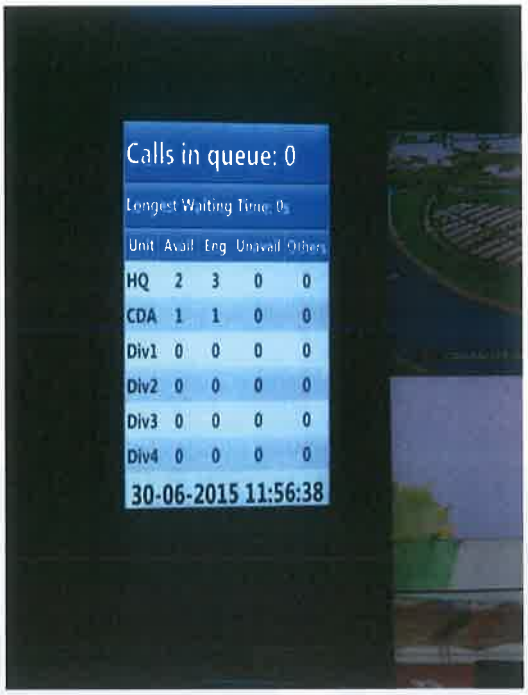


圖 2-指揮中心開設席位資訊

派遣中心每個席位均有 5 個螢幕，分別顯示各種不同資訊，如道路狀況，派遣車組及人員數量，到達現場情況等等，使派遣員可以同時瀏覽所有資訊以加快派遣流程及掌控現場狀況。

圖 3-指揮中心席位設備圖

(三)民防部隊緊急廣播系統

新加坡民防部隊除負責建築消防安全及緊急災害應變外，還負責新加坡防空警報之發布。新加坡全國重要處所均設有廣播系統，如有空襲警報或重大化學災害發生，民防部隊可立即接管所有電視及廣播頻道，播送必要訊息，以疏散或引導民眾進行適當避難行為。防空警報及重大災害的必要訊息，均已錄製影像及聲音訊息，必要時可直接播送。

圖 4-緊急廣播室

圖 5-預錄播送畫面

播送前必須同時按下兩個確認播送按鈕，兩個按鈕分置於播送室的兩側及上鎖，由兩位不同人員保管鑰匙，以避免誤觸或

遭不當使用。

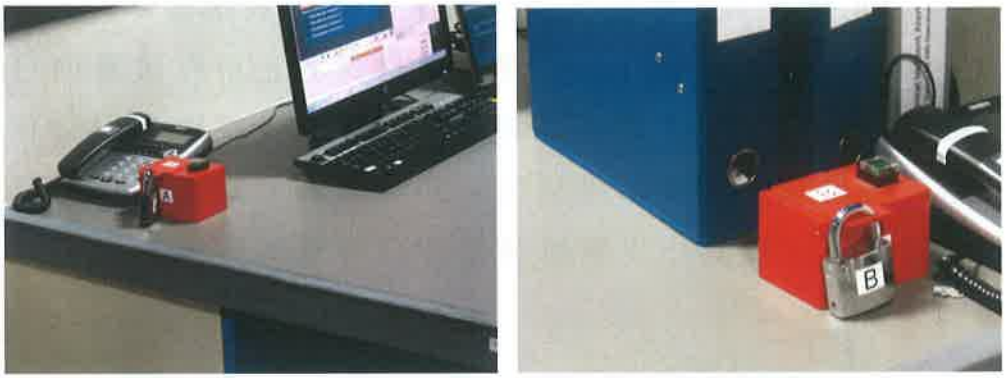


圖 6、7-確認播送按扭

(四)化災應變車(HazMat Control Vehicle, HCV)

為應變化學災害，新加坡民防部隊配置化災應變車，內部裝設可探測化學物品之器材與裝備，器材探測之所有數據均可同步傳送車上電腦，即時顯示於車內螢幕，化災應變車內所有資訊，亦可透過網路訊號傳送至民防部隊總部，總部人員可即時掌握相關資訊，以利化災事故發生時之應變與指揮調度。

圖 8-化災應變車

圖 9-化災應變車內部圖

車上並配置單人操作之兩輪電動車，可供探測人員於較大範圍之化災事故中進行探測使用。兩輪電動車上並配置可手持之探測器具。

圖 10、11-化災應變車配置之兩輪電動車

每次的出動至少配置 3 名人員(含司機，均受化災應變訓練)，如有需要亦可增加車上人員。

圖 12、13-化災應變車內器材

圖 14、15-化災應變車內器材

圖 16、17-化災應變車內器材

圖 18、19-化災應變車內器材

圖 20、21-化災應變車內器材

圖 22、23-化災應變車內器材

(五)危險物品運送車輛追蹤系統(HazMat Transport Vehicle Tracking System, HTVTS)

自 2003 年起，駕駛危險物品車輛的所有司機均需登錄個人生物特徵(指紋)、接受訓練，才能取得駕駛危險物品車輛的執照(HazMat Transport Driver Permit)。

圖 24-新加坡危險物品運送車輛監控室

自 2005 年起，在新加坡的危險物品運送車輛均強制要求裝設危險物品運送車輛追蹤系統(HTVTS-HazMat Transport Vehicle Tracking System)，包含無線電通訊裝置(GPRS)、GPS 衛星定位系統，包含由馬來西亞進入新加坡的所有危險物品運送車輛。運送危險物品的車輛只能行駛規定的路線，而且僅能在規定的時間行駛。

於 2007 年起，進入新加坡的危險物品運送車輛均強制要求設置車輛停止裝置(immobilizer)，如運送危險物品車輛駛離規定路線，監控中心就可以遠端強制車輛減速至停止。

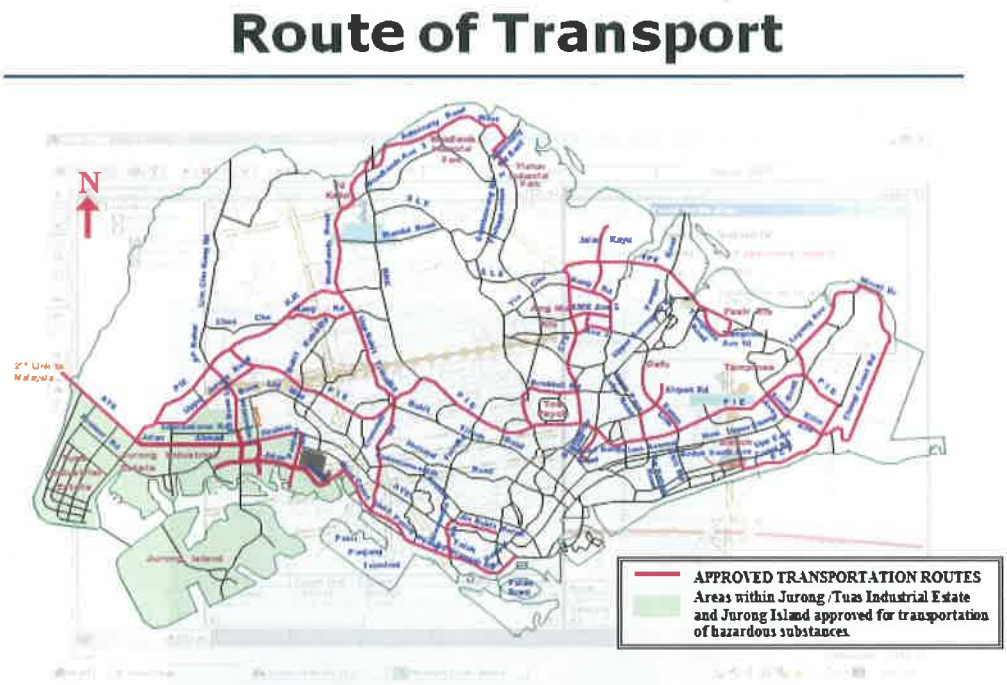


圖 25-新加坡危險物品運送車輛規定行駛路線圖

目前新加坡所有輸送石化原料之管線，每條管理均需有 1 名登記公司，必需為管線申請使用執照(1 條管線 1 個執照)，並需每年申請換發。因石化管線常由不同公司共用，或擁有者與使用者不同(如租用)，如遇災害發生，常難以立即找到負責人員，配合政府部門處理災害(如關閉閥門或管線)，因此新加坡要求每條管線都必須要有一個登記的公司，並需每年重新申請及換發執照。

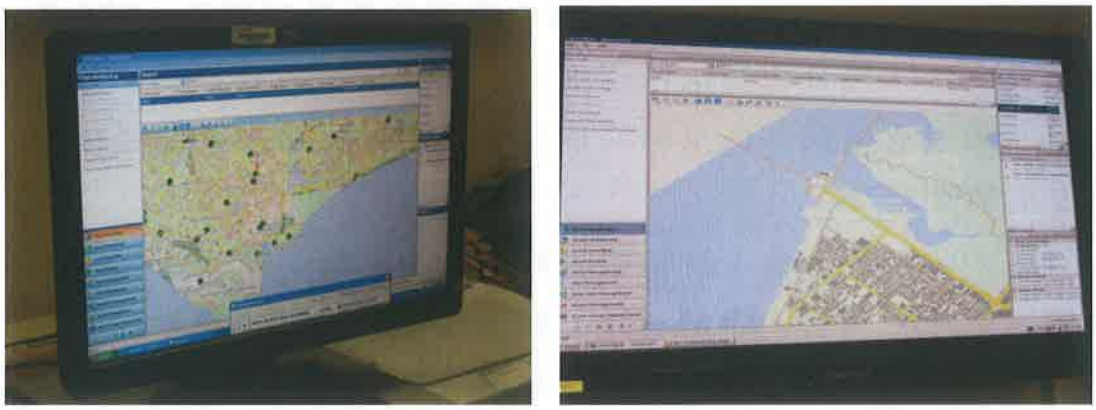


圖 26、27-新加坡危險物品運送車輛監控螢幕畫面

二、 會同新加坡民防部隊中央執法部門(Central Enforcement Department)辦理現場消防安檢

新加坡一定規模以上建築物在建築完成後，需先完成消防安全檢查，獲得消防安全認證(Fire Certificate, FC)或臨時消防安全認證(Temporary Fire Permit, TFP)才能開始使用。

消防安全認證(FC)的有效期為 1 年，故建築物每年均需完成消防安全檢查取得認證才能繼續使用。建築物關係人(stakeholder)在做消防安全檢查(FC Inspection)前，需先委託消防專技人員(QP)做完預檢(pre-testing)，確認所有消防安全設備合格後，才能向民防部隊申請辦理檢查。民防部隊檢查時原則上所有消防安全規定均應為合格狀態。

圖 28-與新加坡中央執法部辦理現場消防安檢情形

圖 29-QP 及 RI 說明當日檢查流程

辦理消防安全檢查時，現場會有消防專技人員(QP)、註冊檢查員(RI)及民防部隊官員一同辦理現場檢查，其檢查程序如下：

第一階段：測試火警警報發生時，消防安全設備作動狀況。

第二階段：測試緊急發電機啟動狀態下，消防安全設備作動情形。

第三階段：逐層測試個別消防安全設備系統。

圖 30-實際測試火警警報發生時消防設備作動情形

圖 31-測試緊急發電機啟動狀態下，消防安全設備作動情形

在消防安全檢查完成後，如果檢查合格，就會發給消防安全認證，如果有缺失，現場督導官會詳列所有缺失，告知建築管理人員。業主必須儘快改善，否則將會被處罰(1 萬新幣以下罰款或 6 個月以下刑期)，改善完成後，再申請複檢。

三、 參訪新加坡民防學院(Civil Defence Academy)

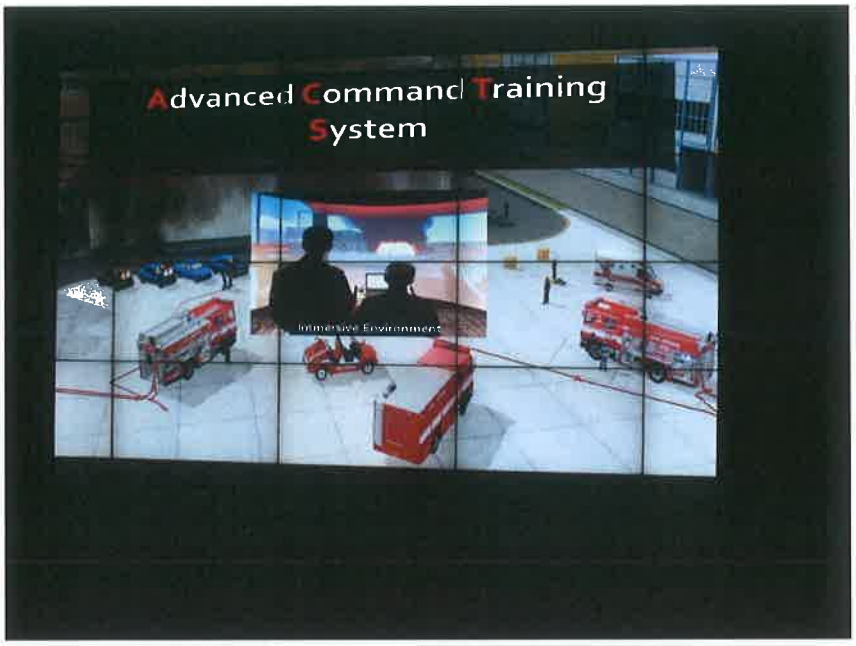
新加坡所有消防人員均在民防學院完成訓練後才分發各消防單位服務。在新加坡 18 歲以上男性均需服役 2 年，役男除可能分發至軍隊外，亦可能被分發至消防隊或警察等單位服務。役男無法自由選擇其服務單位，惟新加坡民防部隊人員表示，目前新加坡正研擬依役男專長分發其服務單位的計畫。

新加坡消防隊大量仰賴義務役男協助執行勤務，義務役接受之消防訓練與全職消防人員完全相同，役男亦可擔任消防隊長(Lieutenant，其職務約等同我國之消防分隊長)帶隊進入火場救災。

一般消防員需接受 5 個月訓練(指揮官則為 7 個月)，包含體能、戰技、繩結等基礎戰技，並接受各種模擬訓練，例如模擬燃燒室搶救、閃燃體驗、坍塌場所救援，以及用 3D 模擬火場體驗各種火場中可能遇到的狀況，讓每名消防員結訓前，皆在腦中累積大量火場可能遭遇的情境及其應對的應變方式，於短期間累積火場經驗，以利將來於實際火場時，有足夠的知識及經驗來做出正確的判斷。

(一)火場指揮訓練系統

圖 32-火場指揮訓練系統-1



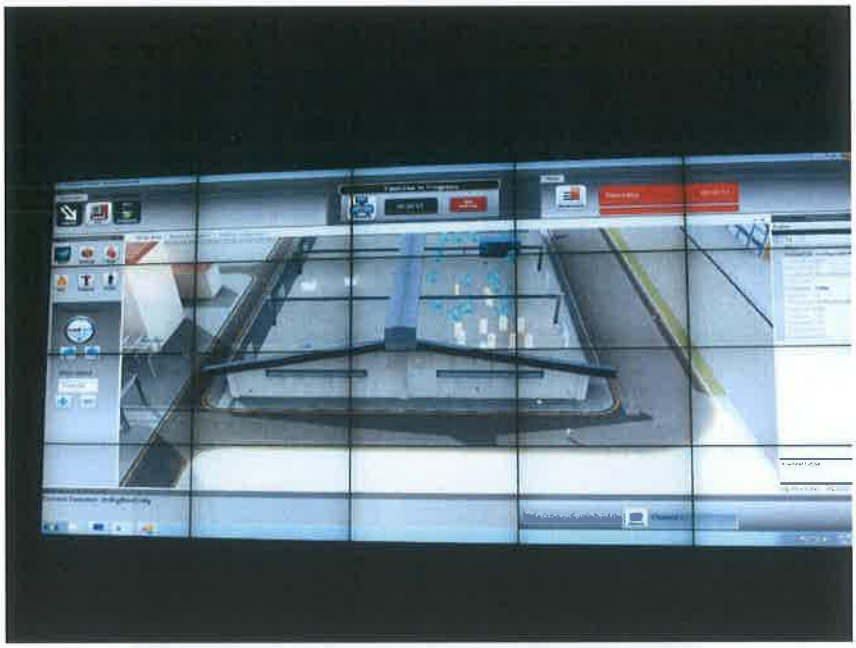


圖 33、34-火場指揮訓練系統-2、3

圖 32 至 34 為新加坡民防學院建置之火場指揮訓練系統，新加坡民防學院為增進火場模擬擬真度，建置 3D 模擬訓練系統。此系統內建圖資以真實場景製作，可模擬各種場所發生的不同火災情境，也可以設定火點及傷患人數、傷患發生地點。受訓學員可以此系統實際模擬火災發生時之應變措施，由訓練教官給予指令及情境，學員實際操作，有如面臨真實火場之情境，籍以累積火場經驗。每次可由 1 人操作，惟其他學員均可同步

觀察，並於操作完成後由具有實際火場救援經驗之教官給予指導，並檢討火場應變措施，以獲取火災搶救經驗。

(二)模擬燃燒大樓

為使訓練儘量接近真實救災情況，針對火災搶救及火場搜索救援，新加坡建造模擬燃燒大樓。大樓內有各種不同場所的模擬火災情境，如商場、酒吧、工廠運送帶、地下室火災、使用瓦斯火災、一般住宅火災、廚房火災等等。訓練時儘量模擬真實場景設置(如放置真實傢俱燃燒)，模擬系統亦可控制火點及火勢。

圖 35-模擬燃燒大樓

圖 36-模擬火場可設定之情境

圖 37-模擬火場-酒吧火災情境燃燒教室

圖 38-模擬火場-使用瓦斯火災情境燃燒教室

圖 39-狹小空間及搜救訓練迷宮

(三)其他模擬訓練設施

民防學院除辦理一般消防員訓練外，亦針對各種特殊災害訓練。例如化學災害、船舶火災搶救、坍塌災害救援、消防安全檢查人員以及防火管理經理(Fire Safety Manager，類似我國防火管理人)訓練，亦協助各國付費訓練消防人員。

圖 40-管線火災搶救模擬設施

圖 41-化學工廠火災搶救模擬設施

圖 42-油槽火災搶救模擬設施

四、 參訪國家聯合戰術訓練中心 Home-Team Tactical Training Centre(HTTC)

國家聯合戰術訓練中心(HTTC)是由新加坡消防、警察及其他新加坡內政部所屬機關所聯合建立之訓練中心，目前仍在建造中，預定於 2015 年底才會啟用。該中心自規劃設計至預估建造完工歷時十年，據新加坡民防部隊人員表示，該訓練中心僅民防部隊投入之建築費用即高達新臺幣 30 億元。未來將與內政部其他機關作為聯合訓練使用。

(一)地下空間及淹水搶救訓練設施

圖 43-地下空間及淹水搶救訓練設施

圖 43 設施作為地下空間或淹水時搶救訓練，該空間可以全部淹滿水，並可以播放如嬰兒哭叫、人員呼救、巨大聲響等模擬聲，以增加救援模擬程度。

(二)建築倒塌救援訓練大樓

圖 44 至 48 為模擬建築物倒塌，訓練救援人員於倒塌大樓搶救之設施。建築物以傾斜 18 度方式建造，包含建築內所有空間、門窗、通道、樓梯及設備均傾斜 18 度，模擬於建築倒塌之情境及增加救援困難度，供學員模擬真實救援情境。

圖 44-建築倒塌訓練大樓(傾斜建築)

圖 45-樓梯與建築同樣傾斜 18 度

圖 46-建築倒塌訓練大樓室內景-1

圖 47-建築倒塌訓練大樓室內景-2

圖 48-建築倒塌訓練大樓室內景-3

(三)自殺救援訓練設施

圖 49-自殺救援訓練設施

新加坡民防部隊人員表示，新加坡的自殺救援案件數逐年提升，並以跳樓為主。為提升自殺救援成功率與保護救援人員，設置專為訓練自殺救援任務之訓練設施，模擬可能情境，以增進救援人員戰技。

(四)船舶火災救援訓練設施

圖 50-船舶火災救援訓練設施

新加坡之船舶火災救援任務由民防部隊負責，為訓練搶救船舶火災之專業人員，建造模擬船舶火災之訓練設施，全棟設施係根據真實船舶藍圖建造。

圖 51、52-船舶火災救援訓練設施室內設備

圖 53、54-船舶火災救援訓練設施室內設備

(五)石化工廠搶救訓練設施

圖 55-石化工廠搶救訓練設施

新加坡設有裕廊島石化專區，專區內石化工廠林立。石化工業一旦發生火災，搶救困難、危險性高且具有特殊性。民防部隊建造石化工廠火災搶救訓練設施，可進行包含火災搶救、人員救援、管線破裂外洩處理及化災除汙等訓練。全棟訓練設施根據真實石化工廠藍圖修改建造，訓練設施內設有多處可能火點，使學員能模擬各種不同設施發生火災時之搶救應變措施。

圖 56-石化工廠搶救訓練設施場景

圖 57-石化工廠搶救訓練設施場景

圖 58-石化工廠搶救訓練設施場景

圖 59-石化工廠搶救訓練設施場景

(六)訓練監控室

模擬的救援訓練和真實的救援一樣具有風險，為管控訓練安全，故所有訓練設施均配置可夜視之監視攝影機，並可由監控視掌控所有訓練情形。另所有訓練情境均可由監控室操控(如火焰、聲響、淹水)，並設有廣播系統，可隨機下達指示。訓練中如造成學員危險，可由監控室立刻停止所有模擬狀況(如停止火焰或停止淹水，打開照明等等)，以維護訓練安全。

圖 60-訓練監控室

圖 61-監控螢幕畫面

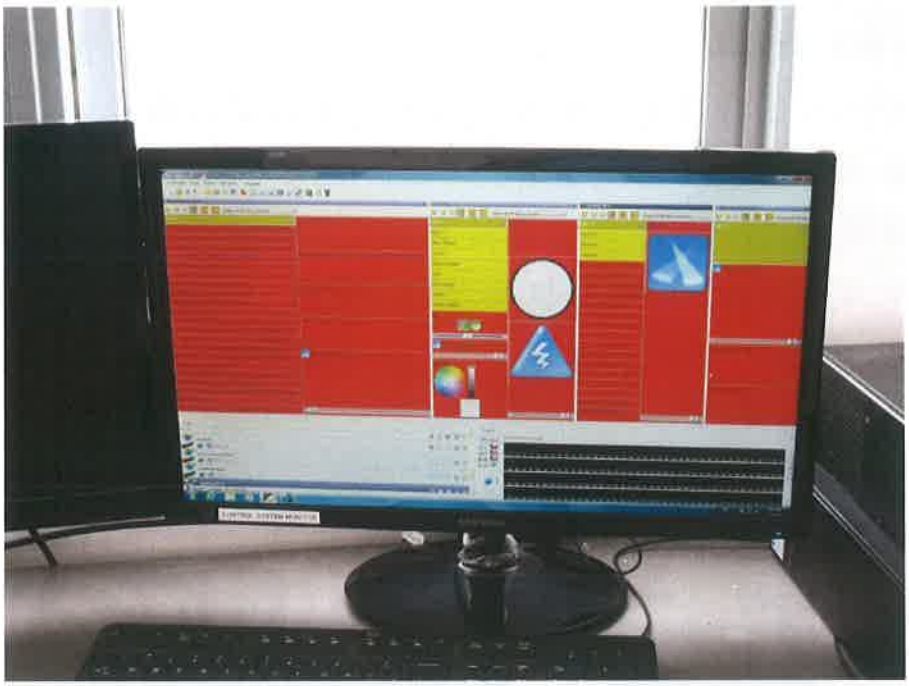


圖 62-模擬情境設定系統

五、 參訪裕廊島消防局(Jurong Island Fire Station)

新加坡裕廊島石化專區是全球最大的石化專區之一，該島是由 7 相鄰的島嶼填海造陸連接而成。新加坡耗費十多年，將七個小島填海造陸，連成一座面積三千二百公頃的大島。裕廊島上有九十五家國際型企業投資，包括殼牌（Shell）、埃克森美孚（Exxon Mobil）、杜邦（Dupont）、巴斯夫（Basf）、住友及三井化學等石化巨擘。

在 911 後，新加坡對於鄰近新加坡主要國土的裕廊島加強了安全措施，進入裕廊島前，必須先通過檢查崗哨，島上的安全人員除新加坡的警察外，尚有第三方的保全公司(可使用槍枝)及荷槍實彈的軍人守衛，以保衛石化園區的安全。

本次參訪裕廊島消防局主要為了解新加坡消防人員勤務制度及車輛裝備器材，並藉此機會了解裕廊島上化學災害及火災應變的相關流程及資訊。

新加坡民防部隊除總部外，分為四個分區，每個分區約有 7 至 9 個消防局，每個消防局約有 3 至 4 個消防隊。新加坡消防局的轄區規模約等同我國的消防分隊，而其所屬的消防隊則為一個輪值的單位。

裕廊島上有兩個消防局，每個消防局有 3 個消防隊，本次訪問的消防隊是裕廊島消防局(Jurong Island Fire Station)，共有 84 名消防人員，18 臺各式車輛，轄區約 32 平方公里。擔負轄區內的火災搶救、緊急救援及緊急救護勤務，並有化災應變隊。

消防局視其勤務需要，設有小型的消防站，主要是設在不易設置消防隊的地點，其輪值時間為上午 10 點至隔日上午 6 點，每日交接時，人員需先回消防局交接，交接人員於晨間訓練結束後，再於 10 點前到消防站備勤。

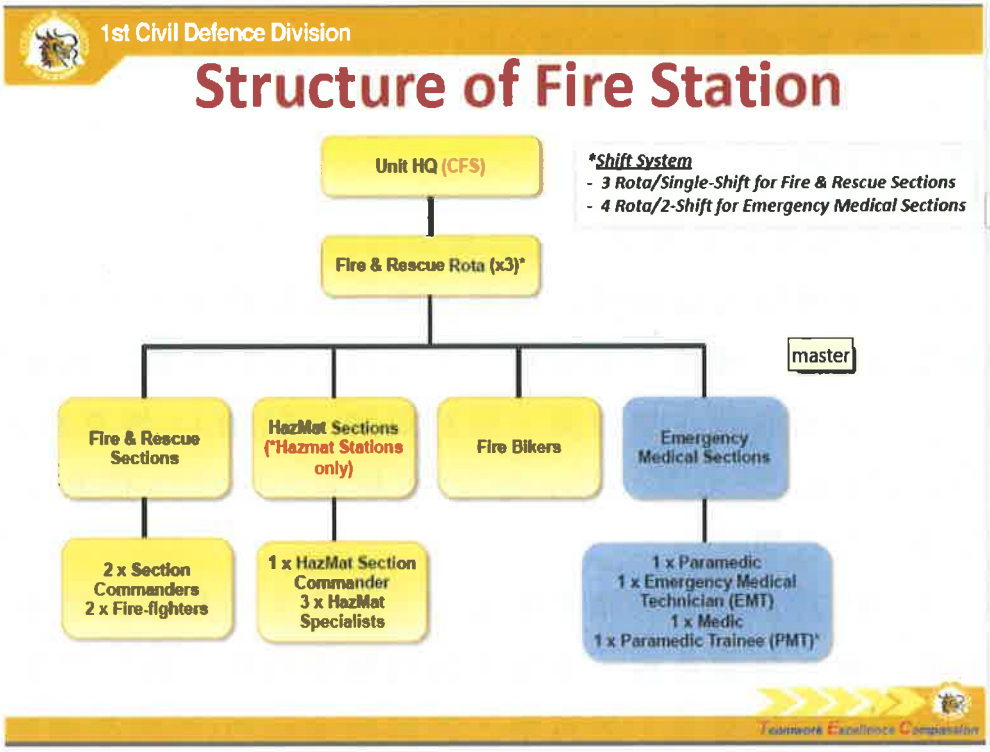


圖 63-新加坡消防局人員編制圖

新加坡消防隊採勤 1 休 2 制(執勤 24 小時，休 48 小時)，每天的輪值中包含火災與救援小組，包含 2 個小隊長和 2 名隊員；部分消防局有化災應變隊，內含 1 名指揮官和 3 名化災應變人員。另外新加坡還設有消防機車，消防機車上裝載特殊滅火用具及急救器材，可在交通擁塞時爭取時效到達現場。為勤務安全，消防機車只於 7 至 15 時、15 至 23 時間執行勤務。

圖 64-新加坡消防人員勤務制度圖

新加坡消防隊擁有特殊專長者(經訓練並通過測驗者)可領特殊專長加給，如化災應變、船舶火災搶救、特種搜救等，可

較一般消防人員每月多領 500 至 800 新幣的專長加給(視專長類別)，各項特殊專長，每年尚需定期複訓及測驗，1 年有兩次測驗機會，如兩次皆未通過測驗，則其專長加給會被取消。

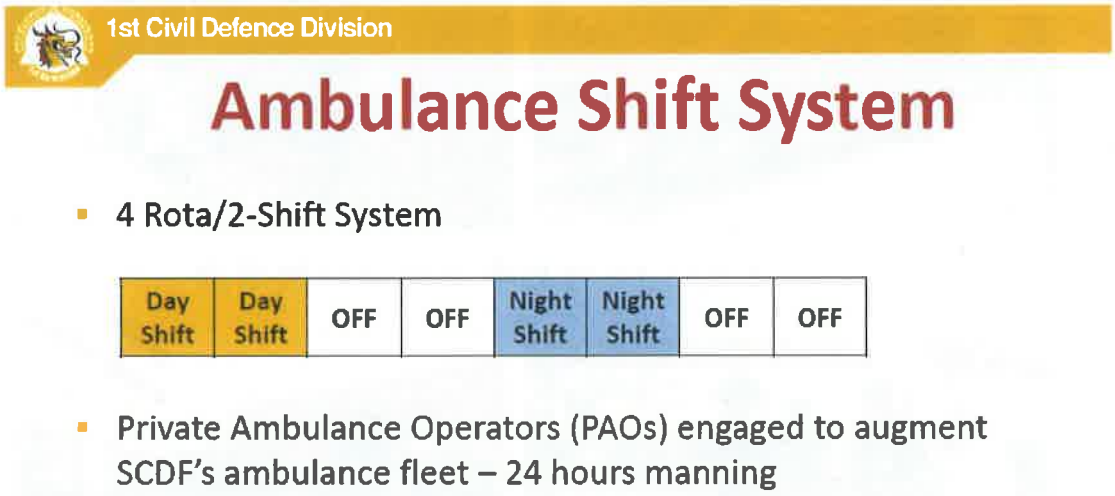


圖 65-新加坡救護人員勤務制度圖

因緊急救護勤務量大且需專業知識及技術，緊急救護執勤人員均專責從事救護工作，不做救災或其他工作。其輪值方式與一般救災人員不同。新加坡緊急救護勤務制度採勤 2 休 2 制度，每次上班時間為 12 小時。每次出勤為 3 至 4 人，其中 1 人為 EMTP，1 人為 EMT，1 人為緊急救護輔助員(通常為役男)，另外視情形可能有一名接受 EMTP 訓練的人員。因民防部隊人力不足以負荷所有的緊急救護勤務，故民防部隊另與民間救護公司簽約提供救護車輛及人力，24 小時接受民防部隊調派。

圖 66、67-裕廊島消防局車輛裝備


圖 68、69-裕廊島消防局車輛裝備


圖 70、71-裕廊島消防局車輛裝備


圖 72、73-裕廊島消防局車輛裝備


圖 74、75-裕廊島消防局車輛裝備

肆、心得與建議

一、研究消防圖說審查與竣工查驗申請收費之可行性

新加坡採行「自我管制」制度，由消防專技人員自行聲明其消防安全設計符合法規要求，以建築無利害關係之註冊檢查員負責審查消防圖說，減少消防機關業務負擔，再輔以「抽查」方式複核審查品質，使消防人員可以從事他們認為最有效益的工作，也就是「諮詢」上，使人力資源效益極大化。

我國目前消防安全設備圖說採全部審查，所有須設置消防安全設備之新建建築須經消防機關審查其消防安全設備設計是否符合消防法規；建築完工後，並須由消防機關會同勘查其消防安全設備是否依圖說設置，耗費消防機關人力，部分消防專技人員更因消防機關會將其不符消防法規部分檢討及告知設計者，因而對所設計的消防安全圖說較不嚴謹，從而將其設計責任置於消防機關上，加重消防機關業務負擔及風險。

我國消防專技人員制度亦未發展成熟，我國國情亦與新加坡不同，為公共安全利益，尚不宜比照新加坡採行自我管制。惟新加坡專技人員申請消防圖說審查及竣工查驗時，均須繳交規費，因其申請辦理事項使用國家資源，國家必須聘用人力處理該申請事項，故採使用者付費制度。我國目前受理審勘申請尚不須繳交費用，故消防專技人員對於其設計圖說之申請及修改送件不會在意反覆修改及申請審查次數，造成消防機關重複審查之人力浪費。針對此點，或可參採新加坡方式，針對圖說審查及竣工查驗案件，收取一定規費，如此消防專技人員於送件時將會考量成本，儘量避免遭消防機關退件，應會對所送之圖說更加嚴謹，減少消防機關重複審查同一案件之人力。

二、強化化災應變訓練及充實化災應變器材

化災事故一旦發生，常有影響範圍廣，危險性高且災害程度大等特性。毒災及化災應變權責機關為行政院環保署，惟消防機關常為第一階段到達現場處理之應變人員。到達現場後，需辨識其危害，並保護自身安全，同時疏散民眾避難。化災應變有其特殊性，應變人員需有毒化物相關知識並配備檢測器材及熟悉操作技術。目前毒化災應變事故訓練，多由環保署辦理，惟其訓練班期數少，多數消防人員尚未接受過化災應變訓練。

為因應化災事故，應強化第一線消防人員化災應變訓練，並充實化災檢測及應變器材。轄內有大型化學工廠之直轄市、縣(市)消防機關，更可考量設置化災應變隊，以應重大化學災害發生時之應變所需。

三、研究增發特殊專業加給之可行性

新加坡民防部隊依需要對不同消防人員施以特殊訓練，並派遣擔任該種特殊災害之應變小組，給予不同之專業加給。擔任特殊災害應變人員，並有特殊專長臂章，除可供辨識外，亦為一種榮譽。

我國雖已將消防人員施以不同之特殊訓練，納編為應變小組成員，使不同救災專業模組化。惟應變人員平日仍需辦理其他勤業務，與其他消防人員無異，僅於特殊災害時召集出動。此一現象造成「同酬不同工」之現象，降低消防人員接受特殊訓練或擔任特殊勤務之意願。

我國或可評估參採新加坡制度，對擁有特殊專長且擔任特殊勤務之人員，增發特殊專長加給，以提升消防人員接受特殊訓練或擔任危險性較高勤務之意願。擔任特殊災害應變人員，亦可評估是否發給不同辨識臂章，以增強專長認同及榮譽感。接受訓練人員，應挑選平日表現優秀人員受訓，以產生良性競爭。應變小組成員，平時訓練及勤務並儘量以其擔任之特殊災害為主，使勤務單純化，並加強其特殊訓練強

度及知識，增進其特殊專業。使小組成員專注於該種災害應變，發展其專業技能，增進應變特殊災害之能量。

伍、附件-新加坡民防部隊業務簡報

一、Enforcement Roles and Functions- An Overview

二、HazMat Transport Vehicle Tracking System (HTVTS)

三、SCDF’ s HazMat Mitigation Capabilities

四、SCDF’ s Fire Safety Regulation

五、Fire Station Address

Enforcement Roles and Functions
An Overview

Scope of Presentation

- Introduction
- Components of SCDF fire regulatory system
- Fire Safety Act
- Control Schemes
- Enforcement Process and Powers
- Common examples of fire safety violations and actions taken
- Conclusion

Introduction

SCDF regulates fire safety in buildings to attain a fire-safe built environment

- Formulates fire safety policies
- Implements fire safety standards
- Partnering the industry players to improve on regulatory systems
- Maintains an effective regulatory regime that works well for the country

How is fire safety maintained in Singapore?

Two prong approach

1. Effective Prevention
2. Rapid Mitigation

Components of Fire Safety Regulatory System

1. Fire Safety Legislation

Fire Safety Act

- Enacted in 1993
- Gives Minister power to make regulations
- Enables SCDF to implement fire safety regulatory control and systems
- Provides Commissioner powers to enforce against fire safety offences

2. Control Schemes

Building's fire safety and life safety of occupants

- Fire Certificate (FC) – To ensure the premises fire safety designs and protection systems are in compliance after occupation and maintained in good working order.
- Fire Safety Manager (FSM) - To safeguard and prepare the occupants of large public and industrial building against fire
- ERP – Formulation of Plan to prepare the building occupants against any fire or CBR threats.
- CERT – Incipient fires are effectively put out by the occupant prior to the arrival of SCDF forces

Petroleum and Flammable Materials (P&FM)

- SCDF regulates the import, transport, storage, dispensing and conveyance of P&FM in pipelines through the licensing regime.

SCDF's Pipeline Regulatory Control

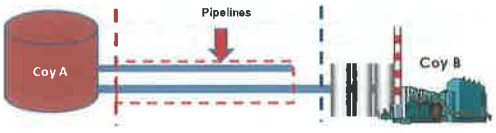
- New provisions in the Fire Safety Act and Fire Safety (P&FM) Regulation were gazetted in Mar and Sep 2013 respectively to regulate the conveyance, supply and distribution of P&FM through pipelines

SCDF's Pipeline Regulatory Control

- **Objectives of regulatory control** :
  - High fire safety design and construction standards
  - Good practices in day-to-day operation and maintenance to prevent incident
  - Effective initial response by the licensee

SCDF's Pipeline Regulatory Control

- To license Pipelines Corridors Owner
- For segment outside corridor, to license Pipelines Owner



Our Considerations

- Pipelines Corridors Owner
  - Holistic knowledge of all pipelines in corridor
    - QRA, Plans Approval, Fire Safety Cert, Emergency Response Plan
    - Maintenance regime of pipelines
  - Speedy response (even before identification of actual owner for the leaking pipeline & accessibility to the corridor)
  - One clear accountable party
- Pipelines User
  - Knowledge on pipelines integrity & isolation arrangements
    - Design, Construction and Operation
  - Control of safe day-to-day operation
- Basically Corridor owner and Pipelines Users have shared responsibilities

SCDF's Pipeline Regulatory Control

- QRA submission
  - Evaluation and approval by HAZMAT Dept
- Plan submission
  - Design, construction and operation pipeline complied with SS 512 and approval by Fire Safety Shelter Dept
- QP to supervise work & RI to ensure compliance
  - Fire Safety Certificate to be issued by CED

SCDF's Pipeline Regulatory Control

- Third party, PE, to carry out inspection and conduct testing on fire safety provisions before licence renewal annually
- Similar to existing licences, application submission through SCDF website with relevant document
- Inspection of a selected segment of pipeline to validate the quality of the P.E.'s work

SCDF's Pipeline Regulatory Control

- Charging model
  - Licence fees (per year) based on cost recovery
    - $350
  - License validity for one year

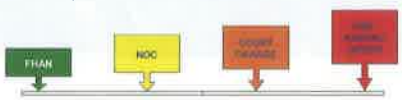
Enforcement Process

Enforcements

- SCDF conducts scheduled enforcement checks at higher risk premises and responds to public feedbacks.
- Post-fire enforcement checks are also carried out to assist premises to rectify violations and improve fire safety standards.

Enforcement Powers

- Serving of Abatement notices (FHAN)
- Issuance of composition fines
- Court actions
- Commissioner Closure
- Fire Hazard Order – Abatement, Prohibition and Closure



COMMON NON COMPLIANCES

Non-Maintenance of Fire Fighting Provisions

Obstruction to Means of Escape

Excessive Storage of P and FM

Unauthorised Fire Safety Works

Unauthorised Change of Use

Unauthorised Workers' Dormitory

LPG DECANTING

Examples of Our Actions

Fire occurred on 21 April 10 at Level 5 of MSCP

Carpark management charged in court

Management required to alleviate all fire safety hazards and violations and relook emergency response and evacuation procedure

Carpark fire: Operator given maximum $60,000 penalty

Unauthorised occupation of hostel (16 August 11)

Operator of hostel has converted pre-war shop-house into concept 'capsule hostel' without mandatory fire safety certificate from SCDF

Hostel ordered to close until obtaining FSC

Capsule hostel has not obtained fire safety certificate

LPG fire at 29 Lembu Road on 14 August 2011 at around 1748 hrs

FS violations includes

Unauthorised workers' dormitory

Excessive storage and improper usage of LPG

Overcrowding remains a problem after repeated fines and court actions.

Applied in court for FHO (Prohibition Order) for closure of Mustafa Centre at Level 1

Imposed 40 hrs long Prohibition Order on 08 April 10

Conclusion

Fire safety provides best safeguard to lives and property protection

A robust fire safety framework and effective enforcement regime is necessary to keep Singapore a safer home to live, work and play.

Thank You

HazMat Transport Vehicle Tracking System (HTVTS)

SCDF

Background

- HTVTS requirements made mandatory in 2005 (P&FM Regulations)
- HazMat drivers to undergo training
- HazMat vehicles to be easily identified
- In 2007, the immobilizer was installed in HazMat vehicles
- Mandatory annual inspection

HazMat Transport Requirements

- Transport Licence
  - HazMat Transportation Driver Permit (HTDP)
  - GPS tracking device
  - Immobilizer
  - Orange-colored licence plate
  - Transport Emergency Response Plan
- Approved Routes
- Approved Transport Timings

HazMat Transport Driver Permit

- Implemented in April 2003
- Security Screening
- Training
- Biometrics Verification System using thumbprint

HazMat Transport Vehicle Tracking System

- Introduced in July 2005
- Harnesses technologies such as GPS, SMS, & GPRS for vehicle tracking
- Uses Inertia Navigational System (INS) for blind spots

Tracking Devices

GLP 100
Geo-Location Positioning Device

Active Tag (Trailer) Receiver (Prime Mover)

RF Tag and **Receiver** for prime movers & trailers to identify trailer connection and disconnection

Immobilizer

- Implemented on 1st April 2007
- Uses "Limp Mode" Principle which controls the throttle to restrict the fuel injection to prevent acceleration
- Vehicle decelerates and slows down progressively without affecting its power steering and braking system
- Speed is reduced safely to 10 km/h before coming to a complete stop

Route of Transport

Route of Transport

Approved Hours

S/N	TYPE OF HAZMAT	APPROVED HOURS
1	Petroleum and Flammable Materials generally, unless any other item in this table applies (Including transportation via Tuas Checkpoint. Transportation of P&FM via Woodlands Checkpoint is not allowed)	0700hrs to 1900hrs
2	Petroleum and flammable material in tube trailers	0900hrs to 1700hrs
3	Other hazardous substances, i.e. corrosives, toxics, etc	0900hrs to 1700hrs except Sundays & PHs
4	LPG cylinders for domestic purposes or use at an eating place or a restaurant	0700hrs to 2100hrs
5	Petroleum and flammable materials transportation within Jurong Industrial Estate, Tuas Industrial Estate and Jurong Island	No restriction
6a	Petroleum and flammable materials for transshipment between Brani Terminal, Pasir Panjang Terminal or Keppel Terminal	0700hrs to 1900hrs. Beyond approved hours subjected to SCDF's approval
6b	Diesel & Acetylene	

What are we monitoring?

- Petroleum/flammable materials whose total net quantity is over 3 MT
- Liquefied Ammonia, Chlorine, Hydrogen Chloride, Hydrogen Fluoride and Methyl Chloride in quantities over 1 MT*
- Arsine, Phosphine and Phosgene gases in any amount
- Explosive Precursors above 3 MT*
- Applicable to foreign HazMat vehicles coming through Tuas Checkpoint as well

* Licensed by NEA/SPF

HTVTS Ops Centre

- 24/7 monitoring and tracking

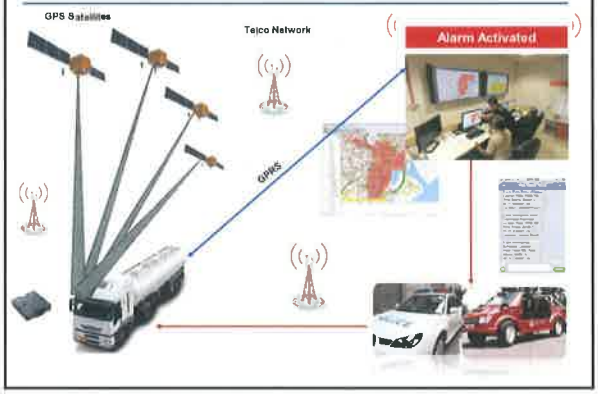
HazMat Transport Check Point (HTCP)

- Manned by officers from 0700hrs to 1900hrs daily
- Checks on Tracking Device and HTDP
- Checks to ensure vehicles are licensed to transport hazardous goods

CBD Gantry Points

- CBD - Geo-fenced Area
- Located at Anson and Lavender
- Manned by officers from 0700hrs to 1900hrs daily
- Verification of HTDP
- Checks to ensure vehicles are licensed to transport hazardous goods

HTVTS Overview



End of Presentation

THANK YOU

SCDF's HazMat Mitigation Capabilities

LTC Ryan Ong
Assistant Director HazMat Department
Singapore Civil Defence Force

Key Challenges

- Complex super structures
- Rapid growth of the bio-tech and petrochemical industry
- Global threat of terrorism

CAPABILITY BUILDING PHASE

- Multi-agency Emergency HazMat Response System
- Capability to manage toxic industrial chemical incident

POST 1995 – UNCONVENTIONAL THREATS CAPABILITY

Monitoring, sampling and decontamination capability for chemical agent incident

POST 9-11

Capability for response to Biological, Radiological and Improvised Explosive Device incidents

OPS CIVIL EMERGENCY

- Appointed Incident Manager for Civil Emergencies
- Coordinate and integrate plans across the government

MULTI-TIERED RESPONSE

PHASE I Initial Response
- First Responders
- Rescue & Evacuation
- Medical Treatment

PHASE II HIT Team
- HazMat Incident Team
- Trained Technicians
- Mitigation Ops

PHASE III HEART Team
- HazMat Emergency Assessment and Response Team
- Technical Expert
- Identification of CBR Threats

HAZMAT/CBR Detection Capabilities

- All Frontliners trained to operate in CBR conditions
- Equipped with detectors like CAMplus, GID, Polytector for detection and initial zoning of hazard areas

HAZMAT/CBR Mitigation Capabilities

- To carry out mitigation, HIT Team will respond in their HazMat Mitigation Vehicle (HMV)
- The HMV has a comprehensive range of mitigation equipment to mitigate HazMat/CBR threats
- HazMat Utility Buggy enables the swift evacuation of casualties

Capability: HazMat Control Vehicle

Deployed during HazMat incidents for identification of hazardous substances, assessment of the extent of contamination and enables SCDF to achieve greater situational awareness of the incident

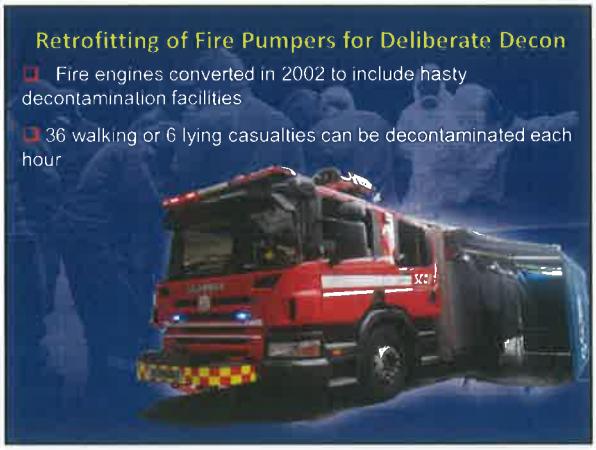
Capability: HazMat Control Vehicle

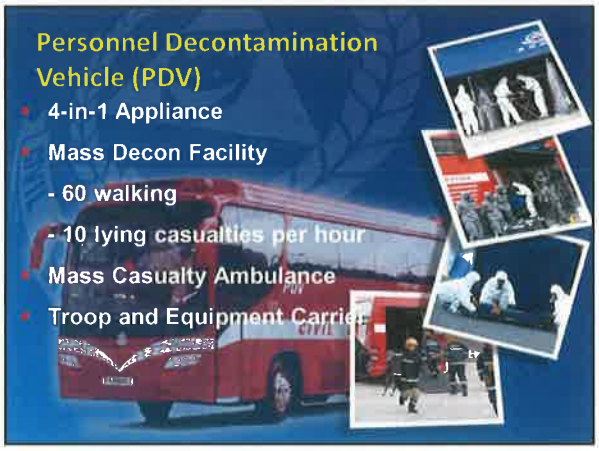
Integrated with 3 new components:
- Advanced detection and analytical equipment
- Command, Control and Communication infrastructure
- Vehicle-in-Vehicle concept

HazMat Incident Management System (HIMS)

- Provides overall situational picture for effective incident management
- Wireless real-time transmission of detector readings
- Predictive simulation models provide comprehensive info for commander's decision making


Immediate Decontamination Capability
SCDF deploys Pump Ladders (PL) and Personnel Decontamination Vehicles (PDV) for decon purpose


Retrofitting of Fire Pumpers for Deliberate Decon
Fire engines converted in 2002 to include hasty decontamination facilities
36 walking or 6 lying casualties can be decontaminated each hour


Personnel Decontamination Vehicle (PDV)
4-in-1 Appliance
Mass Decon Facility
- 60 walking
- 10 lying casualties per hour
Mass Casualty Ambulance
Troop and Equipment Carrier


MOVING FORWARD – CAPABILITY DEVELOPMENT
Seaward CBR response
FIREFIGHTER II


MOVING FORWARD – CAPABILITY DEVELOPMENT
Drones fitted with toxic gas and radiological detector
Robotic system for casualty convevance
SCDF


CONCLUSION
Successful in responding to emergencies
Remain vigilant to future threats
Prepare as best we can
SCDF


THANK YOU

SCDF's Fire Safety Regulation

Presentation to
National Fire Agency, Ministry of Interior,
Taiwan, Republic of China

30 Jun 2015

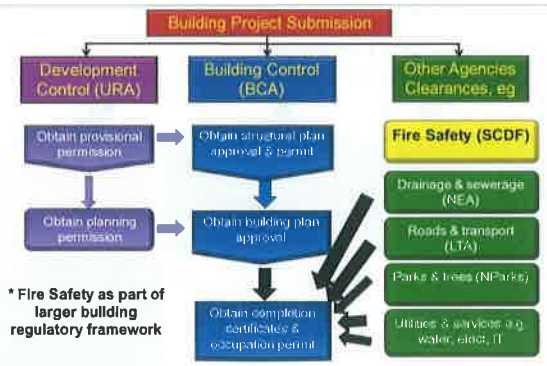
SCDF

SCDF's Fire Safety Regulation

SCOPE

- Fire Safety Regulatory Framework
  - Legislation
  - Systems and processes
  - Codes and standards
  - Competency & professional development
- Challenges in Regulating Fire Safety
- Conclusion

Singapore Fire Safety Regulation



Singapore Fire Safety Regulation

Singapore Fire Safety Regulation

Guiding Philosophy in regulating fire safety

- **Design to Comply**
  - impose requirements for new projects while calibrating those for existing ones
- **Risk-managed Approach**
  - evaluate the risks and mitigating strategies
- **Evidence-based Validation**
  - conduct fire burn test, fire modeling etc
- **Reinforcing Cycle of F.I.R.E**
  - Fight fires, Investigate origin & cause, Review prevailing codes, Enforce for compliance

Singapore Fire Safety Regulation

1. Fire Safety Act (FSA) & its Regulations

- All fire safety works are governed by FSA and its regulations
- Fire safety works are designed by Qualified Persons **(QP)** and approved by SCDF
- Fire safety standards for buildings in Singapore are stipulated in the Fire Code and standards

Legislative aspects include:

- Administrative framework & processes
- Qualification of Fire Safety Professionals
- Registration & Professional Development
- Professional Conduct & Discipline

Singapore Fire Safety Regulation

1. Fire Safety Act (FSA) & its Regulations

Channels to communicate regulatory changes:

- Revised fire code or standards
- Fire safety requirement circulars
- Codes and standards review meetings
- Official SCDF website
- Seminars
- Stakeholders' briefings and dialogue

- ***6 months grace period granted***

Singapore Fire Safety Regulation

2. Systems and Processes

Fire Safety Plans Submission : An Evolving System

Full Checking (1982 - 96) - Every plan that was submitted to SCDF was checked for compliance. Written directions were issued to the QP, who would then re-submit the plans upon compliance.

Self - Declaration (Jul 96 - Sep 98) - QPs submit plans where SCDF only checks specific requirements in the plans.

Self- Regulation (From Sep 98) – Plans are approved within 2 working days based on QP statutory declaration.

Singapore Fire Safety Regulation

2. Systems and Processes

Previous System	Remarks
Every plan submitted to SCDF was checked in detail.	Iterative process - several rounds of resubmissions.
At least 75% of submissions require WDs to be issued to QP for non-compliances.	Usually a project took several months.
Plans would be returned to the QP for amendments.	Mega projects may take as long as 2 years to be approved.
Upon amendment, QP resubmits plans.	
If there were still areas of non-compliance, SCDF would issue WDs again.	
Current System (Self-Regulation)	**Remarks**
QP declares upfront that he has fully complied with the fire code's requirements	Approval time is very much shortened.
On the strength of this statutory declaration, approval is granted within 2 working days.	< 20% of the audited cases warranted an explanation from QP and of these, 0.6% or 19 QPs were penalised.

Singapore Fire Safety Regulation

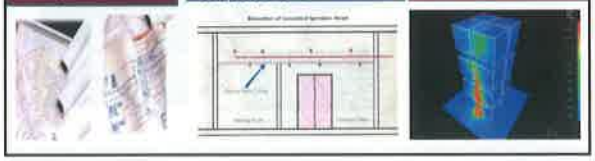
2. Systems and Processes

Types of plans submissions

1) Prescriptive
- endorsed by QP
- completed works inspected by RI
- bulk of plans submitted

2) Minor Additions/ Alterations
- only 1 QP required for endorsement
- no need RI inspection of completed works

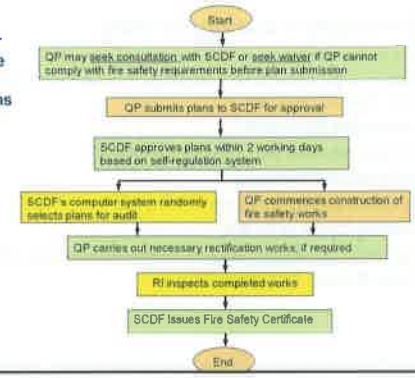
3) Performance-Based (PB)
- endorsed by FSE
- completed works inspected by RI



Singapore Fire Safety Regulation

2. Systems and Processes

Approval Process for Prescriptive Plan Submissions



Singapore Fire Safety Regulation

2. Systems and Processes

- **Inspections** - All completed fire safety works must be inspected by Registered Inspectors (RIs)
- **Enforcements**
  - SCDF conducts scheduled and random enforcement checks to ensure no violations at the ground
  - It also conducts post-fire check to selected premises for possible violations committed on-site


Singapore Fire Safety Regulation

3. Fire Codes and Standards

Code Formulation and Review with key stakeholders

- **Review of overseas codes, practices, research**
- **Conduct of fire burn tests**
- **Conduct of study trips**


Singapore Fire Safety Regulation

3. Fire Codes and Standards

Code Formulation and Review

- **Fire investigation findings**
- **Fire modeling**

Singapore Fire Safety Regulation

4. Competency & Professional Development

- Building Capacity of Staff & Professionals
  - pre-requisite education and training
  - specialised and upgrading training / courses
  - deepening expertise
- Qualification & Registration of Professionals
  - selection interview, continual professional development
- Professional Conduct & Practice
  - professional conduct, audit and disciplinary regime

Challenges in regulating fire safety

- Impacts national, industry, public and individuals
- National mandate to raise productivity in construction industry led to use of Cross-Laminated Timber in building structures


Challenges in regulating fire safety

- Economic, industry and business
  - businesses - opportunity, cost and time sensitive
  - need to weigh business needs with life safety
  - provide platform to seek feedback, assess fire risks and propose mitigation measures


Challenges in regulating fire safety

- **Ground Issues**
  - **Low Competency of Professionals** results in poor quality submissions, supervision, waiver applications etc
  - **Malpractices** at site by contractors, suppliers, professionals
  - **Change-of-Use** of existing premises
  - **Legacy issues** - past approvals granted
  - **Fait Accompli Cases**, presents difficulty in complying to fire safety requirements and may lead to abortive works

Challenges in regulating fire safety

- Adopt a Whole-of-Government Approach
  - High-level involvement to Civil Service-wide approach in delivering public services
  - Inter-agency coordination to resolve regulatory issues and speed up approvals
  - Pro-Enterprise Panel formed to simplify regulatory processes to minimise cost and time

Challenges in regulating fire safety

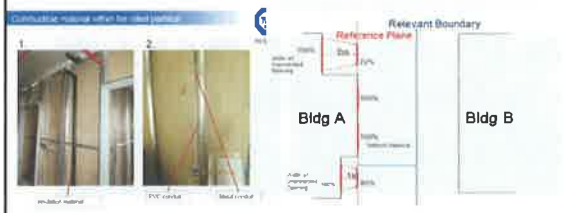
- Customer-Centricity Service Model
  - high service standards
  - prompt and responsive (KPIs)
  - managing demands against resources
  - unreasonable public - fighting for his own cause

Challenges in regulating fire safety

- **Stakeholders Engagement**
  - Valuable source of expertise, experience and industry knowledge and (mal)practices.
  - Collaborative and collective involvement vital in ensuring acceptance, ownership and success in implementation.
  - Multi-agency, multi-disciplinary, industry-focus / trades group eg govt. agencies, professional bodies, developers, industry operators etc
    - Fire Code Review Committee, FSE Selection Panel, Audit Inquiry Committee

Challenges in regulating fire safety

- **Stakeholders Engagement**
  - Form work-group with specific trade association or professional institution to review code provisions
  - Buy-in and ownership in implementation



Challenges in regulating fire safety

Success in regulating fire safety depends on:

- Responsive to changing and evolving needs
  - listen to the ground; prepared to change the mindset
- Manage expectations and shape behavior
  - help to rationalise requirements with expectations
- Pragmatic and calibrated in regulating
  - must everything be regulated
  - regulate, co-regulate, self-regulate, de-regulate
- Dilemma as gate-keeper of fire safety
  - what is the threshold, where is the balance
  - Is fire safety – a bitter pill or a necessary evil

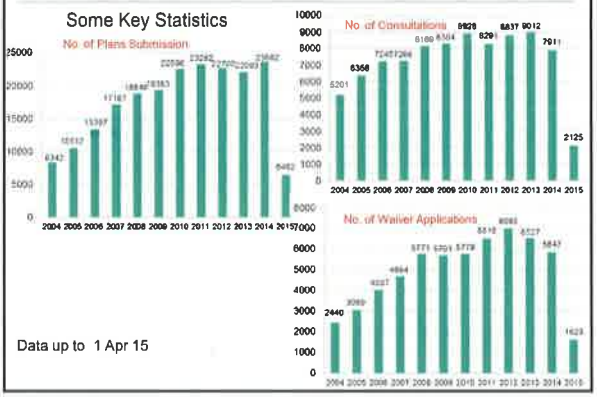
Conclusion

THANK YOU

SCDF

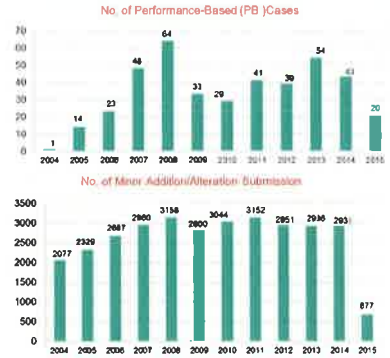
Singapore Fire Safety Regulation

Some Key Statistics



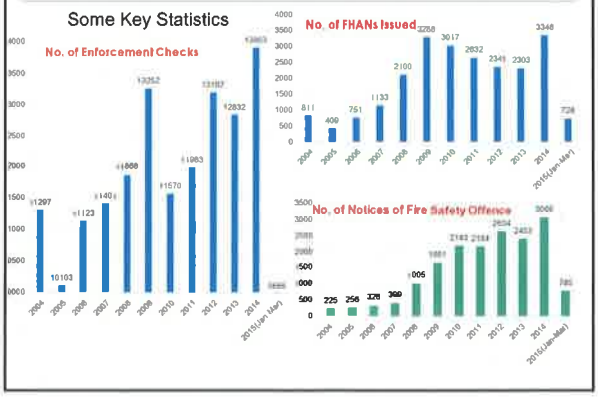
Data up to 1 Apr 15

Singapore Fire Safety Regulation



Singapore Fire Safety Regulation

Some Key Statistics



BANYAN FIRE STATION

FIRE STATION
BANYAN

WELCOME ADDRESS

Scope

- Fire Stations in 1st SCDF Div & Jurong Island
  - Related Agencies
  - Overview of Jurong Island
  - Operating Terrain
  - HRIs & CERTs
  - Organisation Structure
  - Operational Appliances
  - Daily Ops Routine
  - Facilities
- Operations & Activities
- Upcoming Developments & Challenges

SCDF Land Divisions

- Geographically divided in 4 Land Divisions and the SCDF Marine Command;
- Each Division HQ is led by a Division Commander supported by functional branches to administer and commands its line units comprising the fire stations (and fire posts) within its territorial boundary

Fire Stations in 1st SCDF Division

7 Fire Stations and 9 Fire Posts

Fire Stations in Jurong Island

Jurong Island Fire Station

Commander Fire Station: MAJ Benny Ong
Operational Year: 1999
Personnel: 84
Appliances: 18

Banyan Fire Station

Commander Fire Station: CPT Clara Toh
Operational Year: 2010
Personnel: 70
Appliances: 17

Both Jurong Island & Banyan Fire Station provides fire fighting, HazMat and rescue coverage for the oil refineries, petrochemical industries and chemical plants on Jurong Island.

Overview of Jurong Island

- In 1991, JTC was appointed the agent of the Jurong Island project, officially opened on 14 Oct, 2000
- Located to the south-west of main island of Singapore and formed from the merger of seven offshore islands through land reclamation
- Land area of about 32 km^2
- Houses the major petroleum, petrochemical & specialty chemical industries in Singapore
  - ExxonMobil
  - SRC
  - Shell
  - Oiltanking
  - SLNG
  - Jurong Rock Caverns

Operating Terrain

BANYAN CLUSTERS INCLUDE:
- PESEK
- TEMBUSU
- BANYAN
- ANGSANA
- MERANTI

Jurong Island of Today

JI CLUSTERS INCLUDE:
- SERAYA
- MERLIMAU
- MERBAU
- CHAWAN
- SAKRA
- Outlying areas of Jurong Pier Rd

35 High-Risk Installations
- Banyan FS – 14
- Jurong Island FS – 21

High-Risk Installations (HRIs)

- Pre-identified premises of high risk
- Risk found on JI include:
  - High Fire Load Premises (HFLP)
  - Toxic Industrial Chemicals Premises (TICP)
  - Flammable Materials Premises (FMP)
- HRI Contingency Plans (CPs) & Emergency Response Plans (ERPs)
- Company Emergency Response Teams (CERTs)

Company Emergency Response Team (CERTs)

- Primary role is to mitigate & control an emergency situation during initial phase prior to SCDF's arrival
- Comprises a minimal manpower of 6 members organised into a 3-tiered structure as follows:-

Site Main Controller (SMC)
Site Incident Controller (SIC)
Response Team (RT)

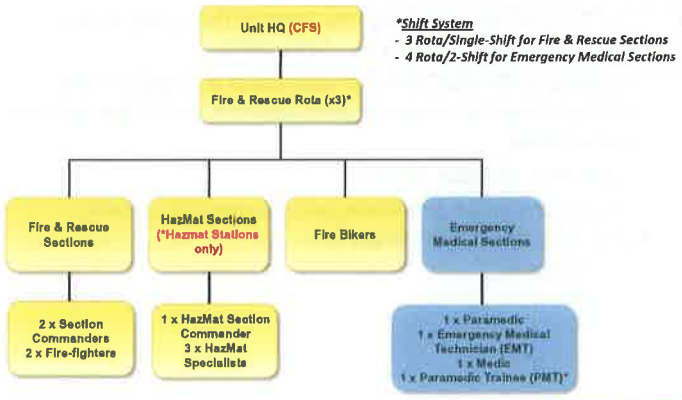
  - SMC - responsible for the overall management of the CERT
  - SIC - leader of the Response Team members
  - RT – personnel directly involved in the groundwork of the emergency

Our Resources

MANPOWER

VEHICLES

Structure of Fire Station



Shift System
- *3 Rota/Single-Shift for Fire & Rescue Sections*
- *4 Rota/2-Shift for Emergency Medical Sections*

Fire Shift System

- 3 Rota/Single-Shift System

24 hrs Shift	OFF	OFF

- Fire-bikers Shift System
  - Shift 1 : 0700 – 1500 hrs
  - Shift 2: 1500 hrs – 2300 hrs
  - Operate from Monday – Saturdays, excluding Public Holidays

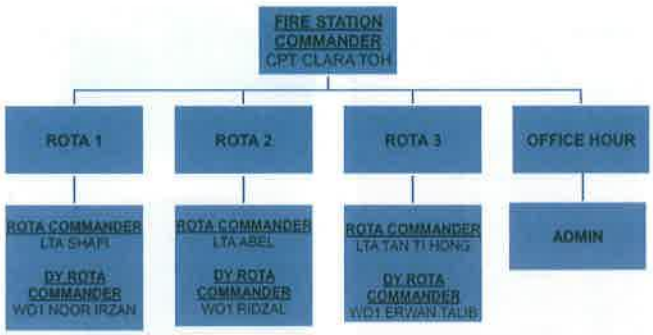
Ambulance Shift System

- 4 Rota/2-Shift System

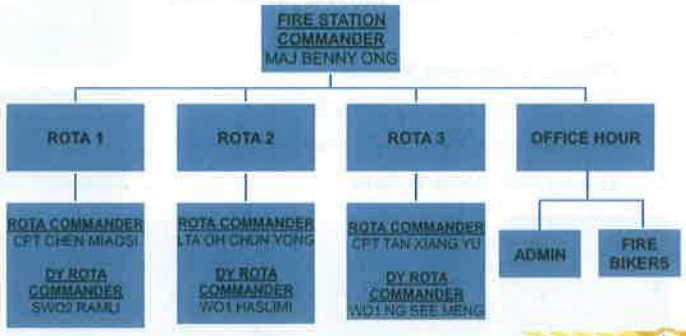
Day Shift	Day Shift	OFF	OFF	Night Shift	Night Shift	OFF	OFF

- Private Ambulance Operators (PAOs) engaged to augment SCDF's ambulance fleet – 24 hours manning

Banyan FS Organisation Chart



Jurong Island FS Organisation Chart



Fire-Fighting Appliances


PUMP LADDER (DO/SC)


LF4G


INVESTIGATION VEHICLE


COMBINED PLATFORM LADDER


UNMANNED FIREFIGHTING MACHINE

HazMat Appliances


FOAM TENDER


FOAM POD


DECON CLOTHING POD


HAZMAT SUPPORT VEHICLE


HAZMAT DECON POD


HAZMAT POD


HAZMAT MITIGATION VEHICLE

Special Appliances (Large Monitors)


HOSE LAYING TRUCK


LARGE PUMP


LARGE MONITOR VEHICLES (2000GPM)


LARGE MONITOR VEHICLE (6000GPM)

Daily Ops Routine

TIME (HR)	ACTIVITY
0800	Handing / Taking Over Ceremony and Ops Briefing
0900	Equipment Drills
1000	LFAV standby at Fire Post commences
1000 onwards	Ops Routine -Ops Survey -Enforcement Check -Hydrant Testing -Equipment Maintenance -CERT Audit
1700	Physical Training
2000	Night Lecture
2100	Ops Routine (if applicable)
2200	Station Maintenance
0530	LFAV returns to Base Station
0550	Roll Call
0600	Endurance Drills
0700	BTM Drill/ Scenario Drill

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Facilities

- **Equipped with operational, training, recreational and other functional facilities**
  - **Watchroom**
  - **Offices & Meeting Rooms**
  - **Dormitories, locker rooms & stores**
  - **Engine Bays, Drill yard & Training tower**
  - **Dining Hall, Mess & Gym**

Operations & Activities

- HRIs & Sensitive Installations
- Engaging the Industries
- Safety and Security Watch Groups

HRIs & Sensitive Installations

- Jurong Island is home to leading petroleum, petrochemical, specialty chemicals, utilities, logistics and other supporting industries
- More than 120 companies
- Up to 35,000 workers on the island at any one time
- Special Risks – Presence of large storage tanks

Engaging the Industries

- Fire Evacuation Drills
  - Annual fire drill
- Industry Safety Days
  - SCDF support in terms of presence, appliance display
  - Eg. Shell Safety Day, Jurong Port Safety Campaign
- Station Visits by Industries (Ad-hoc, 1-2/year)
  - Bringing of external visitors to JIFS (Eg. ExxonMobil)
  - Understanding of SCDF capabilities (PCS, EGS &other companies)
  - HRI scenario discussions
  - Networking

Engaging the Industries

- Prevention / Preparedness
  - Conduct of Operational Survey
  - Enforcement Check
  - Conduct of CERT Audit
  - Conduct of Exercises (HRI, Outside Drill)
  - Visits to industries for familiarisation of operating terrain

Safety and Security Watch Groups

- Platform to promote security and emergency preparedness (EP)
- Companies grouped into clusters according to their geographical location
- Cluster leader acts as a centralised coordinator for matters relating to security and EP of the cluster

Upcoming Developments & Challenges

- New high-risk premises in the Banyan and Meranti areas that are coming up
- Continual reclamation will bring total land area to 3,200 hectares upon completion
- Plans to further extend the south-western tip