



Section 12



12 RISK APPRAISAL - LANTAU PORT ON-SHORE RISKS

12.1 INTRODUCTION

A range of hazardous materials will be stored, handled and transported during the day to day operation of the Lantau Port. This Section identifies the nature of hazard and associated risks resulting from on-shore activities.

Recommendations have been made for precautions and mitigation measures to minimize the potential hazards. Risks associated with the possible location of Potentially Hazardous Installations (PHIs), on the Lamma Breakwater reclamation are dealt with in Section 13.

12.2 THE PROPOSED FACILITIES

12.2.1 Overview

By the end of Phase IV of the LAPH Development there will be 17 berths each handling something in the order of 400,000 TEUs (20ft equivalent units) per year. Since about 60% of the containers will be the larger 40ft containers, the actual number of containers handled will be in the order of 250,000 per year. The numbers of berths and associated container throughput (for Container Terminal) are summarised in Table 12.1

TABLE 12.1

ANNUAL CONTAINER THROUGHPUT CAPACITY

YEAR	PHASE	BERTHS	TEU'S (MILLIONS)	CONTAINERS (MILLIONS)
2000	I	4	1.6	1.0
2003	II	8	3.2	2.0
2007	III	12	4.8	3.0
2011	IV	17	6.8	4.2

12.2.2 Imports, Exports and Transshipment

Overview

In broad terms, it is envisaged that there will be similar numbers of containers for import, export and transshipment. It is important to emphasise that the terminal will be designed for handling packed

and sealed containers and only rarely will containers be 'stuffed' (i.e. loaded) or 'broken' (unloaded) at the terminal itself.

Imports

Containers will arrive by sea in vessels of up to 60,000dWt (dead weight tonnage) and will be transferred to the shore facilities. In the case of imports, the containers will be taken off-site by road to their final destination. In exceptional cases, such as a container with a mixed Dangerous Goods (DGs) cargo for more than one consignee, the container will be unloaded at the terminal for immediate loading onto the consignees' (road) vehicles for onward transportation.

Prior to 2006, it is envisaged that the road traffic will generally leave the container terminal to the north-east over the Lantau Fixed Crossing, (LFC). In the case of severe weather such as typhoons, the road traffic may be required to travel on the lower 'deck' of the LFC, on the two single lanes running either side of the rail tracks. It is important to note that these are located in a 'box' structure, in effect creating a tunnel.

It is envisaged that some 10-15% of the containerised imports will be transferred by road to the North Shore development for onward river transport to the PRC. In the medium term, there are plans for constructing a (freight) rail/road fixed crossing, the Sham Tseng Link, directly to the mainland to the north (post 2006) as well as a further road and, possibly, rail link eastward to Hong Kong Island via the Green Island Link (post 2011).

Exports

Most containers will arrive for export by road, although as for imports, it is envisaged that some 10-15% will arrive at the North Shore facilities for transfer to the Container Terminal. In the longer term, containers may arrive by rail.

Transshipment

About one third of the containers will arrive on one vessel and leave on another without leaving the terminal.

12.2.3 Other Facilities

Other Port Development Facilities

Apart from the container handling and storage areas, there are a wide range of facilities associated with the Lantau Port development as detailed in Section 2. These facilities include:

- the North Shore development which will handle cargo in both containerised and non-containerised form through the (RTTW);
- the (MSSA) to the north east of the Container Terminal;
- floating docks and a shipyard; and
- other land facilities (industrial areas, offices, fire station, etc.).

Apart from the handling of DGs at the North Shore facilities, it is not considered that the other facilities listed above will present significant (on-shore) risks.

Penny's Bay

From a risk perspective, one further facility of interest is the Penny's Bay power station operation. The station operates intermittently (for 'peak-loading') and currently has a capacity of 300MW. The gas turbines are fuelled by No. 2 distillate which is stored in two 3,000t tanks and delivered in barges from Tsing Yi on, typically, a weekly basis. It is anticipated that the power station's capacity will increase to 600MW which may require a third storage tank.

The main concern with regard to the potential for off-site damage will be a large spill of fuel followed by a fire. In practice, the fuel has a low volatility and is unlikely to be readily ignited in the event of a spillage. In addition, the tank area is banded (i.e. a wall is provided to retain the fuel in the event of a spillage).

A more likely source of a spillage will be the barge-to-shore transfer operations. Although for the reasons mentioned above, it is very unlikely that such a spillage would lead to risks to personnel, there could be environmental pollution. At present the precise nature and location of the (relocated) barge unloading facilities is subject to ongoing discussion with the China Light and Power (CLP) Company.

In the longer term, it is possible that the station will be powered by natural gas, probably from Hainan Island. The presence of high pressure gas lines and associated storage facilities will present localised fire/explosion hazards associated with the possibility of gas escapes. However, at present, there is considerable uncertainty as to whether this project would be viable. For this reason, this matter is not considered in detail.

12.3 HAZARD IDENTIFICATION

12.3.1 Nature of Hazards and Control

DGs Containers

DGs are transported in containers and, in some cases, in purpose built tank-containers. Such materials may make up the entire contents of a container or be transported along with other goods.

In the vast majority of cases, the prime concern is a spillage of a hazardous material due to damaged or inadequate packaging. It is extremely unlikely that such a release would pose a direct risk to people nearby. This is primarily due to the limited quantities involved since most DGs are carried in individual drums or packages, typically of the order of 50-100kg (or litres). A liquid spill (from a damaged container for example) is likely to involve tens of litres and only in exceptional cases will a release involve several tonnes of a material. This situation should be compared to those at PHIs where it is common to consider releases involving tens or, even, hundreds of tonnes of hazardous materials.

Safe Transport of DGs

To facilitate the safe packaging, storage and transport of dangerous goods, there is a range of internationally agreed procedures. In particular, each chemical (or group of related chemicals) is awarded a specific 'UN Number' so that the hazardous properties and associated precautions of a particular material can be readily referenced from the identification label. In addition, there are broad Classes of materials identified by international transport bodies, such as the International Maritime Organisation, (IMO), in respect of sea transport. Such classes include Explosives (Class 1), Inflammable Liquids (Class 3), Organic Peroxides (Class 5.2), etc. In other words, the Class and associated hazard warning signs provide an immediate indication of the hazards presented by a particular material.

The development of such classification schemes has led to guidelines (and, in some cases, legislation as to how a particular material should be packaged, stored and transported. For example, fungicides (UN No. 1609 and Class 6.1 (Poisonous Substances)) should, as might be expected, be segregated from foodstuffs.

The Situation in Hong Kong

In Hong Kong, the safe packaging, storage and transport of DGs is governed by the Dangerous Goods Ordinance (Chapter 295) and associated Regulations. The Regulations provide detailed requirements for a wide range of specified DGs (grouped into 10 Categories) and associated licensing arrangements.

Marine Transport and Transhipment

With regard to DGs import/export through 'Approved Container Terminals' (such as those at Kwai Chung), there are a range of points of interest:

- vessels carrying DGs must provide a DGs Manifest to the authorities (Marine Department) identifying the nature, packaging, quantities, location of the consignment, etc. (*Regulation 4, DGs (Shipping) Regulations*);
- the systems for DGs classification and associated labelling requirements within Hong Kong are quite different from those for international marine transport; and
- no explosives (Category 1 (Hong Kong)) may be handled or stored;

In the case of transhipment, there are two further points:

- the storage of DGs in containers awaiting transhipment is effectively exempted from the Regulations for 7 days (and for 21 days in some cases), (*Regulations 177B, D and F, DGs (General) Regulations - as amended*); and

- in some cases, fireworks (Category 1) may be transhipped (similar to the operations permitted at Kwai Chung).

Storage

The storage of DGs containers within the terminal is governed by two principles:

- DGs containers are to be stored and segregated in accord with international practice as represented by the UK's 'Blue Book' N¹ (*Regulation 177D, DGs (General) Regulations*); and
- the storage of DGs in containers awaiting import/export is effectively exempted from the Regulations for 72 hours and for 21 days in some cases, (*Regulations 177B, D and F, DGs (General) Regulations*).

Once the exemption period has expired, the DGs containers must be moved to a licensed DGs store.

Land Transport

In respect of land transport, the main points are:

- detailed requirements apply specifically to the transport by road of Category 2 (compressed gases) and Category 5 (flammable liquids) (*Regulation 2A, DGs (General) Regulations*);
- in these cases, DGs must be carried by licensed vehicles and be correctly packed and externally labelled; and
- all DGs in containers must be transported in approved and licensed containers (*Regulation 177E, DGs (General) Regulations - as amended*).

1. Historically, the UK's Department of Transport (DTp) Standing Committee's Recommendations for the Carriage of Dangerous Goods in Ships ('The Blue Book') provided variations from and additions to the International Maritime Dangerous Goods (IMDGs) Code which were judged necessary in relation to the UK. In recent years, the comprehensive revisions to the IMDGs Code (and, in particular, the 25th set of Amendments of 1990) have rendered the Blue Book redundant and it is no longer published. To replace the Blue Book, the UK DTp started to publish (as of 1991) a series of Merchant Shipping Notices (MSN) covering specific issues. It is of note that some of the recent MSNs provide guidance for conforming with the implementation of the 26th set of Amendments to the IMDGs Code which become effective in 1993 (as briefly discussed in Section 12.4.2).

In practice, the safety of DGs container transport relies, in part at least, on the presence of the container itself and there should be no difficulties in obtaining the necessary authorizations for land transport by road. In particular, it appears that all tractors should be licensed to permit transport of Category 2 and 5 DGs and that all containers designed and maintained to a minimum standard should be licensed to permit general DGs transport.

12.3.2 Operational Experience

Overview

With the world-wide increase in the containerised transport of goods, there has been emerging concern over the associated hazards, particularly in respect of the transport of DGs. In essence, minimising the risks to the smooth running of a container port, to the health of the workers and to the local environment rely on four main actions:

- an awareness by the originator of the freight consignment as to the requirements for safe packaging and providing the appropriate information to the shippers;
- careful and effective monitoring of container operations by the port operators;
- prompt and effective action plans to deal with small incidents by the port operators; and
- prompt involvement of the emergency services in the event of a potentially significant incident.

Failure to comply with these measures can, on occasion, lead to unexpected consequences. For example, following the *Herald of Free Enterprise* ferry disaster off the Belgian coast, it emerged that several goods vehicles were carrying undeclared DGs cargoes. This led to significant delays to the commencement of salvage operations pending an assessment of the safety and pollution implications of these materials. Similarly, when the container ship *MV Ariadne* went aground in Mogadishu Harbour (Somalia) and broke its back, resulting in a number of DGs containers being deposited into the harbour, the port authorities were completely unprepared for such an eventuality. In the event, the port was closed for several months and an international team of experts had to be assembled to provide on the spot advice to minimise the risks to the environment and to the salvage workers.

To provide a background for the further detailed work presented in Section 13.4, the operational experience from Hong Kong and elsewhere has been reviewed and the results are summarised below.

Finland

In 1988, there was a nine-month nationally co-ordinated study of container handling in the four main ports of Finland. (Hazardous cargo Bulletin, 1989). During the study a number of container ships and individual containers were inspected. The investigators found examples of poorly packed containers, vessels with poorly segregated cargo and numerous cases of inadequate documentation. Overall, perhaps the most worrying finding was that:

'...more than one container in three carrying dangerous goods was not up to standard.'

Felixstowe (UK)

Felixstowe Docks currently handles about 1 million containers per year (i.e. equivalent to the Phase I capacity of the proposed development). The port maintains very high standards to ensure that all DGs are correctly labelled and provided with the correct documentation. Nevertheless, there are frequent incidents, usually involving the spillage of hazardous liquids. In discussions with the local fire brigade (Suffolk Fire Service), it emerged that most spillages occur as a result of poor packing within the container although some are caused by incidents associated with freight handling (such as a fork lift truck puncturing a drum during loading of a container). From the data provided, it appears that there are approximately 50 such incidents per year to which the Fire Service is called as a precautionary measure. This indicates a (potentially significant) incident rate of:

5×10^{-5} (1 in 20,000) per container.

Finally, it is worth noting that, to date, there have been no significant fires resulting from an incident involving a spillage from containers.

Rotterdam (Netherlands)

Rotterdam currently handles about 2.4 million containers per year (i.e. equivalent to that envisaged in 2005 for the Container Port). Once again, there are fairly frequent small incidents. In the Netherlands as in Hong Kong, particular attention has been given to the risks associated with

the bulk storage and handling of DGs. A detailed risk study has been undertaken in respect of the off-site risks associated with the use of tank-containers (or ISO tanks). The results of this study indicate that it is possible to puncture the tank if dropped from a height of about 10m although the chances of this occurring are very low and have been estimated at 5.6×10^{-7} per tank movement.

In dealing with incidents, the operators have trained personnel to deal with the smaller incidents. For more severe incidents there is an emergency team comprising personnel from the emergency services, environment department as well as port authorities. Data on these more severe incidents have been provided by the Harbour Co-ordination Centre for the period 1987-92 inclusive. Most of these incidents involved a spillage of DGs within the containers although a few resulted from a dropped container during ship-to-shore transfer operations. Based on this information, the incident rate appears to have been about eight per year or:

4.3×10^{-6} (1 in 250,000) per container.

Since this figure relates to the more severe incidents, it is lower than the figure derived for Felixstowe (which covers both the minor and the more severe incidents).

Hong Kong

The Kwai Chung complex has 7 container terminals with an eighth under construction. The prime operators are;

- Modern Terminals Ltd. (MTL) - which operates Terminals 1, 2 and 5;
- Hong Kong International Terminals Ltd. (HIT) - which operates Terminals 4, 6 and 7; and
- Sea-Land Orient Ltd. and Asia Terminals Ltd. - which occupy Terminal 3.

Terminals 1-7 handle about 75% of the marine based container traffic in Hong Kong and the current throughput slightly exceeds that for Rotterdam (about 2.5 million containers per year).

During the course of this study, a sample of DGs Manifests were reviewed (as submitted to Marine Department by the shippers) for a one week period

in December 1991 to identify the range and quantities of Dangerous Goods carried on vessels, a summary of these manifests is attached as Appendix A-5. Although, the results (as shown in Table 12.2) do not provide a definitive statement of the DGs carried in Hong Kong waters, they provide a good illustration of the nature of the DGs traffic.

TABLE 12.2

**REVIEW OF DG MOVEMENTS
OVER SAMPLE PERIOD (1 WEEK)**

	TOTAL	TO/FROM KWAI CHUNG
No. of Vessels Carrying DGs (excluding tankers/gas carriers)	39	26
No. of DG Consignments	152	113
No. of DG Materials	92	-
% of Consignments < 10t (part container loads)	-	51
%age ratio; Unloaded : Loaded : In Transit	-	33:35:32

From this summary, it can be seen that there was a wide range of materials carried with similar numbers of consignments carried as (equivalent) part and full container loads although some 'part' loads were carried together in single containers. Interestingly, only one consignment was being conveyed in a bulk tank. However, it is clear that the majority of DGs movements by weight is in full container (or equivalent) loads. In addition, there was an equal split between consignments being imported, exported and in transit, although 25 out of the 26 vessels carrying DGs to/from Kwai Chung loaded/unloaded one or more DGs consignments at the Kwai Chung terminals.

The quantities for DGs consignments ranged from 1kg of phosphoric acid carried in two cartons through to 272t of bromine (a toxic gas) carried in nearly 200 cylinders. As would be expected, the materials included those with a slight fire hazard (such as charcoal and, even, table tennis balls), highly flammable gases and liquids, toxic materials (including pesticides), corrosive acids and highly

reactive substances (such as calcium carbide which produces the explosive gas acetylene on contact with water).

One further point of interest is that about 100 container vessels berth at the Kwai Chung terminals in the average week. In other words one vessel in four loads/unloads (declared) DGs.

Given the range of DGs carried through the Kwai Chung container terminals, it is not surprising that, as at the other ports, there are fairly frequent small scale incidents. In order to build up a picture of the nature and frequency of such incidents, brief (informal) discussions were held with Fire Services Department (FSD) staff (from both Headquarters and the Kwai Chung fire station), the Government Laboratory (who are often called to provide on the spot advice to FSD in the event of a chemical incident) and the operators of the two largest container terminals (HIT and MTL). From these discussions, a similar picture emerges:

- small incidents occur perhaps as frequently as once per month;
- such incidents usually involve a spillage from a damaged drum/bottle/carton;
- the fire service is usually called;
- the incidents sometimes involve the release of toxic fumes or smoke and the immediate work area is cleared; and
- to date, there has not been a major fire incident.

It would appear that the incident rate is somewhat lower than at the other ports considered above. It is believed that this can be attributed to several factors including:

- the Kwai Chung terminals are 'state of the art' facilities;
- the terminal only handles sealed containers and, indeed, has limited facilities for breaking/stuffing containers; and
- there is no non-containerised storage of DGs at the terminals (i.e. there are no licensed DGs stores).

12.4 RISK ISSUES

12.4.1 Introduction

In this Section, consideration is given to some of the issues raised in the previous subsections and the associated implications for Lantau Port. In particular, the marine transport, storage and road transport are discussed against the following headings:

- overview of the proposals;
- likely controls;
- possible incidents and associated consequences; and
- possible mitigation measures.

12.4.2 Marine Transport

Overview

For Phase I (year 2000) it is envisaged that the container terminal will be handling over 2,000 container ships per year of which, perhaps, 500 will be carrying containerised DGs. In addition, there will be perhaps, 3,000 'river' vessels using the North Shore facilities for transport to/from the PRC. By the year 2011 (Phase IV), it is envisaged that these numbers could be quadrupled.

Controls

The design and operation of the large container ships will in all probability comply with the prevailing international guidelines. In view of the increasing concern in DGs transport (as discussed in Section 12.3), there will be ever increasing controls. As of 1 July 1992, there are new international guidelines (Marpol Annex III as incorporated into the International Maritime Dangerous Goods (IMDGs) Code) for the environmentally safe transport of DGs in packaged form including containers. In addition, the UN Code (the 'Orange Book') for DGs Transport will be updated in 1993 and any changes will be subsequently incorporated into the IMDGs Code. For further details of international developments, see the Special Report on Hazardous Cargoes in Lloyd's List dated 21 July 1992.

Incidents

In broad terms, there are two types of incident of concern:

- marine incidents; and
- incidents at or close to the berth.

Incidents involving ships are frequent. Based on the historical data, it is possible to predict accident rates by vessel size/type, location, type of incident and even severity of damage. Although more detailed work is presented elsewhere in relation to the LAPH studies, the following calculation provides an indication of the likelihood of an incident involving DGs:

- No. of large container ships (Phase I):
2,000/yr
- Probability of Carrying DGs:
0.25 (1 in 4)
- Probability of an Incident:
Data gathered by the IMO and Lloyds shows that the overall incidence of a 'serious incident' involving large vessels within Port areas and restricted waters is of the order of 10^{-4} (i.e. 1 in 10,000) per loaded movement.

As the vessels will be making two loaded movements per visit, the likelihood of an incident (involving a vessel carrying DGs) can be calculated as follows:

$$2 \times 2,000 \times 0.25 \times 10^{-4} = 0.1 \text{ /yr (1 in 10 years).}$$

Such incidents do not necessarily lead to containers falling overboard nor to DGs entering the marine environment. For example, the Incheon Glory was involved in two recent local incidents (a collision with an ocean liner in April 1992 and going aground in June 1992) without any containers going overboard. In short, although the likelihood of a vessel incident is high, the likelihood of DGs entering the marine environment are low.

Another type of incident is a dropped container during ship-shore transfer operations. Against the background of Kwai Chung, the chances of this occurring should be very low at the Container Terminal. However, at the North Shore facilities, it would appear that with the loading/unloading of a wide range of small vessels, there is a reasonable chance of a dropped cargo or container. Although once again this is unlikely to lead directly to the loss of DGs.

Mitigation Measures

Given the throughput of vessels and containers, it would appear to be prudent to draw up contingency plans to deal with lost containers and to provide the necessary equipment to recover them (in some cases). Apart from DGs considerations, a submerged container could present a navigational hazard and interfere with the normal operations of Lantau Port.

As mentioned earlier detailed consideration of the marine risks and associated improvement measures are presented in Working Paper No. 25, Preferred Concept Marine Impact Assessment.

12.4.3 Storage

Overview

For Phase I (year 2000), it is envisaged that the Container Terminal will be handling one million containers per year and by the year 2011 (Phase IV), this will have increased to over four million. There will be similar numbers of containers for imports, exports and transhipment. As indicated earlier, the prime purpose of the terminal is the rapid and effective movement of containers in and out. As such, the storage areas within the terminal should be limited to the storage of containers.

At the North Shore facilities, it is envisaged that goods will be imported/exported in both containerised and non-containerised consignments. The anticipated throughput will be in excess of 1 million tonnes (Phase I) increasing to over 5 million tonnes (Phase IV).

Controls

In effect, the design and operation of the container storage areas within the Container Terminal will be governed by international guidelines rather than the Hong Kong legislation. As such, there will need to be designated areas for the storage of containers carrying DGs designed to the appropriate standards (in respect of segregation distances, etc.). Provided these measures are complied with there should be no necessity to establish formal licensed DGs stores.

Depending on the nature of the likely DGs traffic to be imported/exported via the North Shore facilities, it might be necessary to consider the provision of licensed DGs stores, particularly as it is envisaged that these facilities will be for

'stuffing' and 'breaking' containers.

Incidents

There will be incidents involving DGs (both declared and undeclared) at the new facilities, both at the Container Terminal and at the North Shore development). As indicated earlier, it is very unlikely that these incidents will present any degree of off-site risk. Nevertheless, there could be a risk to workers nearby and, possibly, to the smooth running of the facilities. In the case of fires and/or explosions, there could also be damage to other containers and their contents.

Mitigation Measures

Limiting the consequences of an incident will rely upon:

- time to detection;
- time to respond; and
- time to deal with the incident.

The facilities should be provided with closed circuit television (CCTV) surveillance and well trained operators. This will minimise the time to detection of an incident. Given the possible presence of undeclared DGs, these provisions should cover all storage areas.

As part of the development, a fire station will be located on the Serviced Land in Penny's Bay between the Container Port and the North Shore facilities. Clearly, this should be located to provide rapid access to the various freight storage and handling facilities. With the experience of the Kwai Chung terminals, it is considered that there should be little difficulty in prescribing the required equipment, specialist training and facilities to effectively respond to and deal with an incident. As at Kwai Chung, it has been assumed that the fire service will be promptly called in the event of an incident or possible incident involving DGs.

12.4.4 Road Transport

Overview

Given the scale of the proposed container traffic, there will be numerous movements of freight by road to and from the Container Terminal.

Controls

As discussed in Section 12.3, the transport of DGs is governed by the DGs Ordinance and associated Regulations.

Incidents

Incidents involving DGs transport by road are likely to be initiated by routine road traffic accidents rather than by the DGs being carried. It is possible that such incidents will result in a small spill of material which could, in some cases, lead to a fire, the production of toxic fumes or even, a small explosion.

Mitigation Measures

In the extreme, it would be possible to postulate a sequence of events which could result in the (temporary) closure of the LFC with associated implications for access to the new airport.

To facilitate the smooth transport of containers by road, it would be prudent to ensure that:

- all tractor units are licensed DGs vehicles; and
- all containers meet the minimum requirements for DGs transport.

Although perhaps outside the control of the Port Authorities, it would also be prudent to ensure that all drivers involved in the transport of DGs (whether declared or not) to, and from the facilities had received basic training in appropriate emergency measures and were aware of the (relevant) implications and requirements of the DGs Regulations.

12.5 CONCLUSIONS

The proposed Lantau Port will handle DGs. A review of a sample of DGs manifests of vessels using the Kwai Chung container terminals indicated that practically all vessels load or unload one or more consignment of DGs (in containers).

Experience from Hong Kong and elsewhere indicates that there will be incidents at the Port facilities involving DGs, perhaps, several times a year. Most incidents appear to result from poor packaging which results in a leakage of liquid or fumes.

The consequences of the such incidents are generally highly localised. Typically in the more severe events, the immediate work area is cleared, the emergency services are called and the incident dealt with. To date, no major incidents (such as a large scale fire or one requiring off-site evacuation) have been experienced at the three large terminals contacted during the course of this study (Kwai Chung, Rotterdam and Felixstowe).

Greater risks are likely to be associated with the storage and handling of non-containerised DGs as envisaged at the North Shore development. It is likely that these facilities will be required to be licensed under the (Hong Kong) DGs Regulations.

Finally, although there would appear to be minimal risks associated with the Penny's Bay power station, the barge-to-shore transfer operations could present a risk of marine pollution in the event of a spillage.

12.6 RECOMMENDATIONS

Further consideration should be given to the nature of DGs traffic through the North Shore development, with particular regard to non-containerised cargo as this could have implications for the need for licensed DGs storage areas.

A quantitative re-assessment of the transport of hazardous materials past Ma Wan would be appropriate when interest in both the North Shore and Tuen Mun proposed developments become firmer.

Although the ever increasing standards applied to the international marine transport of DGs should reduce the incidence of poor packaging and inadequate documentation, there will still be a need to draw up detailed emergency procedures for dealing with incidents involving DGs during storage and handling operations.

Key members of staff at the Container Port should receive specialist training and have access to appropriate equipment to enable them to efficiently respond to and deal with an incident.