Best Practices of Dangerous Goods (DG) management (Singapore)

New Chee Wee, Principal Port Chemist

(Hazardous Cargo Section)

02 Dec 2022

Maritime and Port Authority of Singapore (MPA) – formed on 2 Feb 1996

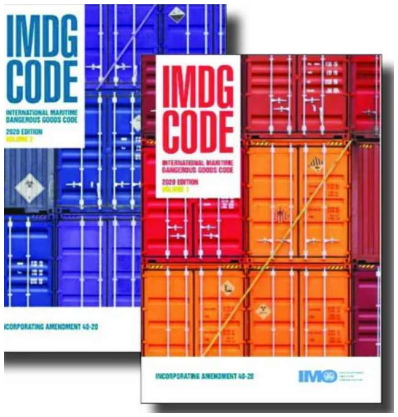
To develop Singapore as a premier global hub port and international maritime centre (IMC), and to advance and safeguard Singapore's strategic maritime interests;

Perform roles of Port Authority, Port Regulator, Port Planner, IMC Champion, and National Maritime Representative

Enhance safety, security and environmental protection in our port waters, facilitate port operations and growth, expand the cluster of maritime ancillary services, and promote maritime R&D and manpower development

Hazardous Cargo Section's objectives

Ensure compliance of IMDG Code



Adherence to International Instruments:

- IMO SOLAS Convention
  - IMDG Code (*amdt. 40-20*)
- IMO MARPOL Regulations

Safeguard reputation and ensure safe operations of Dangerous Goods in port

Enforcement thru:

- MPA Dangerous Goods, Petroleum and Explosives (DGPE) Regulations 2005

Key lessons – Past incidents

- Tianjin Incident 2015 (from open sources):
  i. Large amount of various types of DG were stored;
  ii. Improper segregation of incompatible DG within the same area;
  iii. Undeclared and/or under-declared quantity of DGs;
  iv. Initial response may have been carried out without adequate assessment

- Beirut Incident 2020 (from open sources):
  i. Excessive Ammonium Nitrate stored in warehouse;
  ii. Neglected and left at site up to 7 years;
  iii. Improper control & storage of Ammonium Nitrate;
  iv. Lapse in management controls

Past incidents (involving Singapore Registered Ships)

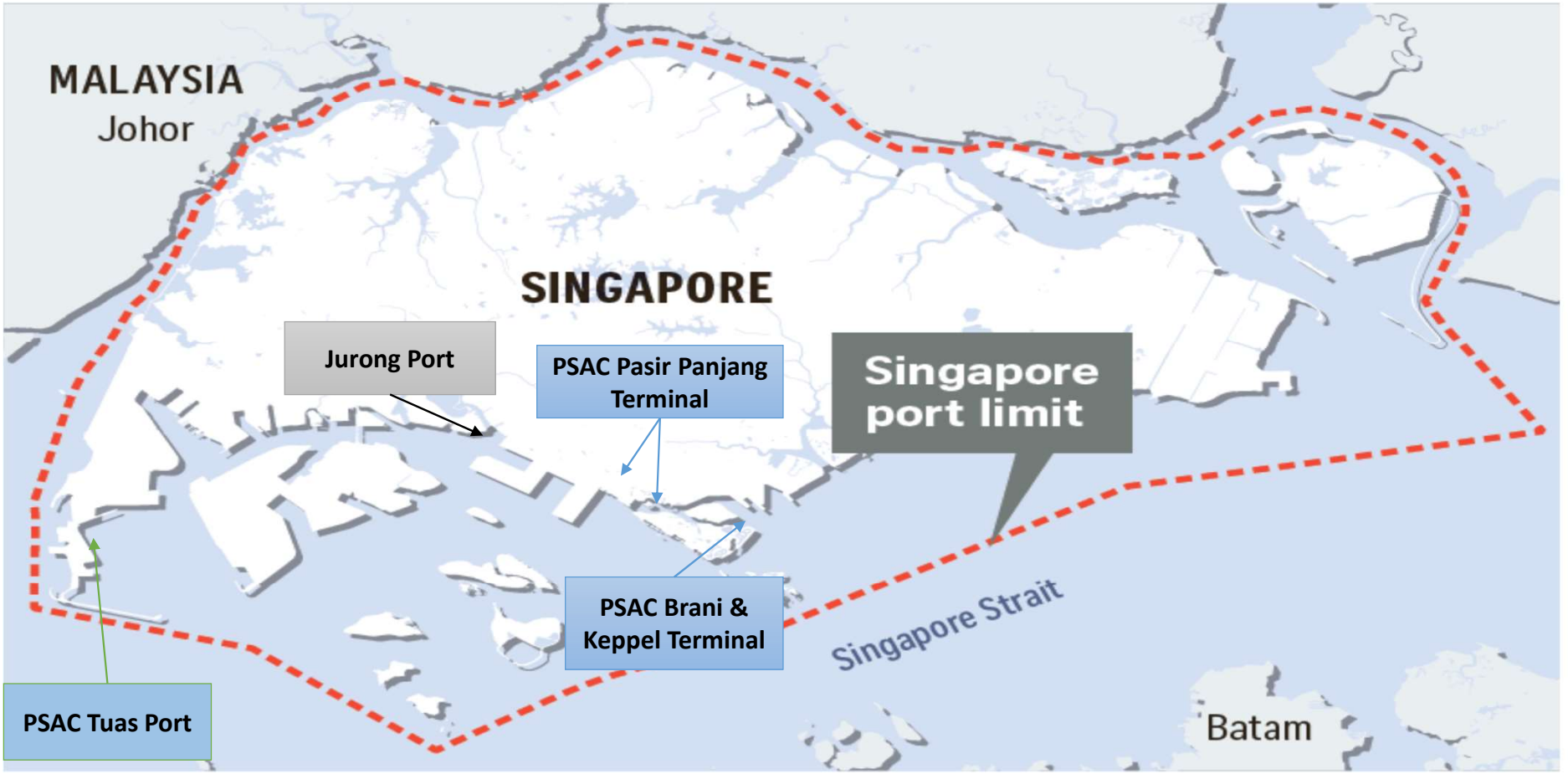
- MV. KOTA LUBAH (Dec 2016):
  i. Diverted to Vietnam berth for fire fighting;
  ii. Involving activated Carbon powder aka Charcoal (self-combustion);
  iii. Declared as NON-DG;

- MV. MAERSK HONAM (Mar 2018):
  i. Fire on-board @ Arabian Sea, 5 crew died, ship declared total loss;
  ii. Investigation carried out by Transport Safety Investigation Bureau (TSIB);
  iii. Involving DG – Sodium Dichloroisocyanurate;

  Stowage issues arising from classification of DG (UN No. 2465, IMO Class 5.1, UN No. 3077, IMO Class 9)

https://www.mot.gov.sg/docs/default-source/default-document-library/final-report_mib-mai-cas-035---fire-on-board-srs-maersk-honam-on-6-march-2018.pdf

Port of Singapore



Source: MARITIME AND PORT AUTHORITY OF SINGAPORE STRAITS TIMES GRAPHICS

Brief overview of Singapore's DG management

- Legislated under MPA Dangerous Goods, Petroleum & Explosive (DGPE) Regulations 2005;
- All DG must be declared to the Authority; Information such as UN No., IMO Class, container number, type of packaging, packing group, gross weight, arrival ship details etc.
- Full electronic submissions;
- DG containers are tracked throughout while on-board ships and in DG yards/terminals;
- 37 million TEU[1] handled in 2021, ~ 3% are DG containers;
- Seamless submission by ship liners using Electronic Data Interchange (EDI)

Vessel Dangerous Goods Details

Vessel Information

Vessel Name : NYK DANIELLA
In Voyage No. : 062N — Out Voyage No. : 062N
Location : P10
Berthing Time : 30/12/2019 18:00 — Unberthing Time : 31/12/2019 12:30
Highlighted : — vTag :
No. of DGD : D : 10 T : 9 L : 49 — No. of Cntr. : D : 9 T : 8 L : 22

PM4 Details

Cntr No./BL No. Label Required	UN No. IMO Class	FP Sub risks.	Operation Pkg type	No. of pkg Weight	Packing grp Stowage	Segr grp Outcome
CAIU 3227284	2796		D	4	II	Acids
Y	8		4G FIBREBOAR	3		Approved

PSN : BATTERY FLUID, ACID /
Tech Name : BATTERY FLUID, ACID /
Segr req. : — Document Checked : No
Spcl Provision : — Physically Checked : No
Remarks : No

DG declaration

[1] – https://www.mpa.gov.sg/who-we-are/newsroom-resources/research-and-statistics

Brief overview of Singapore's DG management

- Works with other National Agencies in implementation of IMDG Code;
- *E.g.* Management of Class 7 (Radioactive) DG with our National Competent Authority (National Environment Agency, NEA);
- For landward management, the MPA adopt additional risk based strategy **on top of** IMDG Code requirements;
- Dedicated segregated areas for certain DG, additional monitoring by operator as required by local agencies;
- Before any site is allowed for storage and handling, a **Quantitative Risk Analysis Study** (QRA) is to be commissioned by the occupier to quantify and assess the hazards related;
- Jointly assessed by different national agencies

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Enforcement – DG inspections

- Inspections carried out to sieve out Non-declaration / Mis-declarations of DG / Stowage / Proper Segregation – Infringements raised for non-compliance;
- On top of the Port State inspection, MPA conducts additional checks for compliance of IMDG carriage;
- Spot checks conducted on-board ships at the terminals;
- *Offences include* – Mis-declaration, non-declaration, stowage, segregation of DG, placarding of containers;
- During COVID, modified remote inspection using systems was used to detect non-declarations;
- Resumption of physical inspection, aided by remote checks on ships in port using technology

Incorrect pictogram , IMO Class 8 but 3 pictogram

COVID – Remote inspection leveraging on technology

Undeclared in-transit DG

PS Portnet Systems Noreply <noreply@portnet.com>
To Chee Wee NEW (MPA)

This is an Internet email. If you are unsure of the content, please check the source before you respond.

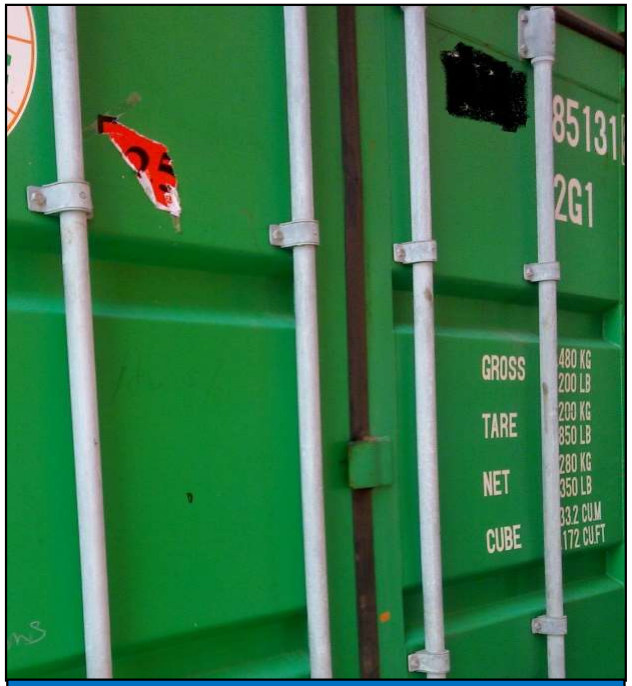
Subject: Undeclared in-transit DG
Error in Task: dg_t
sql_script.Output: Start ------

ERRORS	DVV	DVOY	BTH	CNTR	BBB	RR	TT	OPR	IMO	UNDG	BTHG	UNBTHG
ERROR: UNDECLARED TRANSIT DG FOR VESSEL ALONGSIDE	YM IMMENSE	335N	P01	FCIU 5406456	001	04	82	XR	8	2215	22-FEB-22 03:00	23-FEB-
ERROR: UNDECLARED TRANSIT DG FOR VESSEL ALONGSIDE	YM IMMENSE	335N	P01	KOCU 2204226	003	04	82	XR	8	2215	22-FEB-22 03:00	23-FEB
ERROR: UNDECLARED TRANSIT DG FOR VESSEL ALONGSIDE	YM IMMENSE	335N	P01	HDMU 2804099	001	04	84	XR	8	2215	22-FEB-22 03:00	23-FE

3 rows selected.
sql_script.Output: End -----

Common Infringements

- Improper or No placarding (Marking/Identification);
- Improper Segregation of different DG on-board (Compatibility of DGs)



Placard peeled off during voyage

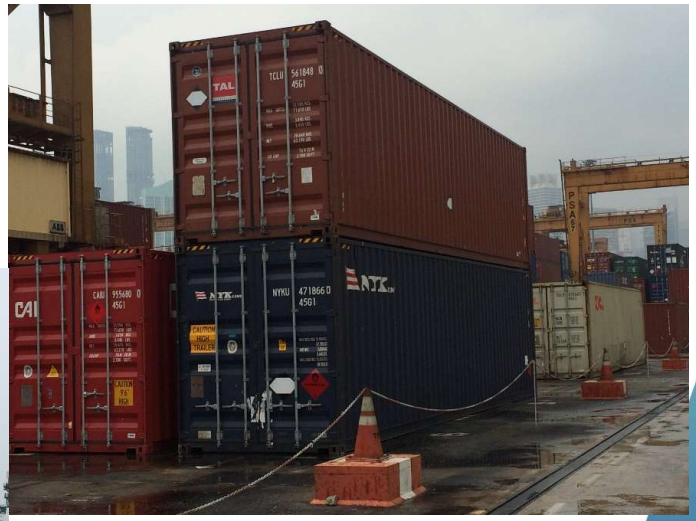
Improper segregation (UN No. 3242 & 2735)

PSAC Inspection

- Maintains oversight DG handling in port by terminal operator
- DG warehouse inspection conducted on 24 Sept 21

PSAC Inspection

- After Tianjin Incident, storage condition at yard was reviewed;
- Dedicated storage yards for different DG;
- Clearly demarcated with safety distances from other DG



Handling of DG incidents

- Guided by SOLAS Regs. VII/6.1 – Report of incidents involving Dangerous Goods & SOLAS 7-4.1 *Reporting of incidents involving dangerous goods*
- Port Marine Circular No. 23 of 1997 – Procedure for damaged vessel to entry port (General Guidelines);
- For DG incident reporting, reference is made to IMO Resolution A.851(20).;
- SOP in place for reporting of leakage or DG incidents on-board before arrival in port; Details such as UN No., IMO Class, severity, Master's report, casualty, mitigating measures taken by ship etc. to be submitted to *hazmat@mpa.gov.sg*
- Assessed and submitted for Port Master's approval;
- For serious cases (involving Tier 2/3 severity) occurring at seaward side, Port Master will activate & convene Emergency Operations Command (EOC) for management of the incident;
- For ships while alongside or incidents that occurred on landward, the management of the incident will fall under Singapore Civil Defence Force (SCDF)

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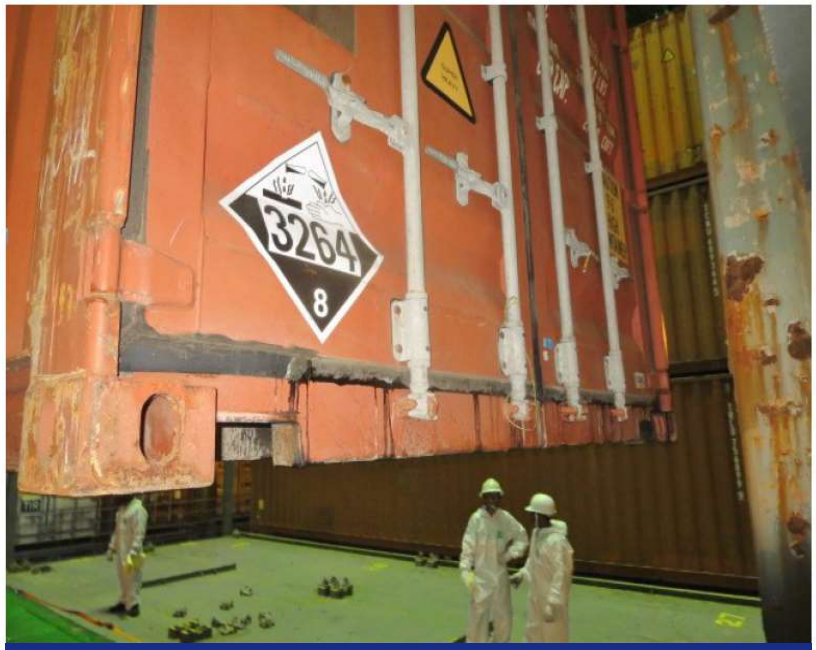
Reporting of leaking / damaged DGs

- Any leaking DG, DG incident must be reported to the Authority before arrival to ensure safe port operations

Class 3 leakage at door sill



Class 8 leakage at door sill

Moving Forward

- Non-compliance of DG handling can lead to loss of lives & damage to the environment;
- Continuous improvement to improve & ensure safe transportation of DG;
- Keeping abreast in developments at IMO & learn from other established administrations;
- Fine tuning in our enforcement checks to better address issues on Non-declarations & mis-declarations;

- Regular session dialogue between government and industries to improve safe handling of DG & issues;
  i. Raise awareness on hazards & dangers of DG;
  ii. Share common areas for improvements;
  iii. Seek feedback from shipping communities on experience & challenges;
  iv. Invite Subject Matter Experts (SME) to share knowledge

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Best Practices – Multi-pronged approaches

- Regulatory
  - Proper Documentation, oversight by Port Authority
  - Enforcement actions

- Engagement with relevant parties i.e. Ship agents, Liner's DG desk, terminal operators etc.;

- SOPs in place for handling different scenarios e.g. Incident involving DG on-board a ship;

- Proper training for people who are handling with DG;

- Regional platform for exchange of information to understand situations and difficulties experienced

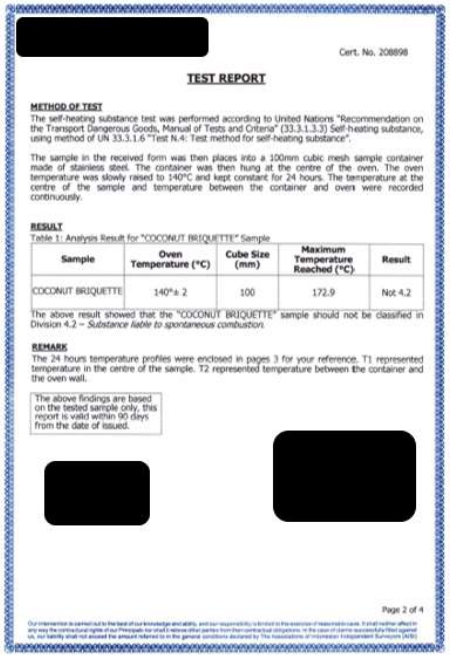
Recent discussion at IMO – CHARCOAL

- Charcoal is a Dangerous Goods (DG) classified under UN No. 1361 or 1362 as “CARBON”. Also known by many other names e.g. Coconut shell, hardwood, Shashi charcoal;

- Provisions need to be complied with to avoid safety risks associated with the carriage of dangerous goods. However, there are Special Provisions (SP) (if fulfilled) exempts the cargo from declaration as a DG;

- Increasing number of similar container fires also reported by other administrations as well;

- Feedback that the Special Provision (SP) were used in exempting the goods from the safety provisions of the Code, when in fact those goods were later proven to be dangerous. Possible reasons;
  - **Intentional non-declaration;**
  - **Mis-declaration;**
  - **Fraudulent certificates used to achieve exemptions allowed under SP;**
- Discuss extensively at recent Carriage of Cargo & Containers Committee (CCC9) in the way forward to prevent such re-occurrences



[redacted]

Cert. No. 208898

TEST REPORT

METHOD OF TEST

The self-heating substance test was performed according to United Nations "Recommendation on the Transport Dangerous Goods, Manual of Tests and Criteria" (33.3.1.3.3) Self-heating substance, using method of UN 33.3.1.6 "Test N.4: Test method for self-heating substance".

The sample in the received form was then places into a 100mm cubic mesh sample container made of stainless steel. The container was then hung at the centre of the oven. The oven temperature was slowly raised to 140°C and kept constant for 24 hours. The temperature at the centre of the sample and temperature between the container and oven were recorded continuously.

RESULT

Table 1: Analysis Result for "COCONUT BRIQUETTE" Sample

Sample	Oven Temperature (°C)	Cube Size (mm)	Maximum Temperature Reached (°C)	Result
COCONUT BRIQUETTE	140°± 2	100	172.9	Not 4.2

The above result showed that the "COCONUT BRIQUETTE" sample should not be classified in Division 4.2 – *Substance liable to spontaneous combustion*.

REMARK

The 24 hours temperature profiles were enclosed in pages 3 for your reference. T1 represented temperature in the centre of the sample. T2 represented temperature between the container and the oven wall.

The above findings are based on the tested sample only, this report is valid within 90 days from the date of issued.

[redacted]

[redacted]

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Our interpretation is carried out to the best of our knowledge and ability, and our responsibility is limited to the exercise of reasonable care. It shall neither affect in any way the contractual rights of our Principals nor shall it relieve other parties from their contractual obligations. In the case of claims successfully filed against us, our liability shall not exceed the amount referred to in the general conditions declared by The Association of Indonesian Independent Surveyors (AISI).

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