Liar, Liar Ship on Fire, Now What?

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Susan Dorgan, Global Marine Recovery Lead, AIG
MISDECLARED CARGOES & CONTAINER SHIP FIRES

04th October 2019

Richard Minton

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AIMS OF PRESENTATION

• To introduce and explain the requirements of the International Maritime Dangerous Goods (IMDG) Code in the context of containerised “Dangerous Goods” cargoes

• To provide an example of a commonly seen problem cargo that highlights the risks of carriage of misdeclared “Dangerous Goods” on container ships
Section 01

BACKGROUND
BACKGROUND

Section 01
BACKGROUND

Section 01

TT CLUB – FACTS & FIGURES

• International Cargo Handling Coordination Association has calculated that of the 60 million packed containers moved each year, around 10% of these containerised shipments are declared as “Dangerous Goods”

• Published Governmental inspections suggest that 20% of these “Dangerous Goods” are either poorly packed or incorrectly identified

• Scale of risk is elevated when undeclared or misdeclared consignments are taken into account

• The TT Club has recently estimated that a major container ship fire occurs on average every 60 days
BACKGROUND

Section 01
BACKGROUND

Section 01
Section 02

IMDG Code
Chapter VII of the International Convention for the Safety of Life at Sea (SOLAS) covers the carriage of dangerous goods, recognising two forms:

- In “Bulk” form, as a solid, liquid or liquefied gas (covered by the IMSBC, IBC and IGC codes, respectively)

- In “Packaged” form, covered by the International Maritime Dangerous Goods (IMDG) code
IMDG CODE

Section 02

DANGEROUS GOODS

• SOLAS defines dangerous goods as “...the substances, materials and articles covered by the IMDG code” and states that the “...carriage of dangerous goods in packaged form shall be in compliance with the relevant provisions of the IMDG code”

• “The classification shall be made by the shipper/consignor or by the appropriate competent authority where specified in this Code”
IMDG CODE
Section 02

CLASS 1
- Explosive substances and articles

CLASS 2 - GASES
- Flammable gas
- Non-flammable gas
- Toxic gas

CLASS 3
- Flammable liquid

CLASS 4.1
- Flammable solid

CLASS 4.2
- Liable to spontaneous combustion

CLASS 4.3
- Flammable on contact with water

CLASS 5.1
- Oxidising agent

CLASS 5.2
- Organic peroxide

CLASS 6.1
- Toxic

CLASS 6.2
- Infectious substance

CLASS 7
- Radioactive material

CLASS 8
- Corrosive

CLASS 9
- Miscellaneous
• “The purpose of this text is to present the United Nations schemes for the classification of certain types of dangerous goods and to give descriptions of the test methods and procedures considered to be the most useful for providing competent authorities with the necessary information to arrive at a proper classification of substances and articles for transport”
IMDG CODE

Section 02

DANGEROUS GOODS

- For each entry, the IMDG code prescribes:
  - UN Number
  - Proper Shipping Name (PSN)
  - Packing group
  - Special provisions
  - Limited quantities
  - Packing instructions and provisions (Including IBC or Tanks)
  - Emergency Schedule (EmS) for spill and firefighting measures
  - Stowage and Segregation
  - Properties and Observations
WHAT SHOULD HAPPEN

- The hazards associated with the dangerous goods should be identified, along with the level of danger and subsidiary risk

- A Proper Shipping Name and UN Number should be provided, as per the dangerous cargo list

- Any special provisions for carriage should be identified

- This information should then be communicated to the carrier in the dangerous goods transport documents – these documents must remain with the shipment and be handed over to the Consignees at the final destination

- The goods should be packed appropriately in line with the requirements of the IMDG code

- The material should be properly stowed on-board the Vessel
Section 03

Calcium Hypochlorite
CALCIUM HYPOCHLORITE
CALCIUM HYPOCHLORITE

Section 03
CALCIUM HYPOCHLORITE

WHAT IS IT?

Properties and observations

White or yellowish corrosive solid (powder, granules or tablets) with chlorine-like odour. Soluble in water. May cause fire in contact with organic material or ammonium compounds. Substances are liable to exothermic decomposition at elevated temperatures. This condition may lead to fire or explosion. Decomposition can be initiated by heat or by impurities (e.g. powdered metals (iron, manganese, cobalt, magnesium) and their compounds). Liable to heat slowly. Reacts with acids, evolving chlorine, an irritating, corrosive and toxic gas. In the presence of moisture, corrosive to most metals. Causes burns to skin, eyes and mucous membranes.
**CALCIUM HYPOCHLORITE**

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<th>Form</th>
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<th>Density (g/l)</th>
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<th>Code</th>
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## CALCIUM HYPOCHLORITE

### Section 03

#### UN NUMBER, PROPER SHIPPING NAME & CLASS

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<tr>
<th>UN No.</th>
<th>Proper shipping name (PSN)</th>
<th>Class or division</th>
<th>Subsidiary risk(s)</th>
<th>Packing group</th>
<th>Special provisions</th>
<th>Limited and excepted quantities</th>
<th>Packing</th>
<th>IBC</th>
<th>Packing mark and bulk containers</th>
<th>Local</th>
<th>Average rate of handling</th>
<th>Emergency procedures and equipment</th>
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<tr>
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<td>3</td>
<td>I</td>
<td>D</td>
<td>E0</td>
<td>0D1</td>
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<td>7.2-7.7</td>
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<td>3486</td>
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<td>II</td>
<td>314</td>
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<td>P002</td>
<td>PPI5</td>
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<td>III</td>
<td>314</td>
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<td>P002</td>
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<td>F-H, S-Q</td>
<td>5.4.3.2</td>
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**Known incorrect names:**
- Calcium Chloride, BK Powder, Bleaching powder, CCH, Disinfectant, Hy-chlor, Chloride of lime, Chlorinated lime, Calcium chlorohydrochlorite, Calcium hypochloride, Calcium oxychloride, Hypochlorous acid, Caporit, Hth, calcium salt
SPECIAL PROVISIONS

312 Vehicles powered by a fuel cell engine shall be consigned under the entries UN No. 3166 VEHICLE, FUEL CELL, FLAMMABLE GAS POWERED or UN No. 3166 VEHICLE, FUEL CELL, FLAMMABLE LIQUID POWERED, as appropriate. These entries include hybrid electric vehicles powered by both a fuel cell and an internal combustion engine with wet batteries, sodium batteries, lithium metal batteries or lithium ion batteries, transported with the battery(ies) installed.

Other vehicles which contain an internal combustion engine shall be consigned under the entries UN 3166 VEHICLE, FLAMMABLE GAS POWERED or UN 3166 VEHICLE, FLAMMABLE LIQUID POWERED, as appropriate. These entries include hybrid electric vehicles powered by both an internal combustion engine and wet batteries, sodium batteries, lithium metal batteries or lithium ion batteries, transported with the batteries installed.

314 These substances are liable to exothermic decomposition at elevated temperatures. Decomposition can be initiated by heat or by impurities (e.g. powdered metals (iron, manganese, cobalt, magnesium) and their compounds).

.2 During the course of transport, these substances shall be shaded from direct sunlight and all sources of heat and be placed in adequately ventilated areas.

315 This entry shall not be used for class 6.1 substances which meet the inhalation toxicity criteria for packing group I described in 2.6.2.2.4.3.
CALCIUM HYPOCHLORITE

PACKAGING

- The temperature at which the self‐accelerating reaction occurs depends on the type, size and shape of the packaging

- IMDG Code defines what packaging can be used for calcium hypochlorite as currently set out in Part 4, Chapter 4.1, Table P002. This allows various types of drum, box or jerrican. Provision PP85 states that bags are not allowed

- The International Group of P&I Clubs has produced guidance on the shipment of this cargo and therein stipulates that the packaging used should be plastic drums of not more than 45kg, whilst the total quantity per container should be not more than 14 tons

- This guidance is based on research into the thermal stability of calcium hypochlorite that was published in 1999 by the IMO
STOWAGE & SEGREGATION

• Stowage
  • For cargo ships:
    • “Stowage Category D” = ON DECK ONLY
    • “SW1” = Protected from sources of heat
    • “SW11” = Cargo transport units shall be shaded from direct sunlight. Packages in cargo transport units shall be stowed so as to allow for adequate air circulation throughout the cargo

• Segregation
  • Class 4.1 (Flammable Solids, Self- Reactive Substances and Desensitized Explosives)
  • Acids
  • Ammonium
  • Cyanides
  • Liquid organic substances
  • Peroxides
CALCIUM HYPOCHLORITE

Section 03

CAXU 218395 0
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<th>Carrier by</th>
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<td>XINGANG CHINA</td>
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<tr>
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<table>
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<th>Part of discharge</th>
<th>Place of delivery (*)</th>
<th>CONTAINERS STATUS</th>
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<tr>
<td>MOMBASA KENYA</td>
<td>MOMBASA KENYA</td>
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<table>
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<tr>
<th>CARRIER'S RECEIPT</th>
<th>PARTICULARS FURNISHED BY SHIPPER - CARRIER NOT RESPONSIBLE</th>
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<table>
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<tr>
<th>Seal No</th>
<th>Mark and No/Container No</th>
<th>Number of Containers/Package</th>
<th>Kind of Packages</th>
<th>Description of Goods</th>
<th>Gross Weight</th>
<th>Measurement</th>
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<td>N/M</td>
<td>408 DRUMS</td>
<td>18.36M3</td>
<td>WHITENING AGENT</td>
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<td>19228 KGS</td>
<td>20 M3</td>
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| UO | 1090870 | 408-19228 | 20 CT/CY | 20' GP |

| CAXU21B3856 | 1090870 | 408-19228 | 20 CT/CY | 20' GP |

| SHIPPED ON BOARD | |

| SHIPPED ON BOARD | |

| SHIPPED ON BOARD | |

| SHIPPED ON BOARD | |

| SHIPPED ON BOARD | |

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| SHIPPED ON BOARD | |

| SHIPPED ON BOARD | |
MATERIAL SAFETY DATA SHEET

Whitening Agent

Main Chemical Composition: Stilbene derivative

Specification: Appearance:
- Slight yellow powder
- Fluorescent Color: Similar to the standard sample
- Whitening strength: $100 \pm 3$ (compared with standard sample)
- Moisture: $\leq 5\%$
- Fineness (80 mesh residue): $\leq 5\%$

NO KNOWN HAZARDS TO ACCOUNT FOR INCIDENT
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<tr>
<th>TESTS</th>
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<th>RESULTS</th>
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<td>Calcium content</td>
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<tr>
<td>Iron content</td>
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<td>D/SGS TW 12(AAS)</td>
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<tr>
<td>Sodium content</td>
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<td>Vanadium content</td>
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<td>Magnesium content</td>
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CALCIUM HYPOCHLORITE

Section 03

PRIDE YEAR MARKETING LIMITED

P.O. Box 66463 – 00800, Nairobi – Kenya.
Tel: 254 - 20 - 558687; Fax: 254 - 20 - 4446187; 558687

1748 CALCULIUM HYPOCHLORITE, DRY or CALCULIUM HYPOCHLORITE MIXTURE, DRY with more than 39% available chlorine (8.8% available oxygen)

Product Name: WHITENING AGENT

UN No. 1748

Dangerous Risk: NOT ALLOCATED
CALCIUM HYPOCHLORITE

Section 03
CALCIUM HYPOCHLORITE

Section 03
REGIDESO
REPUBLIQUE
DEMOCRATIQUE DU CONGO
CONTRAT
NO:N044/DGCMP/DG/DRE/D1/K.L/2013
HYPOCHLORITE DE CALCIUM
POIDS BRUT:47.5KG
POIDS NET:45KG
REGIDESO

4988 DRUMS

226500KG CALCIUM CHLORIDE
IMPORT LICENCE NUMBER
DEC0047279-472A-IB
THE CREDIT NUMBER:CDI13000019
DATE OF ISSUE:130425
THE NAME IF ISSUING BANK:BICDCDKI
GROSSWEIGHT:239175KGS
MEASUREMENT:240CBM
COUNTRY OF ORIGIN:CHINA
Section 04

SUMMARY
SUMMARY

SUMMARISING COMMENTS

- The implications of mis-declaring dangerous goods are enormous, including potential loss of lives, huge cargo losses and ship damage.

- When something does go wrong, determining the cause of a fire and/or explosion can be extremely challenging.

- Calcium hypochlorite is only one cargo that can lead to serious fire and explosion incidents.