



STATE COMMISSION ON MARITIME ACCIDENT INVESTIGATION

FINAL REPORT 06/13

Marine Incident

M/V JU DA

fall of the cargo inspector from the ladder in the ladder way to the hold of the vessel
in the Port of Gdynia on 15 May 2013

June 2014

The examination of the incident on board M/V *Ju Da* was conducted under the State Commission on Maritime Accident Investigation Act of 31 August 2012 (The Journal of Law item 1068) as well as norms, standards and recommended procedures agreed within the International Maritime Organisation (IMO) and binding the Republic of Poland.

The objective of the investigation of a marine accident or incident under the above-mentioned Act is to ascertain its causes and circumstances to prevent future accidents and incidents and improve the state of marine safety.

The State Commission on Maritime Accident Investigation does not determine liability nor apportion blame to persons involved in the marine accident or incident.

This report shall be inadmissible in any judicial or other proceedings whose purpose is to attribute blame or liability for the accident referred to in the report (Art. 40.2 of the State Commission on Maritime Accident Investigation Act).

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1. Facts

On May 15, 2013 during sampling of the cargo of soya beans from the Juda Da vessel laying at the Polskie wharf in the Port of Gdynia, the cargo inspector collecting samples, lost consciousness and fell down the stairs of the ladder way leading to the hold no 7. The victim was pulled out on deck, received first aid and then transported by the emergency ambulance to the city hospital.

After stitching of a broken superciliary arch and completing necessary examinations the injured was discharged from hospital.

2. General Information

2.1. Ship Particulars

Vessel's Name	- Ju Da
Flag	- Chiny
Ship Owner	- COSCO (Singapore) Pte Ltd.
Operator	- Qingdao Ocean Shipping Co. Ltd. (COSCO Qingdao)
Operator	- Liu Wei Hang
Classification society	- CCS (<i>China Classification Society</i>)
Vessel Type	- general cargo
Call Signal	- BOAK
IMO number	- 9300116
Gross tonnage (GT)	- 39 962
Year of build	- 2005
Power	- 10 200 kW
Width	- 32,26 m
Length overall	- 225,00 m
Hull material	- steel
Minimum crew	- 10
Type of the VDR recorder	- Highlander HLD-B2 (Chiny)



Photograph 1. The M/V Ju Da

2.2. Voyage Particulars

Ports en route	- San Lorenzo (Argentina), Hamburg (Germany)
Port of destination	- Gdynia, Gdańsk
Type of navigation	- unlimited
Cargo	- 26 561 tonnes of soya beans
Manning	- 25 persons, citizens of the People's Republic of China
Passengers	- none

2.3. Marine Incident or Accident Information

Type	- marine incident
Date and time of the incident	- 15 May 2013 at 16:15 LT
Place of the incident	- the Port of Gdynia, Polskie wharf
State of the vessel	- loaded vessel
Place of the incident aboard	- front ladder way to the hold no 7
Participation of human factor	- the incident involved the cargo inspector who was not part of the crew
Consequences of the incident	- loss of consciousness, head contusion, and break of the superciliary arch of the injured

2.4. Shore Services and Rescue Action Information

The injured was assisted by the ambulance emergency service.

3. Circumstances of the Marine Incident

M/V Ju Da moored at the Polskie wharf in the Port of Gdynia on 15 May 2013, at 14:30.



Photograph 2. Ju Da at the Polskie wharf in Gdynia

The general cargo vessel brought a load of post-extracted toasted HIPRO soya bean meal from Argentina.



Photograph 3. Soya bean meal in the hold of the vessel

Following the completion of arrival clearance, at ca 15:00 two cargo inspectors from the local inspection company came on board to collect samples of cargo for laboratory examination for the presence of salmonella. The crew of the vessel opened the hatches of holds no 1, 4, 5, and 7. The inspectors commenced sampling starting from the bow of the vessel.

Sampling of cargo from holds No. 1, 4, and 5 was smooth and uninterrupted. The crew indicated the hatches, one of the inspectors descended the ladder to the hold and collected cargo samples from several different places, usually 9 - 10 places, whereas the other inspector remained on board as an assistance and documented (photographed) external state of the cargo.

At ca 16:10 the inspector collecting samples went through front deck hatch to the hold no 7 which had been opened by the crew.



Photograph 4. Entrance to the ladder way to the hold no 7



Photograph 5. Entrance to the hold no 7 covered with cargo - view from the inside of the ladder way

Since he could not get into the hold because of the entrance covered with the cargo, he collected part of the cargo sample from the heap in the ladder way and went back upstairs to the exit aboard. While ascending the stairs he fainted and fell 1.5 m down to the landing (*Australian ladder*).



Photograph 6. Second platform of the ladder way to the hold no 7

At ca 16:15 the other clerk, waiting on board, being concerned over the prolonging absence of his colleague, who went down to the hold, after unsuccessful calling for him, went into the ladder way and found him unconscious, lying on the platform. He ran out of the ladder way and alerted the encountered crew members about the accident. Together they pulled the unconscious man up the ladder way to the main deck.

After a few minutes, rescue services alerted about the accident, arrived to the vessel. The victim, who regained consciousness, was applied the first aid on board. Then, with the help of the vessel's crane he was transported to the wharf to the awaiting emergency ambulance and taken to the city hospital in Gdynia.

4. Analysis and Comments about Factors Causing the Incident with regards to Results and Expert Opinions

Soya bean meal are a sensitive cargo and when transported in bulk in the vessel's holds in result of damp or moisture it undergoes intensive microbiological (development of various

types of microorganisms) and biochemical processes. These processes become the most intense when the relative humidity exceeds 17% of the meal.

The vessel loaded the soya bean meal in the port of San Lorenzo in Argentina on 14 April 2013 and after 31 days of journey arrived in Gdynia. The visual inspection of the cargo carried out on 16 May 2013 in the holds of the vessel exhibited that the soya bean meal was in good condition, taking into account changes in climatic zones. The surface of the cargo area was dry, it had correct colour, and there were no visible traces of condensation. This means that the holds have been properly ventilated during the trip. When ventilating the cargo, the ladder way to the hold no 7 could not have been ventilated.

The bottom of the Australian ladder shielded with a steel casing was covered with cargo from the side of the hold.



Photograph 7. View of the ladder way in its lower part at the entrance to the hold no 7

This has resulted in the creation of a small enclosed space, covered from the top by the hatch of the ladder way, completely separated from the rest of the hold. In such a place the condensation (which is most intensive during the journey from warmer to colder climates) may proceed without interference and cause dampness of the meal, and consequently the intense growth of microorganisms, including aerobic bacteria that consume significant amounts of oxygen.

4.1. Human Factors (fault and neglect)

Cargo inspectors who arrived on board to collect samples of the soya bean meal had not measured the level of oxygen before entering the hold. This was due to lack of knowledge about the effects of entering the enclosed and inadequately ventilated space on board the vessel.

4.2. Organizational factors

The Commission does not object to the organization of work (the teams of two) of the cargo inspectors on board the vessel. However, the cooperation of inspectors with the crew while sampling, is questionable. The absence of a representative of the crew during sampling in the hold, lack of communication with the crew whether the gas concentration in the holds and adjacent premises had been controlled, no assurance from the crew that the descent to the hold was safe contributed to the occurrence of the incident. Another factor that contributed to the incident was the fact that the employer had not equipped the inspectors with gas concentration meters and gave them insufficient training at their workplace in this regard.

5. Description of Examination Findings Including the Identification of Safety Issues and Conclusions

Toasted HIPRO soya bean extraction meal is a feed formed after the extraction of soya bean oil from genetically modified soya beans. In the production process, after grinding of seeds, soya bean oil is extracted in special squeezers. Oil cake obtained in this process contains substantial quantities of oil, which is then extracted by means of solvents. Soya bean extraction meal formed after the extraction of oil cake is heated (toasted) in order to remove the residual solvent. Fat content in the soya bean extraction meal is only about 1.5% and water content is ca 11%.

This type of cargo transported in bulk, classified in the International Maritime Solid Bulk Cargoes Code under the UN number 2217 (Seed cake), is "susceptible to oxidation in consequence causing the reduction of oxygen in holds; it can also emit carbon dioxide."¹ Precautions provided by the Code, as far as such seed cake is concerned are very considerable. The Code prohibits people from entering the holds with such a cargo until the tests are carried out in order to confirm that the oxygen concentration is at a normal level.²

Neither the inspectors nor the crew of the vessel had made the necessary measurements of gas concentration in the holds of the vessel prior to sampling. It was assumed that the mere opening of the holds was sufficient to ventilate them. It has not been taken into consideration that the ladder way to the hold no 7 closed tightly with the hatch for the sea voyage would not be ventilated because there was no gap between the hold and the ladder way due to a heap of cargo mounting above the entrance to the ladder way. Opening of the hatch to the ladder way by the crew shortly before the inspector entered it for sampling had not allowed for full exchange of air thus securing safety for people in lower part of the ladder way.

According to the Resolution A.1050 (27)³ adopted by the International Maritime Organization (IMO) - relating to security issues while entering enclosed spaces of the vessel - poorly ventilated spaces such as for example holds of the vessel and adjacent premises, e.g. ladder ways, should be regarded as the so called enclosed spaces⁴ and treated in a special way (in practice treated simply as dangerous places). Admission to such places should be strictly controlled. Before entering such places, one should assess the risk, get the admission permit and while entering and staying in such places, take special precautions, basically check the concentration of gas with appropriate and correctly calibrated instruments.

Cargo inspectors, despite their experience, had not been aware of the risks caused by entering unventilated enclosed spaces. They had not undergone appropriate training in the company that employed them. They did not know that they should be equipped with a meter allowing for checking the concentration of gases in the premises (hold) they were entering.⁵ Also they did not know that they could (and even should) have asked members of the crew to

¹ *IMSBC Code, Appendix 1*, p. 263.

² The concentration of oxygen in the air in the amount of ca 21% is regarded as a normal level. According to the investigation of the Commission based on the hearing of witnesses of the incident, the concentration of oxygen in the ladder way to the hold no 7 could be at a level of ca 0-12%. This was confirmed by the symptoms manifested by the injured.

³ *Resolution A.1050(27) Revised recommendation for Entering Enclosed Spaces aboard Ships.*

⁴ Except for the holds, such places (spaces) includes, among others, double bottom of the vessel, fuel tanks, cargo pump stations, cofferdams, chain lockers, empty tanks (*void spaces*), engine blow down spaces, refuse tanks as the adjacent premises.

⁵ A more appropriate with that type of cargo would be a multi-gas meter that except for oxygen (O₂) can also detect the level of carbon dioxide (CO).

do so, specially that such instrument, properly calibrated, was found aboard with a valid certificate.

Calibration Certificate																													
BW气体检测器校验证书																													
Model # 型号: <u>GasAlertMicro GAMIC-4-CN</u>		Serial # 出厂号: <u>S110-03512</u>																											
Temperature 温度: <u>19°C</u>		R.H. 湿度: <u>60%</u>																											
Pressure 压力: <u>1025hPa</u>																													
Calibration Date 本次校验日期: <u>January 22, 2013</u>		Next Calibration Date 下次校验日期: <u>January 19, 2014</u>																											
<p>Calibration Gas Applied 校验所用的标准气体成份: <u>H2S=25ppm; CO=100ppm; O2=20.9%; CH4=50%LEL; and balance N2</u></p> <p>Flow Speed 流量速度: <u>0.5LPM</u></p>																													
<p>Factory Alarm Setting 出厂报警设置:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th>LOW</th> <th>HIGH</th> <th>TWA</th> <th>STEL</th> </tr> </thead> <tbody> <tr> <td>H2S</td> <td>10 ppm</td> <td>15 ppm</td> <td>10 ppm</td> <td>15 ppm</td> </tr> <tr> <td>CO</td> <td>35 ppm</td> <td>200 ppm</td> <td>35 ppm</td> <td>50 ppm</td> </tr> <tr> <td>O2</td> <td>19.5 %</td> <td>23.5%</td> <td></td> <td></td> </tr> <tr> <td>Combustible</td> <td>10% LEL</td> <td>20 %LEL</td> <td></td> <td></td> </tr> </tbody> </table>						LOW	HIGH	TWA	STEL	H2S	10 ppm	15 ppm	10 ppm	15 ppm	CO	35 ppm	200 ppm	35 ppm	50 ppm	O2	19.5 %	23.5%			Combustible	10% LEL	20 %LEL		
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Combustible	0-100%LEL																												
<p>Reading After Calibration : 校准后读数:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tbody> <tr> <td>H2S</td> <td>25PPM</td> </tr> <tr> <td>CO</td> <td>100PPM</td> </tr> <tr> <td>O2</td> <td>20.9%</td> </tr> <tr> <td>Combustible</td> <td>50%LEL</td> </tr> </tbody> </table>					H2S	25PPM	CO	100PPM	O2	20.9%	Combustible	50%LEL																	
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<p>This is to certify that the above equipment has been calibrated by the standard gas in accordance with manufacturer's specification.</p>																													
<p>Service Centre Authorized by BW Technologies Ltd 厂家授权的服务中心:</p> <p>GrandUnit Co.,Ltd. 广州市精航船舶配件有限公司</p>																													
<div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;"> <p>GRANDUNIT COMPANY LIMITED</p> <p style="font-size: 1.2em;">邱光进</p> </div>																													

Photograph 8. Calibration certificate of the gas meter on board Ju da

To some extent, the vessel's crew could have prevented the incident, which took place in the Port of Gdynia, if during the voyage, and specially in its last phase, they had been opening regularly in good weather the hatches of ladder ways, to ventilate the cargo which appeared there from the hold of the vessel. This would result in a longer exchange of air and would ensure adequate oxygen concentration in the ladder way.

In the course of investigation, the Commission stated that there were no internal procedures for using the gas meters in the enclosed spaces by the cargo inspectors in the

inspection company employing the injured aboard Ju Da, and there were no trainings for the employees related to the safety of entering the enclosed spaces on board the vessels.

6. Safety Recommendations

The State Commission on Maritime Accident Investigation considered reasonable to submit to Inspectis Poland Ltd in Gdynia, the company employing the injured cargo inspector, safety recommendations suggesting steps to be undertaken in order to prevent similar incidents in the future. The Commission has recommended:

1. Developing procedures regulating the entry of the cargo inspectors into the enclosed spaces aboard including the identification, assessment, and control of risks associated with entering and staying in such premises.⁶
2. Developing a list of tasks to be performed or verification activities (checklist) before sampling the hold of the vessel, depending on the type of load to be controlled. Such tasks or activities should include, among others:
 - a) a review of personal protective equipment (safety shoes, helmet, gloves, respirator, safety harness),
 - b) checking the state and security of ladders used by inspectors,
 - c) checking lighting in the sampling places,
 - d) determining whether the cargo has been fumigated, and if so, whether the holds have been adequately ventilated by the crew,
 - e) checking the state of atmosphere in the premises where the inspector enters with a certified measuring instrument.
3. Obliging the inspectors to observe the accepted procedures, and use the checklist, and to confirm that the tasks have been performed or checking the activities described in the checklist before entering the hold.
4. Conducting regular trainings for cargo inspectors in respect of safe entry into enclosed spaces aboard.
5. Equipping the controllers with personal gas concentration measuring instruments and providing trainings in the use of such devices.

⁶ The Commission recommends to use the guidelines included in the IMO Resolution A.1050(27): *Revised recommendation for Entering Enclosed Spaces aboard Ships*.

6. Equipping the inspectors designated to do the sampling of cargo in the holds of a vessel with standard safety harness, which facilitate the evacuation in the event of the loss of consciousness in the hold (the ladder way).

7. Information Sources

Notification of the incident

Materials from hearing of witnesses

Photographs taken on board

Documents of the vessel

Expert opinion by Roman Kamiński, M. Eng.

8. Composition of the Incident Investigative Team

The team conducting the investigation was composed of:

the Team Leader – Cezary Łuczywek – the Chairman of the State Commission on Maritime Accident Investigation

the Team Member: Krzysztof Kuropieska – a member of the State Commission on Maritime Accident Investigation