Marine Safety Investigation Unit

Transport Malta

SAFETY INVESTIGATION REPORT

201112/048 REPORT NO.: 17/2012 September 2012

MT TRANS SCANDIC

Loss of Pygas cargo
Whilst on passage
Between 29 and 30 December 2011

SUMMARY

Trans Scandic (Figure 1), a Maltese registered oil and chemical tanker, lost approximately 125 mt of Pyrolysis Gasoline (Pygas) from the Butterworth opening of the no. 9 centre cargo tank.

The vessel was en route from Fos-sur-Mer, France to Rotterdam, The Netherlands via Ceuta, Spain, when she encountered stormy weather conditions with very rough seas. At the time of the spill, the ship was more than 12 nautical miles off the coast of France and Spain.

The open Butterworth cover of no. 9 centre cargo tank was noticed during an inspection of the deck carried out after the encountered storm.

Immediate action was taken to close and secure the cover.

The safety investigation analysed the line of communication and reporting, most particularly how instructions were being specifically delegated to the crew and the preventive maintenance that should have been carried out on board.

Taking into considerations the comprehensive actions taken by Seatrans AS, no recommendations have been issued.

Figure 1

FACTUAL INFORMATION

Vessel, crew and environment

Trans Scandic, a 5025 mt chemical tanker, was built by Herman Surken, Germany in 1992 and was registered in Valletta, Malta[1]. The vessel was owned by Euro Trans Skips as, managed by Seatrans AS and classed with Det Norske Veritas. *Trans Scandic* has an overall length of 116.8 m and a beam of 20.2 m.

Trans Scandic operated on international voyages. She had a crew of 12, with English being the working language on board. The chief mate was the vessel's cargo officer, directly assisted by the other officers and the pump man. Company procedures stipulated that he was responsible for the preparation of plans, and the loading and discharge of cargo. Both the chief mate and the pump man had served on *Trans Scandic* before and were well familiar with the vessel's cargo system.

At the time of the accident, it was dark and cloudy, and the air temperature was about 11°C. The vessel encountered very rough seas and gale winds were blowing from the North-northwest.

Narrative

Trans Scandic loaded a cargo of Pygas on 27 December 2011 in Berre, France. The voyage from Berre to Fos-sur-Mer was uneventful. Crew members were utmost certain that all the Butterworth covers were closed and tightened during this part of the voyage. The AB and the pump man had been given instructions to ensure the secure closure of all cargo tanks after the Pygas was loaded.

On 29 December 2011, the vessel was set to leave the port of Fos-sur-Mer after having loaded a cargo of Propylene Oxide in the other cargo tanks. One AB and the pump man were again given instructions to ensure the secure closure of the loaded cargo tanks.

Since the forecasted weather conditions were expected to be unfavourable, the chief mate gave instructions to the AB and the pump man to prepare the deck for rough weather and check that all cargo tank openings were secured tight before departure from Fos-sur-Mer.

The course was set at a distance of no less than 12 nautical miles from the coast (Figure 2)[2]. It was forecasted that rough weather would be approximately 45° to the aft starboard quarter.

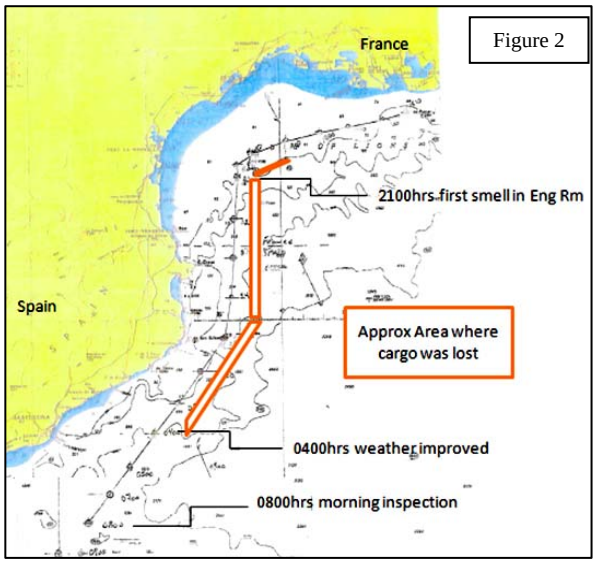

Figure 2

After completing all the necessary formalities, the vessel left the port of Fos-sur-Mer at 1350.

At about 2100, a smell of chemicals was detected in the engine-room during a normal routine inspection by the second engineer, who immediately notified the chief engineer. Both proceeded to inspect the machinery compartments for the possibility of overturned chemical drums

[1] At the owners' request, the vessel was deleted from Registry of Maltese ships on 22 May 2012.

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due to the heavy rolling. No spillage was found and therefore the chief mate was informed at approximately 2200.

The chief mate immediately proceeded to the cargo control room to check the loading data on the computer. Since no change in the data records was found, he assumed that the strong smell was coming from the Pressure Vacuum (PV) valves. This was not the first time for the chief mate to experience relief of overpressure from the cargo tanks especially during heavy rolling.

By 0400, the weather had improved and at 0800, the crew carried out an inspection for storm damage. It was during this period that the open Butterworth cover of no. 9 centre cargo tank was noticed.

Immediate action was taken to notify the Master of the finding, who instructed the crew to wear the required personal protection equipment (PPE), close the cover, and ensure that it was tightly secured. At a later stage, additional fastenings were also applied.

At this point, there was a strong suspicion amongst the crew members that some cargo may have been lost at sea during the storm. The exact location of the potential spill could not be determined but estimated to be at a point between the coasts of France and Spain. The vessel continued with the voyage to the port of Ceuta, Spain for bunkers. *Trans Scandic* arrived at Ceuta on 31 December 2011.

Once alongside, the Master instructed the chief mate to sound no. 9 centre cargo tank. The ullage report indicated a loss of approximately 10 mt. The tank measurement gave no clear results for water content.

The vessel sailed from Ceuta to Rotterdam, The Netherlands on 01 January 2012 at 0830. Seatrans AS and Marseille port authorities were advised of the accident on 01 January 2012 at around 0845.

The vessel arrived at the port of Rotterdam in the evening of 08 January 2012. A team from the management company and a P&I club surveyor went on board to start an internal investigation into the accident and sample the cargo. The results of the samples obtained on 08 January were unclear.

During the following morning, additional sampling and gauging were carried out and eventually, a distinct interface was established at an ullage of 6.68 m. This corresponded to about 157.0 m^3 of water in the tank bottom. The water was discharged to a slop barge on 10 January 2012. The remaining cargo was discharged as per normal shipboard procedure on 11 January.

The final measurements and calculations indicated a cargo loss of about 124.8 mt. The flag State was eventually informed of the accident on 10 January 2012.

Cargo information

Pygas, which is the trade name of the cargo, is a flammable liquid and has a Pollution Category Y. The substance is a mixture of gasoline, pyrolysis, and other hydrocarbons. It is a pale yellow liquid with an aromatic, gasoline-like odour. Pygas is used in the industrial production of benzene, toluene, and xylene (for fuel additives).

The specific gravity of Pygas is between 0.8 and 0.9 and is therefore classified as a ‘floater-evaporator’. It also has low viscosity, is volatile, and does not easily dissolve in water. When spilled in water, Pygas floats and forms a slick at the surface. Whilst some of the aromatic compounds may dissolve, evaporation of the slick is rapid to very rapid, depending on the environmental conditions.

ANALYSIS

Aim

The purpose of a marine safety investigation is to determine the circumstances and contributory causes of the accident as a basis for making recommendations, to prevent further marine casualties or incidents from occurring in the future.

Focus of the investigation

The investigation carried out by MSIU focused on the line of communication and reporting, most particularly how instructions were being specifically delegated to the crew, and the preventive maintenance that should be carried out on board.

Crew related tasks

It was routine practice on board *Trans Scandic* to change gaskets when loading different cargoes, since different cargoes require specific gasket material (Figure 3).

Figure 3: Cross-section of the gasket used on the Butterworth covers. The gaskets are of the endless type, necessitating a custom made gasket, which fits the dimensions of the hatch coaming.

The duty AB had changed all the Butterworth covers' gaskets for the tanks loaded with Pygas, *i.e.* nos. 1, 2, 3 centre, 4 starboard, 7 port, and 8 and 9 centre. When the task of changing gaskets was completed, all the cargo hatches were closed and tightened by use of a special tool. This was done prior to the Pygas loading operation since the loading of this cargo was of the closed loading type (Figure 4).

Figure 4: View of no. 9 centre tank Butterworth from the catwalk

Taking into consideration the very strong and distinct odour of Pygas, it was concluded that any opening left unsecured would have been easily noticed either at the port of Berre or Fos-sur-Mer.

Master's awareness

There was a considerable delay in notifying the master as a result of how the situation was perceived. Whilst an odour of Pygas had been detected at 2100, no spill was detected. Moreover, no changes in the cargo level were observed from the cargo control room, leading the chief mate to believe that the PV valves were opening and relieving gas that was generated by the heavy rolling and cargo sloshing. The Master was therefore not informed and no further actions were taken.

As a result of the above factors, the master was only informed at 0800 when the Butterworth cover was found open. It was only at this stage that the Butterworth was closed and re-secured with additional fastenings as a safety precaution (Figure 5).

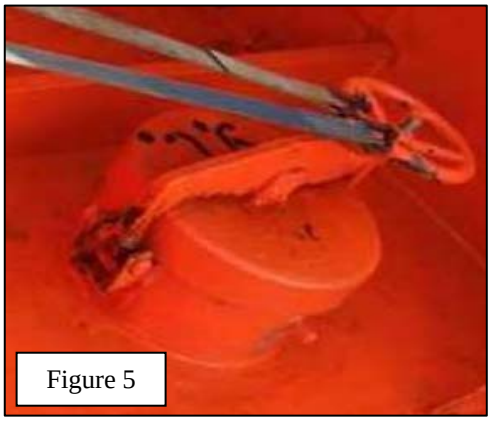

Figure 5

Risk assessment - routine maintenance

It was reported that the securing mechanism of the no. 9 centre cargo tank Butterworth cover had been bent for some time. However, there were no indications as to when this could have happened. Taking into consideration the cargo which the vessel loaded, and since there was only one locking device on the cover, it was of utmost importance that these devices were fully maintained.

During any particular deck inspection, it was not particularly difficult to notice that the extent, to which the spindle and tierce were bent, would have facilitated the falling of the spindle off the tierce with the least minimum effort (Figure 6).

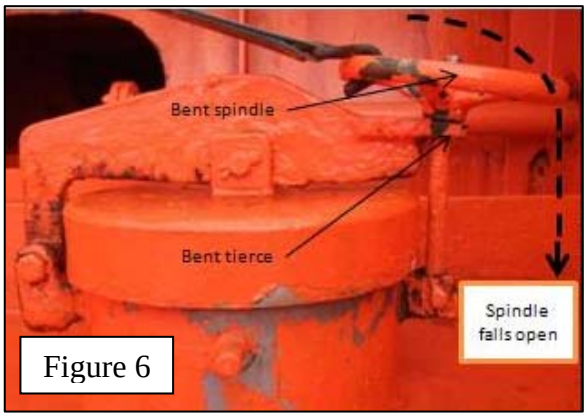

Figure 6

Considering that the gasket on no. 9 centre Butterworth cover was renewed, there was also the possibility that this was not fully compressed when initially fitted. By time, the gasket gradually compressed itself enabling the cover locking spindle to become free.

During the heavy rolling, the sloshing effect of the cargo imposed forceful pressure, facilitating the process of the spindle easing off the tierce. Once the spindle fell off, there was nothing else preventing the cover from opening.

Since the bent spindle and tierce were not considered critical, no formal risk analysis was ever carried out to determine the possibility of a Butterworth cover to open.

Risk assessment – extraordinary inspection

Prior to departure, the chief mate instructed the AB and the pump man to secure the deck for the sea passage.

This was the fourth inspection; the other three occasions were prior to the loading of the Pygas, prior to sailing from Berre, and after the loading of Propylene Oxide at Fos-sur-Mer. Although this fourth inspection was not part of the normal routine procedure, the crew members were unaware of the potential damage which could have been inflicted by the forecasted rough weather. Therefore, the inspection was not given any extraordinary importance.

Moreover, taking into consideration the prevailing weather conditions, it was highly unlikely that the crew members would have been able to thoroughly inspect the cargo length area of the ship during the sea passage.

Reporting culture

From the reported time frames during the accident period, it was noted that the company's reporting procedure system was not adhered to.

Given that no consideration was given to the NNW wind direction, it was not deemed possible that the odour of gas from the PV valves would have been carried away from the vessel and the engine-room air inlet vent.

It has already been stated that the matter was not immediately reported to the master. Once notified, even the Master did not report immediately (the spillage of Pygas into the sea) to his office and port authorities. He only informed the appropriate parties upon sailing from Ceuta, *i.e.* 48 hours after having been notified of the situation himself.

Moreover, Seatrans AS did not inform the flag State immediately of the accident[3]

Impact on the external environment

As part of the mitigation process in the wake of the spill, the managers requested an assessment of the risk posed on the environment as a result of the loss of the cargo[4].

It was not possible to model the likely trajectory of the spill since accurate information on the location and times of the spill were unavailable. Notwithstanding, it was expected that given the physical and chemical characteristics of the cargo and the prevailing sea and weather conditions, the spilled Pygas would have readily spread on the sea surface.

An estimated 95% of the spilled volume would have evaporated very rapidly *i.e.* within several hours from the release. Moreover, since the vessel was navigating at a distance of more than 12 nautical miles from the shore and given that the winds were offshore, no impacts on nearby coasts were expected.

[3] The report was lodged with the MSIU on 10 January 2012.

[4] The assessment was produced by the International Tanker Owners Pollution Federation Limited (ITOPF).

CONCLUSIONS

1. The insufficiently tightened Butterworth opening, in conjunction with the sloshing effect of the cargo due to bad weather led to the opening of the Butterworth opening cover.
2. There were no company procedures for the fitting and subsequently re-tightening of Butterworth cover gaskets.
3. The crew members were unaware of the possibility that the new Butterworth gasket would give way under compression. To this effect, there were no follow ups to retighten the Butterworth cover.
4. The prevailing weather condition may have hindered a thorough inspection of the Butterworth openings at sea.

SAFETY ACTIONS TAKEN DURING THE COURSE OF THE SAFETY INVESTIGATION[5]

As a result of this occurrence, Seatrans AS has taken immediate and permanent corrective actions. A cargo supervisor went on board and sailed with the ship in order to observe daily routines. Corrective actions were discussed and introduced at this stage.

Moreover, as a permanent corrective action, additional tierces were fitted where necessary on the Butterworth openings on board *Trans Scandic* and her sister ship. Notifications were also issued to the sister vessel and all crew members were briefed and encouraged to improve communication procedures.

Training programmes and reporting procedures were also amended. The

[5] **Safety actions and recommendations should not create a presumption of blame and/or liability.**

company has ensured that all officers sailing on company's managed ships attended two seminars, which were organised during the spring of 2012. The *Trans Scandic* cargo spill was the main topic of the seminars.

The company has also implemented changes in the loading procedures and relevant checklists on board all its managed ships. The reporting requirements from the vessel and to shore authorities, including the flag State Administration have been reviewed and amended accordingly.

The lessons learnt from this accident have been also disseminated to all vessels and company employees ashore.

SHIP PARTICULARS

Vessel Name:	Trans Scandic
Flag:	Malta
Classification Society:	Det Norske Veritas
IMO Number:	9000247
Type:	Chemical tanker
Registered Owner:	Euro Trans Skips A.S.
Managers:	Seatrans A.S., Norway
Construction:	Steel
Length Overall:	116.8 m
Registered Length:	108.42 m
Gross Tonnage:	5025
Minimum Safe Manning:	12
Authorised Cargo:	Chemicals in bulk

VOYAGE PARTICULARS

Port of Departure:	Fos-sur-Mer, France
Port of Arrival:	Rotterdam, The Netherlands
Type of Voyage:	International
Cargo Information:	Pyrolysis Gasoline and Propylene Oxide
Manning:	12

MARINE OCCURRENCE INFORMATION

Date and Time:	Around 2100 on 29 December 2011
Classification of Occurrence:	Serious Marine Casualty
Location of occurrence:	Mediterranean Sea
Place on board	No. 9 centre cargo tank
Injuries / fatalities:	None
Damage/environmental impact:	None
Ship Operation:	On passage
Voyage Segment:	Transit
External & Internal Environment:	Dark and cloudy, and the air temperature was about 11°C. Very rough seas and gale winds were blowing from the North-northwest. One of the cargo tank Butterworth openings was not secured.
Persons on board:	12