

## The Understanding of Crews about Safety on Tanker Vessels

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**Abstract:** This research aimed to investigate the knowledge levels of the crews about the safety equipments on tanker vessel; to investigate the application of the safety procedures on tanker vessels; to investigate the vessels of understanding about the safety as seen from the aspects of age, education, and experience. The research was conducted on tanker vessels which were sailing in Indonesian territory. The methods used were the spot survey and interviews using questionnaires with 25 crews of the vessel as respondents. The data were analyzed using a quantitative analysis in order to determine the mean values of the geometrics, which were continued with the cross tab test and correlation test using SPSS. The research results indicated that the crews understanding about the safety on board of the tanker vessels showed a close correlation with the three aspects the experience, education, and age.

**Keywords:** Crews Vessel, Tanker Ship, Safety Procedure

### I. INTRODUCTION

Transport safety at sea lately, rising to the surface became hot theme in the news. Therefore, the role of shipping safety in sea transportation system is very important because it involves the transport of logistic and people, in crossing the ocean with a full dangers and threats. Sea survival or saving human life at sea is a sailor practical knowledge concerning how to save themselves or others in an emergency. Such as collision, fire/explosion, foundered/leakage, people fall into the sea and so on. Some factors contributing to transportation accidents at sea by the Supreme Court of the shipping Decree 2012 is a human error (88%), natural conditions (8%), technical malfunctions, damage boat engines, signs-traffic signs shipping, and more (4%).

As an example of an accident the ship MT. Soechi Lesmana on August 27, 2012 at 03.00 pm, the cause of the crash was engine failure that caused the explosion that started the fire. Suppression efforts failed due to heavy smoke. Thus, the Master decided to leave the ship at 05.00 pm. This incident raises an explosion accompanied by destructive fires ships, engines, until the building of accommodation ship (NTSC 2012).

Of the many types of ships in the world, tankers are vessels that have safety hazards are very large compared to other vessel types. This is caused, because this type of ship construction is devoted to load cargo in liquid form, which is included in the hazardous cargo, among others: crude oil, refined oil, liquid chemicals, liquefied gases under pressure, and other types of liquid cargo.

In the vessel tanker with its crew is multinational brings a variety of situations difficulties and problems that can not be separated with the ability of the crew itself. One of the contents of the article of Law No. 21 of 1992 on the voyage is the Maritime Safety. Maritime Safety in question is sea worthiness ship and crew as a whole included in chapter 1 verse 10 to verse 14 of Law No. 21 of 1992. Safety cruise on a ship regardless of the state of sailors, in addition to the skills possessed by a sailor in the ship were already eligible operates a sail, thing to note also of a sailor is the speed and accuracy in taking emergency action onboard. Therefore, this study aims to (1) know the level of understanding of the safety crew on vessel tanker, (2) How about the application of the above procedure for the safety on vessel tankers. (3) The extent to which the relationship between age, education and experience to the understanding of the safety crew on vessel tanker.

### II. MATERIALS AND METHODS

#### Location and design research

This research was conducted in a vessel tanker MT. Harmony Bull-owned company PT. Berlian Laju Tanker singapur operating in Indonesian waters. This election was taken on the basis that the ship is a type of tanker, one of the crew are relatives to facilitate the research and data collection and respondent data. This type of research is quantitative; the value of the distribution of questionnaires by respondents who own's experience in the ship tanker.

### Data collection methods

Data collection methods used in this study a field of study, observation and the distribution of questionnaire and literature study of secondary data from sources associated with this research, especially originating from tankers.

### Data analysis

The analytical method used in this study is a comparative analysis method qualitative with quantitative calculations based on the results of secondary data and primary obtained using SPSS, using Crosstab, Correlation and simple regression.

## III. RESULTS AND DISCUSSIONS

### General overview of respondents

The crews are a person working or employed on the ship by the owner, or operator of a vessel to perform these tasks in accordance with his ship listed in the book Certificate (Low No. 17 in 2008). Respondents as the sample material are an officer. The officer in question in this case is the Master, KKM, Mualim one, Mualim/Machinist two, Mualim/Machinist three; if possible there is a chief mate/engineer four.

Deck officer respondent's age varied from 22 years with ANT III level of education and work experience of less than 5 years, until the age of 50 years education level ANT 1 with his experience over 20 years. Age of respondents is distributed in over 24 years with a greater percentage which the average level of education is ANT II with varied work experience. Meanwhile, respondents' age also varies the engine officer of 26 years of education level ATT III with work experience under the 10 years up to the age of 50 years I ATT education level with over 30 years of work experience. Ages of respondents are dominated by the age group 25-37 years. See above explanation can be that an officer of the deck and the average engine is still relatively young, the average education level of ANT/ATT II with varied work experience. It can be concluded that the older the respondent, the higher education and work experience more and more can be seen in table data respondents based on age, education and work experience. See in Table 1.

**Table 1.** Data respondents based on work experience, education, and age

No.	Name	Ship Name	Position (Y)	Experience (Year) (X1)	Education (X2)	Age (X3)
1	Harson Tjolly	Bull Sulawesi	Master	24	ANT I	53
2	Kallo Bin Jabbar	Bes Solar	Master	20	ANT I	42
3	Yosafat Frederik	Offshore Cat	Master	18	ANT I	40
4	Alberto Tasiabe	Bull Sulawesi	CH. OFF	6	ANT II	28
5	Basrani La Undu	Bes Solar	CH. OFF	8	ANT II	31
6	Abd. Suwandi	Ebonbog	CH. OFF	6	ANT II	27
7	Herman Hammae	Offshore Cat	CH. OFF	6	ANT II	27
8	Yon Hendrik	Tete Oldendorff	CH. OFF	23	ANT II	45
9	Donna Donny P.	Bes Solar	2ND OFF	4	ANT III	25
10	Subekti Pratomo	Bull Sulawesi	2ND OFF	10	ANT III	33
11	Endro Y.Pramono	Bull Sulawesi	3RD OFF	5	ANT II	24
12	David E.P.Simalongo	Tete Oldendorff	3RD OFF	5	ANT III	24
13	Ahmad Djefri Jamhari	Banowati	4TH OFF	4	ANT III	25
14	Ferry Setiawan	Bull Sulawesi	4TH OFF	2	ANT III	22
15	Muhammad Yusuf	Bull Sulawesi	KKM	38	ATT I	59
16	Fahmi Baharessa	Bes Solar	KKM	23	ATT I	49
17	Galih Santoso	Offshore Cat	KKM	7	ATT II	30
18	Deni Kurniawan	Mandiri Benoa	2ND ENG	3	ATT II	29
19	Johanis Andris	Bull Sulawesi	2ND ENG	25	ATT I	52
20	Hamka A. Azis Sima	Bes Solar	2ND ENG	13	ATT II	35
21	Syukri Hasan	Armada Gema	2ND ENG	5	ATT II	29
22	Iim Adi Saputra	Bull Sulawesi	3RD ENG	14	ATT II	39
23	Jhon Allorerung	Bes Solar	3RD ENG	15	ATT III	37
24	Irmawan Setyoko	Bull Sulawesi	4TH ENG	4	ATT III	26
25	Ivan Potto	Tete Oldendorff	4TH ENG	6	ATT II	27

In tanker there are several kinds of training emergency that must be applied in accordance with SOLAS regulation 1974-1978, IMO in 1996, and from 1973 to 1976 MARPOL. The training in question is Abandon Ship, Grounding, and Man over Board, collision, Personal Injury, Power Failure, Fire Drill, Accommodation Fire, Fire In Engine Room, Escape From Enclosed Space, Steering Failure, Oil Pollution, Life raft, and Lifeboat Rescue Boat as shown Drill Schedule MT. VS Harmony. However, some safety drills above

there are three mandatory safety drills each month is applied (1). Ships leaving or Abandon Ship is an emergency do if the ship can not be saved anymore. Exercise Fire or Fire Drill is a way to overcome or extinguish fires that occurred onboard, and the Oil Pollution Oil Pollution or emergency is done to prevent the oil spill vessel.

Correlation of the analysis results indicate that the relationship between experience (X1) and answers respondents (Y) with the result of the correlation is  $-0.052$  (negative) means that the two variables have a strong relationship, but not the direction. Not unidirectional means if a high amount of experience of the possible answers will responde low. Then the next variable, with a level of significance  $0.805 < 0.05$  means that respondents experience not only related to the respondents' answers but also to the other aspects. Based on the criteria (X2) Educational existing relationship between the two variables because the numbers significance of  $0.061 < 0.001$ . Relations between the two variables have two-way (two-tailed), which may be one way and not unidirectional to see the correlation between the two variables. Directions correlation seen from the figures the correlation coefficient is positive or negative result. Because the number of correlation coefficient is positive, namely  $0.770$ ; the correlation of the two variables are unidirectional. That is if the number of respondent's higher education, then the value of the respondents' answers will be higher as well. The results of the analysis Correlation Age (X3) and answers respondents (Y) with the result of the correlation is  $-0.037$  (negative) means that the two variables have a strong relationship, but not the direction. Not unidirectional means if the amount of the age of the respondents is high then the possibility of respondents will be low. Then the next variable, with a significance level of  $0.859 < 0.05$  means that the respondent's age is not only related to the respondents' answers but also to the other aspects. The distribution of the respondents' answers and corelation results by using SPSS program can be seen in Table 2 and 3.

**Table 2.** The distribution of responSdents accordSing to the understanding of safety in the Tanker Vessels

No.	Weighting of Responses					Total
	5	4	3	2	1	
1	20	0	0	0	0	20
2	18	2	0	0	0	20
3	19	1	0	0	0	20
4	20	0	0	0	0	20
5	20	0	0	0	0	20
6	19	1	0	0	0	20
7	18	1	1	0	0	20
8	18	1	1	0	0	20
9	18	2	0	0	0	20
10	20	0	0	0	0	20
11	20	0	0	0	0	20
12	19	1	0	0	0	20
13	19	1	0	0	0	20
14	18	0	2	0	0	20
15	18	2	0	0	0	20
16	18	2	0	0	0	20
17	17	2	1	0	0	20
18	17	1	2	0	0	20
19	20	0	0	0	0	20
20	20	0	0	0	0	20
21	19	0	1	0	0	20
22	19	0	1	0	0	20
23	19	0	1	0	0	20
24	20	0	0	0	0	20
25	20	0	0	0	0	20

**Table 3.** Correlation Results by SPSS Program

Correlations					
		Respondents Answer	Experience	Education	Age
Respondents Answer	Pearson Correlation	1	-.052	.061	-.037
	Sig. (2-tailed)		.805	.770	.859
	N	25	25	25	25
Experience	Pearson Correlation	-.052	1	-.710**	.977**
	Sig. (2-tailed)	.805		.000	.000
	N	25	25	25	25
Education	Pearson Correlation	.061	-.710**	1	-.746**

	Sig. (2-tailed)	.770	.000		.000
	N	25	25	25	25
Age	Pearson Correlation	-.037	.977**	-.746**	1
	Sig. (2-tailed)	.859	.000	.000	
	N	25	25	25	25
**. Correlation is significant at the 0.01 level (2-tailed).					

#### IV. CONCLUSION AND SUGGESTION

Based on the answers of respondents note that the crew understand and know all the safety aspects that are above tankers this can be seen from the results of the questionnaire.

Appropriate safety regulations applicable shipping application of safety procedures on tankers spur on the training of emergency which is called Drill. From several drill applied in tankers there are three drills are required, namely Abandon Ship, Fire Drill, and the Oil Pollution

Based on the answers of respondents note that the crew has understood and know all aspects of existing safety on ship. Safety procedures on board the vessel meet the safety standards in accordance shipping safety regulations applicable in terms of the various regulations. Based on the answers of respondents were observed that: The second variable is the age of the crew to his understanding of salvation, has a strong relationship with the significant value of 0.859 and not in line with its negative value -0037, education links of crews against his understanding of salvation, is strong enough significant and in line with the positive value of 0.061 and 0.770. The crew relations experience to his understanding of salvation, which is pretty strong, but not the direction because it has significant value 0.805 and the value is not unidirectional -0.052. It can be concluded that the older the respondent, the higher education respondents, also the experience of respondents. However, the level of understanding of the safety of two-way means that there can be said to be a good understanding or lack of understanding.

Seeing the results of the conclusions of this study, the researchers suggest further research can include all respondents' tanker ship including crew not officers and examine more than one tanker.

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#### Attachemnts:

##### FAQ Respondents

No.	Questions	SM	M	CM	KM	TM
		5	4	3	2	1
1	I am unable to mention the agency relating to the safety of shipping.					
2	I am able to mention Indonesia regulations concerning safety.					
3	I am able to mention special certificates must-have when working onboard tankers.					
4	I am able to explain the emergency signals					
5	I am able to explain the function of safety equipment on board.					
6	I am able to explain the impact if the international safety regulations are ignored.					
7	I am able to mention all international regulations concerning the safety of shipping.					
8	I am able to explain the function of Oil Record Book					
9	I am able to explain all kinds of emergencies at sea.					
10	I am able to explain the sources of pollution of sea water.					
11	I am able to explain the rules of training on tankers.					
12	I am able to mention fire extinguishers in tankers.					
13	I am able to explain what they should do in the event of a fire					

	onboard the tanker.					
14	I am able to explain what actions to take when he saw people falling in the sea ..					
15	I am able to explain the regulation about the collision at sea.					
16	I am able to explain the sounds signaling danger.					
17	I am able to mention the task of the crew in case of fire.					
18	I am able to mention the responsibility of the crew in case of fire.					
19	I am able to explain all emergency safety procedures.					
20	I am able to explain the prevention of the occurrence of hazards emergency on ship.					