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Questionnaire on Marine Safety and Vessel Traffic Services in Philippine Coastal Waters (Part 1)

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필리핀 연안수역의 선박교통관제서비스와 해양안전에 관한 설문조사 (Part 1)

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Abstract : *This paper presents the Part 1 of the Questionnaire Survey on Marine Safety and VTS in the Philippine Coastal Waters. This part deals with respondents profiles; experiences onboard and ashore; familiar areas; and their subjective perception of marine risks- by factors and by areas. The subjects are chosen from different regions nationwide with connection and/or with maritime background. There are 202 responses returned and these are put into a database for analysis made through Excel programs and statistics references. The result of the nationwide responses show that 97% of respondents have shipboard experiences onboard of different ships' types and sizes; and 88% are directly involved in the navigation of ships. Risk Perception levels - by factors and by familiar areas - show a higher risk degree in the 3rd level ('Sometimes Increases Risks') and 4th level ('Often Increases Risk') in each respondents' response indices. The study finds that the most risky factor is the "Violation of Rules and Regulations" which has a high risk at 5th level (Very Often Increases Risk), and for the over-all familiar areas, the Manila Bay area (NCR region) garners the most risky perception, also, at the 5th level. It is, therefore, recommended by this paper to conduct a comprehensive review of the rules and regulations viable in each locality; strengthening the maritime traffic systems, structures and educating the stake-holders specifically in Manila Bay area and other busy waterways of the country. The ultimate goal of this paper is to gather information, analyze these data and develop a set of tools and techniques to be utilized as a guide in the improvement and development of maritime traffic safety in the country.*

Key Words : *Marine safety, Vessel traffic services, Marine risk factors, Risk perception, Risk perception levels, Philippine regions*

요 약 : 이 연구는 필리핀 연안수역의 해양안전과 선박교통관제서비스에 대한 설문조사 결과의 일부를 나타낸 것이다. 이 연구는 응답자의 경력과 육·해상 경험, 친숙해역, 위험요소별·위험지역별 선박운항자의 주관적 위험인식을 조사하였다. 설문은 202명이 응답해 주었고 설문 데이터는 엑셀 프로그램과 통계 프로그램을 이용하여 분석하였다. 전체 응답자의 97%가 다양한 종류와 크기의 선박에서 승선한 경험이 있었고 88%는 선박 항해에 직접적으로 종사한 사람이었으며 마닐라 지역(NCR지역)에서 가장 높은 응답률이 있었다. 위험요소별·위험지역별 위험인식 부분에서 위험수준 3단계 '때때로 위험 증가'와 위험수준 4단계 '자주 위험 증가'라는 높은 위험 지표를 보였다. 이 연구에서 가장 높은 위험 요소는 위험수준 5단계 '매우 자주 위험 증가'에 해당되는 "법과 규정의 위반" 으로 나타났다. 그리고 전체 친숙 해역 중 가장 높은 위험 인식을 보인 마닐라 베이 지역(NCR 지역)에서도 역시 위험수준 5단계로 나타났다. 그러므로 각 지역내에서 실행가능한 법과 규정의 광범위한 검토(해상교통체계와 구조물들의 강화, 이해당사자들의 교육(국가의 혼잡 수역, 특히 마닐라 베이 지역))의 실행이 이 연구에 의해 권고된다. 이 연구의 궁극적인 목적은 안전 관련 정보를 수집·분석하여 국내 해상교통안전의 개선과 향상의 지침으로 활용될 기술과 모델을 개발하는 것이다.

핵심용어 : 해양 안전, 선박교통관제서비스, 해양 위험 요인, 위험 인식, 위험 인식 수준, 필리핀 지역

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1. Introduction

This paper presents the first part of the survey questionnaire about marine safety and vessel traffic services in the Philippine coastal waters. The survey was conducted in the mid-2011 to late-2012. This is patterned after a similar survey questionnaire (Park, 1994) and amendments are made to conform with the current Philippine maritime setting. Subjects are chosen from the different marine stakeholder and professionals from the different regions of the archipelago. Distribution of questionnaires were done by visiting maritime institutions, harbor pilots offices, harbor authorities, training and review institutions and shipping companies in different regions of the country. The principal ports used in the questionnaire were based from the Philippine Ports Authority Annual report of 2011(Philippine Ports Authority, 2012) and Cebu Ports Authority Statistical Report of 2011(Cebu Port Authority, 2012) Upon examination of the collected questionnaires, only 202 responses are accepted after invalidating the returned papers from deck and engine ratings, trainees without prior sea time, students of maritime schools and respondents who have no domestic experience. A database of the responses is constructed where they are analyzed and presented in tables and graphs in this paper. The results are analyzed using statistical tools from Excel program and statistics references(Takahashi, 2011).

The goal of this paper is to gather and analyze information from the frontline maritime personnel from the different regions nationwide based on their experiences and subjective perceptions. Upon analysis, these data shall establish a set of tools and techniques to be utilized as a guide in the improvement and development of maritime traffic safety in the country.

2. Respondents' Basic Information

Part A of the questionnaire is composed of respondents' professional profile. This part presents the shipboard experience (A1), rank served(A2), sizes of ships last served in GT(A3), other marine experience if the respondents are not presently serving onboard(A4) and areas where the respondents have familiarity(A5) according to the selected ports per regions(National Statistical Coordination Board, 2012) around the archipelago.

2.1 Full-Time Shipboard Experience

This first question, A1, in the survey requests the respondents to indicate the number of years they have full-time experience onboard. Data of respondents' experiences was graphed in Figure 1.

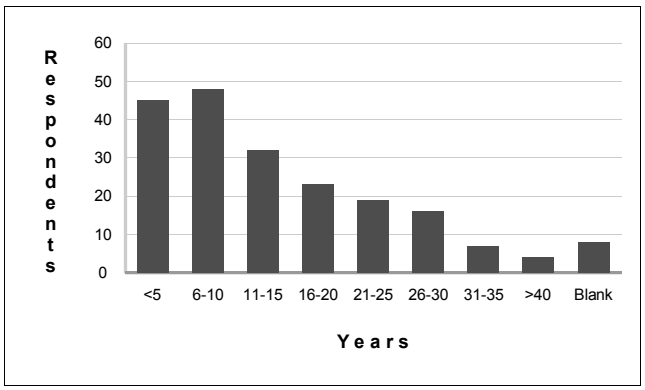

Fig. 1. Respondent's years of experience.

Of the 202 respondents, the highest number (48) is in the 6-10 year-group where 15 of them have 10-years sea-time. This is followed by the <5 years sea experience with 45 respondents. The more experienced are in the 34-38 years of sea-time with one each and one (1) outlier with 48 years of experience. Because the degree of dispersion is so widespread that the median is taken at 21.5 years sea-experience. Four (4) respondents have no sea experience at all and 8 did not declare any years of experience which is denoted as "Blank" in the graph.

2.2 Last Rank Served Onboard

The second question, A2, has nine shipboard ranks to choose from which is illustrated in Figure 2. There are two additional alternate choices: "Master/Mate of other vessels, please specify" and "Others, please specify" for those unlisted ranks, however, nobody responded on these questions. Also, there is no respondent on the "Master/Mate of fishing boat" and this is excluded in the graph. Returns from merchant ships have 90 respondents, followed by the passenger with 69. There are 25 Pilots, 19 Marine engineers and 10 from tug officers. Only 6 responded from the Philippine Coast Guard and they are working at the VTMS center in Manila Bay. One former Radio Officer answered and seven respondents left this question blank.

There are 220 responses from this question, excluding the 7 blanks, where 28 respondents have doubled their ranks - merchant vessels officers and also as pilots. Three have tripled their ranks - as merchant vessels, passenger vessels and as pilots. 97 % (213) of the respondents are experienced officers; while 88 % (194) are directly involved in the navigation of the vessels.

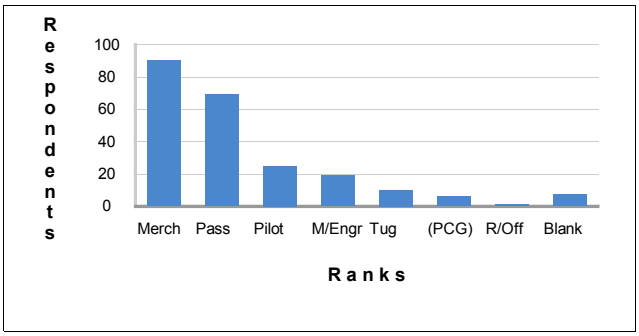

Fig. 2. Respondents last rank served onboard.

2.3 Average Size (GT) Served Onboard

The third question, A3, is about the average size in gross tons of each respondents' ships experience. The data for this question is analyzed and presented in Figure 3.

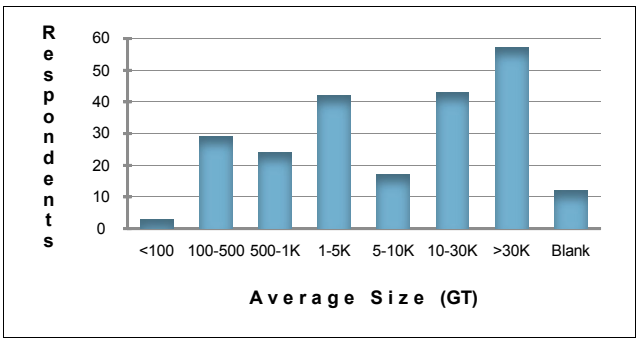

Fig. 3. Average size (GT) served onboard.

There were a total of 215 return responses on this question because 12 respondents picked more than one size as their averaged-size while 12 did not respond at all to this question. The graph in Figure 3 shows the relationships between the numbers of respondents to each tonnage group.

Table 1. Standardized scores and percentile of responses (Takahashi, 2011)

Size GT	Freq	%	Standard Score	Deviation Score
<100	3	1.4	-1.7	33.5
100-500	29	13.5	-0.1	49.0
500-1K	24	11.2	-0.4	46.0
1-5K	42	19.5	0.7	56.7
5-10K	17	7.9	-0.8	41.8
10-30K	43	20.0	0.7	57.3
>30K	57	26.5	1.6	65.7

Table 1 tabulates the frequencies, percentile, normalized scores and deviation scores of each tonnage-group. The highest (57) were onboard >30K with 26.5 %, followed by the 10-30K (43), at 20 % and by 1-5K (42), 19.5 %. The least number is at <100GT (1.4 %) with only three respondents. Based on response frequencies, the median is placed at the 100-500GT group with 29 respondents.

2.4 Respondents Other Marine Background

The next set of questions, A4, is designed for respondents who are presently not engaged in full-time shipboard job. They are given choices to indicate their current link or connection to the maritime community.

Table 2. Respondents' other marine background

Other Maritime Links or Connections	Freq.
Shipping company, Agents	45
Seafarer's education and training institutes	22
Philippine Coast Guard	10
Government employee	9
Port/Harbor Official	5
Official of maritime organizations/maritime industry/commercial organization	1

There are eight links listed but only six are tabulated because none from "Maritime Police" and "Classification surveyor" participated in the survey. In Table 2, those serving the shipping companies ashore as Agents or personnel in human resource top the list at 45 respondents. This is followed by those in training centers, upgrading centers, review centers and maritime schools with 22 respondents. Respondents from Coast Guard have 10 responses; Nine (9) are employed from various maritime agencies of government; Five (5) from the Harbor offices and one (1) works at Philippine Ports Authority in Manila. A line "Others, please specify" is asked for those who intend to voluntary specify other maritime connection that are not listed. None responded. There are 92 responses in this question because one has doubled his entries as he/she works in the training centers and manning agency. Other respondents are working on ships but side-lining for training-center jobs or as manning agency personnel while on leave ashore.

2.5 Familiar Areas

The last question of this Part, A5, asks to indicate the geographical area/s which the respondent is currently familiar with. It allows the respondents to choose more than one familiar areas and responses are tabulated in Table 3. The table includes a column for the geographical regions(National Statistical Coordination Board, 2012) of the maritime areas listed. These areas are maritime ports culled from the PPA Annual summary and CPA Statistical Report

of the highest number of port-calls in the year 2010-2011(Cebu Port Authority, 2012; Philippine Ports Authority, 2012). Northern Regions constitute only tiny fraction of the total ship-calls in the country and only one port (San Fernando in Region 2) is incorporated with NCR.

Table 3. Maritime areas with their Regions and number of respondents per area

No.	Maritime Areas	Region	Freq.
1	Manila Bay Area and Approaches	NCR	108
2	Batangas Bay and Calapan Area incl Verde Is. Passage	4A	98
3	Cebu Approaches and satellite ports	7	79
4	Cagayan de Oro Area and Approaches	10	63
5	Iloilo Area and Approaches	6	47
6	Davao Area and Approaches	11	46
7	Ormoc Area and Approaches	8	30
8	Tagbilaran Area and Approaches	7	26
9	Puerto Princesa Area and Approaches	4B	25
10	Iligan Area and Approaches	10	25
11	Zamboanga Area and Approaches	9	22
12	Legazpi Area and Approaches	5	20
13	Tacloban Area and Approaches	8	18
14	Ozamiz Area and Approaches	10	16

The table is arranged from highest to lowest number of respondents. The highest is the National Capital Region (NCR) with 108. NCR encompasses the whole of Manila Bay where the Port of Manila with its three harbors are sited, the Navotas Fish Port, the port of Limay across the Bay and the entry/exit points in the island of Corregidor. Batangas Bay (98), Cebu (79) and Cagayan de Oro (63) in Northern Mindanao constitute the top four in the table. The least is in region 8, Tacloban area and approaches (18); and in region 10, Ozamiz area and its approaches (16). There are 624 responses to this question because most respondents have declared multiple familiar areas.

Table 4 is the continuum presentation of Table 3 showing the last rank served based on Fig. 2, Section 2.2; and the familiar areas and their regions (Table 3). This includes the sums per region (in rows) and per last rank served (in columns). The table also shows the sums and standard scores per regions and per ranks served. The calculation excludes the blank (Blnk) column where 22 respondents did not answer this particular question.

Table 4 illustrates the test of relationship between the respondents' ranks served and their familiar areas. The paper tries to show any degree of relationship between these sets of categorical data.

Table 4. Familiar areas by Regions and Frequency of respondents' last rank served onboard tally

No.	Reg	Mer	Pass	Engr	PCG	Pilot	Tug	Blnk	Sum	SC
1	NCR	55	23	6	5	5	5	9	99	1.8
2	4A	37	31	8	3	8	3	8	90	1.5
3	7	44	36	7	0	5	2	0	94	1.6
4	10	33	23	7	0	6	8	0	77	1.0
5	6	22	21	4	2	3	1	1	53	0.2
6	11	21	12	4	0	13	5	1	55	0.2
7	8	13	11	3	1	2	2	2	32	-0.6
8	7	13	14	3	0	2	1	0	33	-0.6
9	4B	5	11	3	4	3	1	0	27	-0.8
10	10	11	11	2	0	5	3	0	32	-0.6
11	9	9	10	1	0	5	2	1	27	-0.8
12	5	7	11	1	2	0	1	0	22	-0.9
13	8	6	8	4	1	0	0	0	19	-1.0
14	10	8	5	2	1	3	2	0	21	-1.0
Sum		284	227	55	19	60	36	22	**681**	-
SC(Sum)		1.7	1.1	-0.6	-0.9	-0.5	-0.8	-	-	-

The Cramer's coefficient calculation is used to determine this degree of relationships. The calculation is illustrated in series of steps shown in Section 2.6.

2.6 Calculation of Cramer's Coefficient (Takahashi, 2011)

The first step in the calculation is to cross-tabulate the actual values (values surrounded by the bold frames in Table 4) - the horizontal header is the ranks last served onboard and at left-vertical axis is the regions. The next step is to calculate each values' expected frequencies using equation (1) and results are shown in Table 5.

$$Expected\,Freq. = \frac{\sum regions \times \sum ranks}{\sum of values} \quad (1)$$

Table 5. Expected frequency values

Reg	Mer	Pass	Engr	PCG	Pilot	Tug	Sum
NCR	41	33	8	3	9	5	99
4A	38	30	7	3	8	5	90
7	39	31	8	3	8	5	94
10	32	26	6	2	7	4	77
6	22	18	4	1	5	3	53
11	23	18	4	2	5	3	55
8	13	11	3	1	3	2	32
7	14	11	3	1	3	2	33
4B	11	9	2	1	2	1	27
10	13	11	3	1	3	2	32
9	11	9	2	1	2	1	27
5	9	7	2	1	2	1	22
8	8	6	2	1	2	1	19
10	9	7	2	1	2	1	21
Sum	284	227	55	19	60	36	**681**

The third step is to calculate by Pearson's Chi-square test each value by equation (2).

$$\frac{(Actual\,Frequency - Expected\,Frequency)^2}{Expected\,Frequency} \quad (2)$$

Table 6. Pearson's Chi-Square test values

Reg	Mer	Pass	Engr	PCG	Pilot	Tug	Sum
NCR	4.6	3.0	0.5	1.8	1.6	0.0	11.5
4A	0.0	0.0	0.1	0.1	0.0	0.6	0.9
7	0.6	0.7	0.0	2.6	1.3	1.8	7.0
10	0.0	0.3	0.1	2.1	0.1	3.8	6.4
6	0.0	0.6	0.0	0.2	0.6	1.2	2.6
11	0.2	2.2	0.0	1.5	13.7	1.5	19.2
8	0.0	0.0	0.1	0.0	0.2	0.1	0.4
7	0.0	0.8	0.0	0.9	0.3	0.3	2.4
4B	3.5	0.4	0.3	14.0	0.2	0.1	18.5
10	0.4	0.0	0.1	0.9	1.7	1.0	4.1
9	0.5	0.1	0.6	0.8	2.9	0.2	5.1
5	0.5	1.8	0.3	3.1	1.9	0.0	7.8
8	0.5	0.4	4.0	0.4	1.7	1.0	8.0
10	0.1	0.6	0.1	0.3	0.7	0.7	2.4
Sum	10.8	11.1	6.3	28.8	26.9	12.4	**96.3**

Table 6 shows the values of Pearson's chi-square test. The final step is to calculate the Cramer's coefficient using the equation (3).

$$= \sqrt{\frac{\chi_0^2}{\sum values \times (\min\{r,c\}-1)}} \quad (3)$$

$$= \sqrt{\frac{96.3}{681 \times (6-1)}}$$

$$= 0.16817$$

According to the informal standards of the Cramer's coefficient, "Below 0.25 = Very weakly related"(Takahashi, 2011), therefore, the calculated coefficient of 0.1681 proves that the two data have very weak relationship.

3. Risk Perception

Part B of the questionnaire deals with Risk Perception. This is presented in two sub-sections: Risk Factors and Over-all Risk by Areas, and are arranged in cross-tabulated forms shown in Tables 7, 8 and 9. The levels of perceived risk, all in categorical form, are also assigned with numerical equivalents, but not necessarily use as a rating value.

3.1 Risk Factors(Kristiansen, 2005)

Various factors contribute to accidents or to situations where the chances of occurrence of accident increase. These consequences at times are hard to quantify and may involve some degree of subjectivity(Kristiansen, 2005). This question, based on each respondent's over-all experience and subjective perception, asks to indicate the level of possible risk occurrence or happening due to the given risk factors.

Table 7. Risk Factors and respondents perception of risk levels showing SD, Means and Std. Score

Risk Factors	No Opinion Do Not Know	Very Seldom Increases Risk	Seldom Increases Risk	Sometimes Increases Risk	Often Increases Risk	Very Often Increases Risk	Std° Deviation	Mean
	0	**1**	**2**	**3**	**4**	**5**		
Reduced visibility (Rain, Heavy Mist)	0	22	24	43	53	46	18	31
Standard Score	-1.7	-0.5	-0.4	0.6	1.2	0.8	-	-
Stormy weather	2	9	17	50	55	59	23	32
Standard Score	-1.3	-1.0	-0.6	0.8	1.0	1.2	-	-
Strong current	3	16	29	63	46	34	19	32
Standard Score	-1.5	-0.8	-0.1	1.6	0.7	0.1	-	-
Many fishing boats in shipping lanes	1	12	23	58	66	28	23	31
Standard Score	-1.3	-0.8	-0.4	1.1	1.5	-0.1	-	-
More pleasure boats in fishing lanes	3	41	36	56	37	9	18	30
Standard Score	-1.5	0.6	0.3	1.4	0.4	-1.2	-	-
More service crafts in shipping lanes (tugs/tow, barges, bancas, ferry boats)	0	22	40	61	60	5	24	31
Standard Score	-1.3	-0.4	0.4	1.2	1.2	-1.1	-	-
Narrow channel and passage	5	23	40	69	37	15	21	32
Standard Score	-1.3	-0.4	0.4	1.8	0.3	-0.8	-	-
Higher density of traffic due to merchant ships	4	15	27	64	62	11	24	31
Standard Score	-1.1	-0.6	-0.1	1.4	1.3	-0.8	-	-
Poor design of fairways (sharp bend, shallow water)	3	26	25	61	50	22	19	31
Standard Score	-1.5	-0.3	-0.3	1.6	1.0	-0.5	-	-
Poor navigational aids (fixed and floating)	4	18	28	38	63	35	18	31
Standard Score	-1.5	-0.7	-0.2	0.4	1.8	0.2	-	-
Inadequate maritime traffic systems (VTIS, VTS)	9	21	22	36	52	46	15	31
Standard Score	-1.5	-0.7	-0.6	0.3	1.4	1.0	-	-
Human Factor in shiphandling	2	17	19	53	42	52	19	31
Standard Score	-1.5	-0.7	-0.6	1.2	0.6	1.1	-	-
Violation of Rules and Regulations	2	16	16	32	49	66	22	30
Standard Score	-1.3	-0.7	-0.7	0.1	0.9	1.6	-	-
SUMMARY OF STD. SCORES	**-18.2**	**-7.0**	**-3.0**	**13.5**	**13.1**	**1.6**	-	-

Based on the perceived levels of 0-5 where 5th level is the worst (Very Often Increases Risk) and 1st level is the least (Very Seldom Increases Risk), the analysis of Table 7 shows:

1. "Violation of Rules and Regulations" has the highest risk at 5th

level with Standard Score (SC) of 1.6.

2. "Stormy Weather" is next worst with SC of 1.2.
3. Third is "Human Factor in ship-handling" with SC 1.1.
4. Fourth is the risk factor "Inadequate maritime traffic services (VTIS, VTS)" with 1.0 SC.
5. The fifth in the worst perceived risk level is "Reduced Visibility (Rain, Heavy Mist)" with 0.8 SC.
6. The risk with the least SC in the 5th level is the factor "More pleasure boats in shipping lanes" with an SC of −1.2.
7. The summary of perceived risk level shows that the 3rd degree, "Sometimes Increases Risk" dominates the risk perception level of the respondents with an SC of 13.5, closely followed by the 4th level "Often Increases Risk" with 13.1 SC.

Table 8. Additional Risk Factors comments

Additional Comments	Level of Risk					
	0	**1**	**2**	**3**	**4**	**5**
Poor Maneuvering				1	3	
Channeling				1		
Crowded VHF 16					1	
Not reporting before entry				1		
Safety Inspection						1
Improper Display of Navigational Lights						1
Master are pressured by owners to sail even at worst weather						1
Poor VTM						1

The questionnaire asks the respondents to freely comment on any risk factors that they may wish to add. Table 8 lists these additional risk factors with each risk levels and shows a similar trending of higher degree of risks.

3.2 Over-all Risk by Areas

In this question, the respondents are asked the level of risk as they see it in the area/s which they are familiar with in a generally prevailing conditions. Table 9 presents each responses and summed according to their geographical location in the main island-groups of the archipelago: Manila/Luzon; Southern Luzon; Visayas; Northern Mindanao; and Southern Mindanao. With each region/area's total scores are likewise shown the normalized scores. This enables each score to have an unbiased analysis. This table shows each groups' totals per level of risks and each Standard Scores (SC).

Table 9. Overall risk by familiar areas and perceived level of risk showing Means and Std Scores(Takahashi, 2011)

Over-all Risk By Areas	No Opinion Do Not Know	Very Seldom Increases Risk	Seldom Increases Risk	Sometimes Increases Risk	Often Increases Risk	Very Often Increases Risk	Mean of Total6°	SD (Total)
	0	**1**	**2**	**3**	**4**	**5**		
Manila / Luzon								
Manila Harbor Area	2	8	13	27	32	29	-	-
Limay Area	2	9	11	16	14	2	-	-
Total	4	17	24	43	46	31	27.5	14.5
Std. Score (Total)	-1.6	-0.7	-0.2	1.1	1.3	0.2		
Southern Luzon								
Batangas Area	1	17	15	32	26	12	-	-
Calapan Area	2	11	18	23	13	4	-	-
Legazpi Area	2	3	6	5	4	3	-	-
Puerto Princesa Area	4	2	8	7	6	5	-	-
Total	9	33	47	67	49	24	38.2	18.7
Std. Score (Total)	-1.6	-0.3	0.5	1.5	0.6	-0.8		
Visayas								
Cebu Area	0	9	9	29	27	16	-	-
Iloilo Area	1	8	5	21	10	7	-	-
Ormoc Area	3	4	13	9	3	1	-	-
Tacloban Area	3	2	5	6	7	3	-	-
Tagbilaran Area	3	2	10	14	4	3	-	-
Total	10	25	42	79	51	30	39.5	21.9
Std. Score (Total)	-1.3	-0.7	0.1	1.8	0.5	-0.4		
Northern Mindanao								
Cagayan de Oro Area	1	6	16	19	11	5	-	-
Iligan Area	0	3	13	11	3	0	-	-
Ozamiz Area	1	4	3	11	4	2	-	-
Total	2	13	32	41	18	7	18.8	13.7
Std. Score (Total)	-1.2	-0.4	1.0	1.6	-0.1	-0.9		
Southern Mindanao								
Davao Area	1	6	11	17	10	6	-	-
Zamboanga Area	1	3	4	17	6	1	-	-
Total	2	9	15	34	16	7	13.8	10.2
Std. Score (Total)	-1.2	-0.5	0.1	2.0	0.2	-0.7		
Summary: Std. Scores	-6.9	-2.6	1.4	8.0	2.5	-2.5	-	-

Analysis of Table 9:

1. Manila/Luzon group area- it has an average of 27.5 responses and the highest at 4th level "Often Increases Risk" Standard Score (SC) 1.3.
2. Southern Luzon- this group has four ports with the mean of 38.2 and the highest SC of 1.5 at the 3rd level "Sometimes Increases Risk"
3. Visayas- this group has five ports inclusive of Eastern, Central and Western Visayas. The mean score of this group is 39.5 and the highest SC 1.8 at the 3rd degree "Sometimes Increases Risk"
4. Northern Mindanao- the three ports in this group has an average of 18.8 and the SC 1.6 at the 3rd level "Sometimes Increases Risk"
5. Southern Mindanao- the two main port is this group has a mean of 13.8 and the SC 2.0 also at the 3rd level "Sometimes Increases Risk"

The summary of Standard Score of these five port-groups shows that the 3rd level- "Sometimes Increases Risk"- has the predominant score of 8.0.

Table 10. Percentile risk level by group area

Risk - by Areas	Level of Risk					
	0	**1**	**2**	**3**	**4**	**5**
Manila / Luzon	2 %	10 %	15 %	26 %	28 %	19 %
Southern Luzon	4 %	14 %	21 %	29 %	21 %	10 %
Visayas	4 %	11 %	18 %	33 %	22 %	13 %
Northern Mindanao	2 %	12 %	28 %	36 %	16 %	6 %
Southern Mindanao	2 %	11 %	18 %	41 %	19 %	8 %

In percentile illustration, Table 10 shows each response by "Risk – by Areas" per level of risk. Of the highest risk level, the Manila/Luzon group is at the 4th level, 28 %, "Often Increases Risk"; Southern Luzon has its 29 % at 3rd level "Sometimes Increases Risk"; Visayas has 33 % also at its 3rd level; and Northern and Southern Mindanao with their similar highest stage at the 3rd level, 36 % and 41 % respectively.

4. Summary

There is a total of 202 return-responses in this questionnaire survey. Herewith is the summary of findings on the Part 1 of the questionnaire:

1. Most of return-responses are from sea-borne respondents. The highest number (48) is in the 6-10 year-group where 15 of them have 10-years sea-time. Followed by the <5 year group with 45 respondents. The more experienced are in the 34-38 years of sea-time and one (1) outlier with 48 years of experience. The median is placed at 21.5 years sea-experience.
2. In the last rank served, there are 220 responses where the greatest number came from the merchant vessel officers at 90 responses; followed by 69 from the passenger/ferry people. There are 25 pilots, 19 from tugs and 6 from the PCG. Some responses are double-ranked being a full-time merchant ship officer but, also performing other maritime shore jobs while in vacation. 97 % (213) of the respondents are experienced officers; while 88 % (194) are directly involved in the navigation of the vessels.
3. The average size served came from the >30K group with 57 respondents (26.5 %) and followed almost even number 43 and 42 responses by 10-30K and 1-5K group (20 % and 19.5 %) respectively. The least number is at <100GT (1.4 %) with only three respondents. The median is placed at the 100-500GT group with 29 respondents.
4. In the Familiar Areas, the highest is the National Capital Region (NCR) with 108, followed by Batangas Bay (98), Cebu (79) and Cagayan de Oro (63) in Northern Mindanao. The least is in Region 8, Tacloban area (18); and in Region 10, Ozamiz area (16). There are 624 responses to this question because most respondents has declared multiple familiar areas. By using Cramer's coefficient test, the relationship between the respondents' ranks served and their familiar areas resulted in 0.1681 coefficient which denotes that the two data have very weak relationship.
5. In the perception level, the perceived risk level shows that the 3rd degree, "Sometimes Increases Risk" dominates the risk perception level of the respondents and closely followed by the 4th level "Often Increases Risk" The summary of Standard Scores of the five port-groups shows that the 3rd level has the predominant score of 8.0.
6. In the risk by group-areas, the highest risk is placed at Manila/Luzon group with 28 % (4th level, "Often Increases Risk"), followed by the Southern Luzon group with 29 % (3rd level, "Sometimes Increases Risk"), Visayas has 33 % also at its 3rd level; Northern and Southern Mindanao with their highest at the 3rd level also, 36 % and 41 % respectively.

5. Conclusion and Recommendation

The analyzed results of this study finds that the most compelling perceived risk factor is the "Violation of Rules and Regulations" described in Table 7, which has the highest risk at the 5th level (Very Often Increases Risk) and the most risky area, over-all by the familiar areas, is the Manila/Luzon group, specifically the Manila Bay of the NCR area. Based on these results, therefore, this study recommends:

1. That a stringent observation of the rules and regulations of the port be followed by all fairways' users. This can be done by studying each port's traffic behavior and customs and adopting a safe traffic management policy and system acceptable to the end-users in line with the national maritime policies.
2. Educate and re-validate the local water-users of the current

rules, systems and policies; and the necessity of having a safe maritime traffic management.

3. Enhance the capabilities of the coastal authorities in policing the waterways.
4. Placing physical structures, alongside of educating all stake-holders and end-users of the waterways, of modern types of system to monitor traffic movement in the busiest fairways, not only the Manila Bay area but also in other busy ports and waterways of the country.

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