CHAPTER 4

ANALYSIS

INTRODUCTION

This chapter will discuss and present the analysis results based on data collected from the questionnaire distributed to the respondents (customers), interviews with the staff officers (implementers) and statements obtained from headquarters via written problem statements submitted.

The researchers found that majority of respondents described the present RMN logistic support system is a good system. The feedback given was more towards the implementation of policies and procedures. The implementation of the old system such as Squadron Support System, Five Years Base Spares Support System and Total Maintenance Package Support System which operates individually, has a long way to prove its efficiency and effectiveness. Based on other navies of the world such as United Kingdom, USA and Australia, they found that isolated logistic support dealing with each system and equipment is not cost effective. They have embarked on ILS, then too they found that a focus need to be made on either on maintainability, availability or reliability. Since reliability is supported by maintainability and produce availability, maintenance concept is now focussed on reliability (RCM), as discussed in Chapter 3.

RMN logistic support system is in the transition towards ILS. The study is therefore measuring the customers' satisfaction of the transition period. It is possible that the customers are in a confuse state of what system is in place and very much affecting their awareness and satisfaction. However, the end result in term of ships availability is the ultimate aim of the RMN logistic system. No matter what support system RMN embarked upon, the resultant should be to meet the operational needs of the fleet, meeting the much needed ships sea time

and at the highest possible mission capability. This data can be use to counter-check the success of RMN logistic support efficiency and effectiveness.

Mission Capability is still a definition yet to be made. Nowhere can it be found the definition of mission capability. ILS itself talks about Reliability, Maintainability and Availability. For the purpose of this study, mission capability is assumed to be part of availability and hence will be discussed in the context of operational readiness.

Operational Readiness in RMN has been documented as ship category of readiness ranging from CAT1 to CAT5 where CAT1 and CAT2 (with defects not affecting performance) are for ship fully operational and ready for mission, CAT3 are for ship with limited operational capability whilst CAT4 and CAT5 are the category for non-operational ship (in harbour, dockyard for slipping or refit).

Category of readiness as mention, for CAT1 and CAT2 in RMN term is the category considered as fully operational (available and mission capable). The study however did not relate the ship category of readiness to effectiveness and efficiency of the logistics support system. Ship's category of readiness is found, most of the time tend to be temporary. It is difficult to relate this temporary and fluctuating state of ship's category to the measurement intended, that is 'fleet officers' satisfaction'. Satisfaction of the fleet officers were measured in a broader perspective, including their awareness of the RMN logistics system, satisfaction in defect rectification (in four major areas that are; mechanical, electrical, electronics and hull). To enhance their response, two open-ended questions were asked to let them express their opinion and ideas to improve the present system.

Demographic of Respondents

The researchers identified that measuring the fleet officers' satisfaction is the closest indicator of the effectiveness and efficiency of the RMN logistic support as RMN is TQM driven. The researcher translate this to the end result of top management final objective is 'working with customer focus' in mind and the end result is customer satisfaction. This further relates to the statement by the Chief of the Navy 'We exist because of the fleet'.

Demography		Frequency	Percent
Branch	Executive	29	46.8
	Technical	25	40.3
	Supply	8	12.9
	Total	**62**	**100.0**
Rank	S/Lt	1	1.7
	Lt	26	41.9
	Lt Cdr	24	38.7
	Cdr	9	14.5
	Captain	2	3.3
	Total	**62**	**100.0**
Class of Present Ship	FAC M	7	11.2
	Corvette	20	32.4
	Frigate	12	19.4
	MCMV	4	6.4
	MPCSS	12	19.4
	PC/OPV	7	11.2
	Total	**62**	**100.0**
Class of Class of Ships Served	One	18	29.0
	Two	16	25.8
	Three	18	29.0
	Four	7	11.2
	Five	2	3.3
	Six	1	1.7
	Total	**62**	**100.0**
Total of Years Service in the Fleet	3-5 Years	23	37.1
	6-10 Years	17	27.4
	11-15 Years	16	25.8
	16-20 Years	6	9.7
	Total	**62**	**100.0**

Table 4.1 Profile of Respondents

The demographic of respondents were focussed on rank, specialization (branch), number of years the respondents served in RMN, the class of ship

respondents is serving, and the experience level based on the number of ships the respondents served. These categories cover most information required. The tendency of declining number of respondents as the rank and number of years in service increases is due to the fact that the organisation structure of ships in the fleet is as such. Only 3.4% of respondents are in the rank of Captain commanding capital ships, 15.3% are Commanders who are the commanding officers and technical officers (weapons and electrical engineers and the marine engineers) of capital ships whilst Lt Cdr and Lt are either commanding, technical or supply officers (appointed to capital ships).

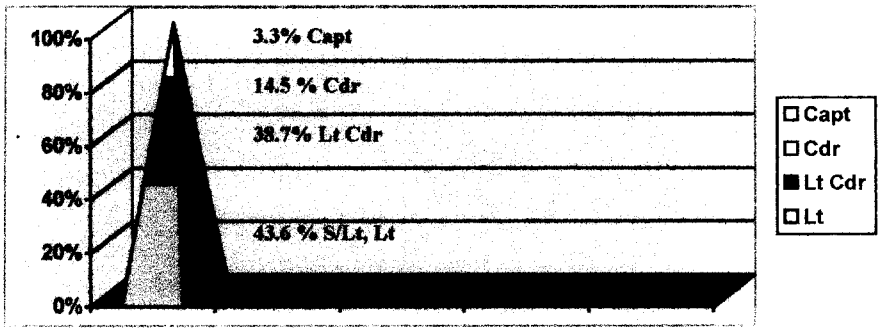

Figure 4.1- Composition of Respondents by Rank

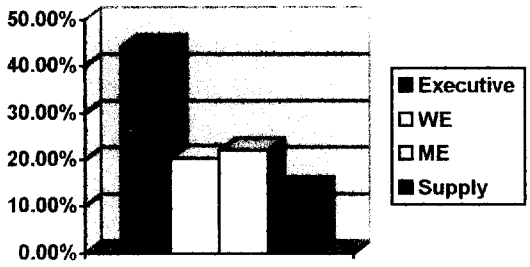

Figure 4.2 - Composition of Respondents by Branch

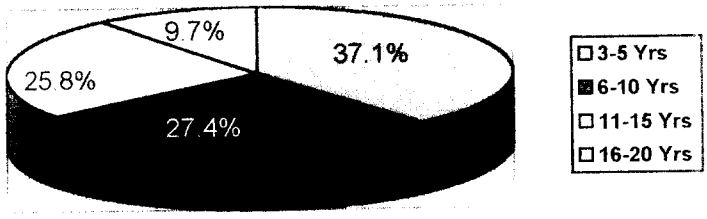

Figure 4.3 - Composition of Respondents by Period of Service in the Fleet

Number of years in service also related to seniority in service (rank))

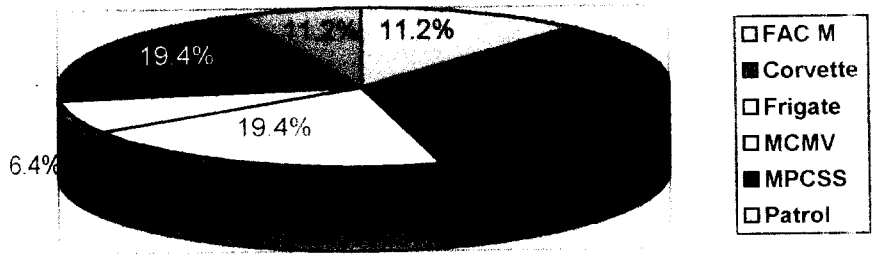

Figure 4.4 - Composition of Respondents by Class of Present Ship

The respondents' population represent the ship type in the fleet proportionally except for the case of patrol class where fewer ships were available for survey as they are being stationed out of Lumut and those in Naval Area 1 (Tanjung Gelang, Kuantan) were out of harbour for special operations and routine patrols.

ILS as the Benchmark

Understanding that ILS is a disciplined, unified and iterative approach to the management and technical activities necessary to integrate the elements of logistics, the respondents were asked on their awareness of the overall RMN logistics support system and how it works.

Awareness of Respondents

The frequency distribution among respondents does not show any significant different based on the level of awareness. The awareness was almost equal within the range of 29% to 33.9%. The mean of total awareness is only 1.95 showing that the level of awareness is very low. Only 29% of respondents are 'much aware' the remaining majority are merely non-conversant and lack of exposure group that made up 71% as shown in Table 4.2.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1-Not Aware	21	33.9	33.9	33.9
	2-Just Aware	23	37.1	37.1	71.0
	3-Much Aware	18	29.0	29.0	100.0
	Total	62	100.0	100.0	

Table 4.2 - Frequency of Total Awareness

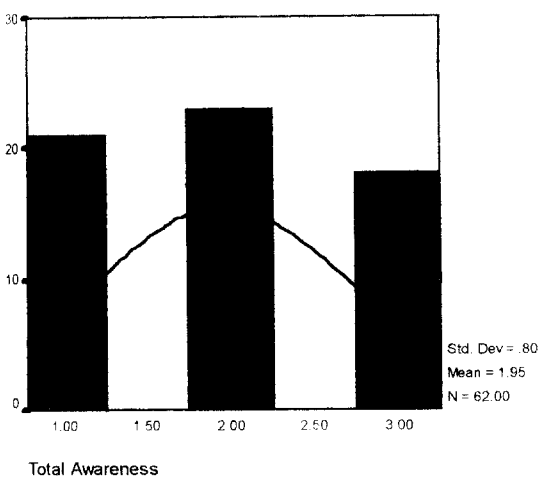

Figure 4.5 - Means of Total Awareness

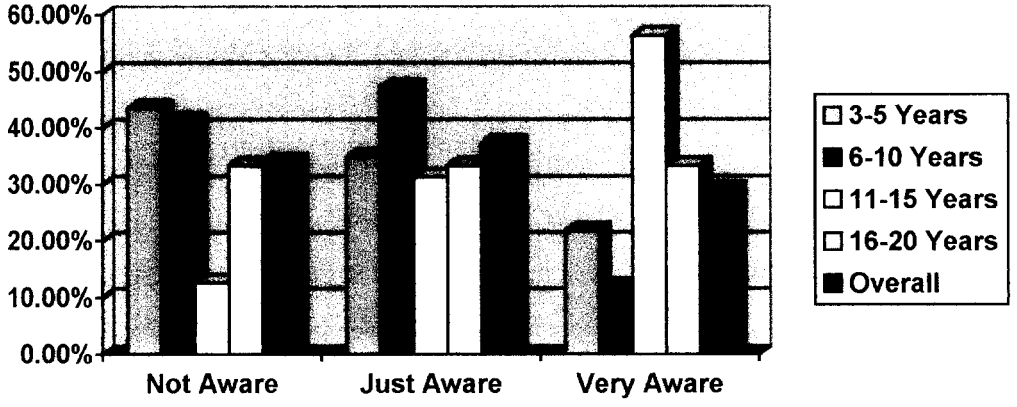

Figure 4.6 - Percentage of Awareness by Years of Service in the Fleet

The data gathered shows that there is no relationship between number of years in service and rank in awareness of logistic support as the significant **p** value is more than 0.05. Awareness therefore varies at every level of years in service and do not have any pattern. The population variances for each group are approximately equal.

The various systems and procedures are intended to best serve the fleet. However, these work processes will only create satisfaction among customers once they are understood. The fact that the total of respondents in below average awareness records 71.0%, RMN has to look at this aspect as an issue, that is to say, the population's awareness have to be above average. With high awareness the satisfaction measurement tool can then, be correctly measured.

The data in Table 2 (Annex A) show that the levels of awareness with the subject matter are varies. The mean for ILS Concept (mean 2.94), ILS Implementation (mean 2.86) and 5 Years Base Spares (mean 2.60) are relatively small as compare with other subjects. This can be concluded respondent are no very conversant with the subject matter and believe that only certain quarter of the respondents are really understand on the subject. The subjects are more

discussed within the circle of logisticians and engineers and therefore attract least interest among respondents from other respondents. However, based on the frequencies, it can be derived that even some numbers of junior officers from engineering branch are not really conversant with the subject matters. Subjects such as Demand Process (mean 3.76), Slipping Procedures (mean 3.73) and Delivery Method of Spares (mean 3.69) are more routine matters to the respondents. There are references that are readily available for the respondents to make a reference if there is need to do so. The frequencies of work undertook allows the respondent to gain experiences and increases the awareness on the subject. The overall analysis on awareness of logistic support system among fleet officers in the RMN is assessed as very low. Generally the work process such as 'Demand Process' which is routine to the respondents increases the execution of logistics matters in supporting the system for the mission ready fleet. The level of awareness shall be more than 70% to indicate the high level of awareness among the respondents.

Total Awareness Relationship with Years of Service with the Fleet

Data in Table 3A (in Annex A) where the chi-square test reveals that **p** value is 0.125 (**p** > 0.05) showing that there is no relationship between awareness of the logistic support system in the RMN and years of service in RMN. The table shows that the level of awareness of group 11 – 15 years (56.3%) have higher awareness of the logistic system as compared to other groups. The percentage is relevant as the period of service in the fleet exposes the respondents on the procedures, instructions and procedures enforced within the RMN and therefore they are very much aware of the logistics process in logistics support system. However, the respondents who served 6 – 10 years in the fleet has 11.8% is unexplainable. The group should have a higher percentage from the group 3 – 5 years. The awareness of respondents who served 16 – 20 years in the fleet drop to 33.33% is also unexplainable. The percentage should be higher as compared with the group 11 – 15 years.

As the researchers study the data, the summarized table of awareness as shown in Table 2 at Annex A, the critical data of concern is the awareness level among fleet officers which was found to be as low as 1.95 (total awareness).

Areas of Concern

The study shows that RMN should focus on educating its personnel on the ILS. Their awareness need to be enhanced so that as part of the system, customers provide feedback to the service provider for improvements. The percentages of awareness on ILS Concept and ILS Implementation among fleet officers are as shown in Figure 4.7. Awareness of ILS Concept records 72.9% for the **Average & Below** whilst awareness of ILS Implementation **Above Average** is only 23.1%. Customers' input for their satisfaction in future will not be measured accurately if they are not aware of the system. This will effect the system loop when RMN fully embarks on ILS and attempt to apply TQM concept for continuous improvement.

Other areas of concern are the fleet officers' awareness of the present mixed of logistic system. Level of awareness in Figure 4.8 showed the higher means are among element that have higher occurrence involving the ship and the officers whilst lower means are the areas of concept and implementation. The area of concern is displayed graphically in Figure 4.7. This implicate that officers learn through experience and not through organised training.

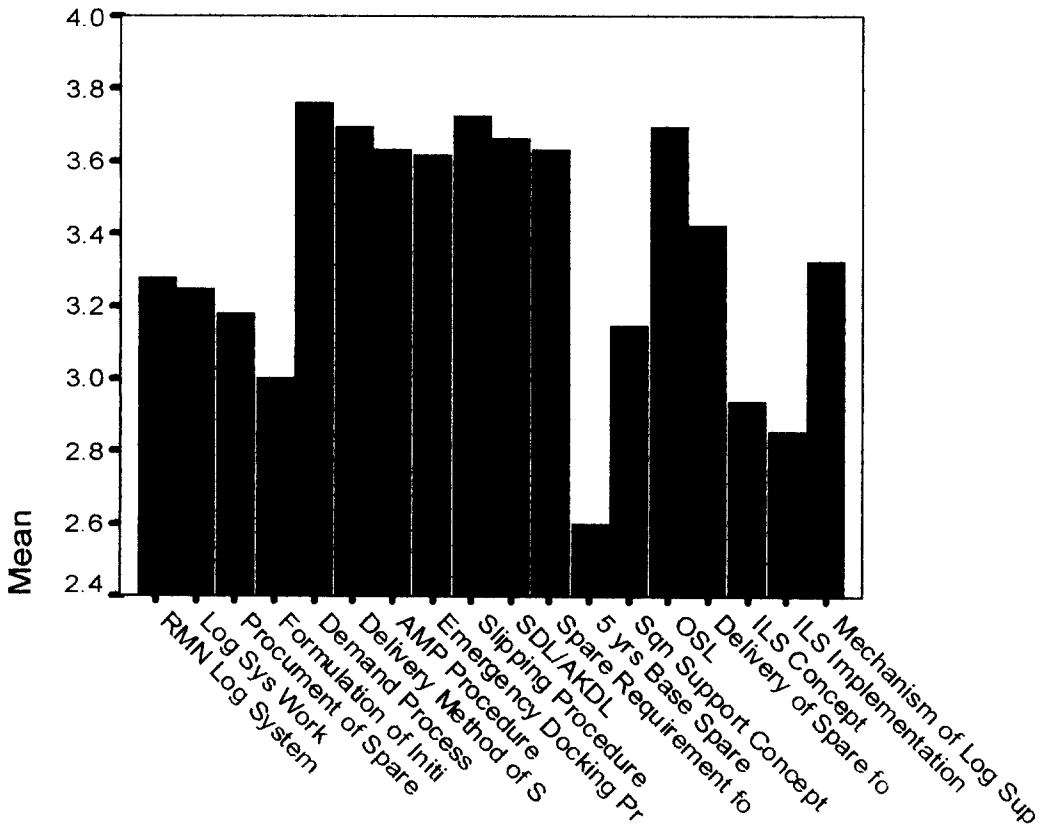

Figure 4.7 – Means of Level of Awareness (by specific areas)

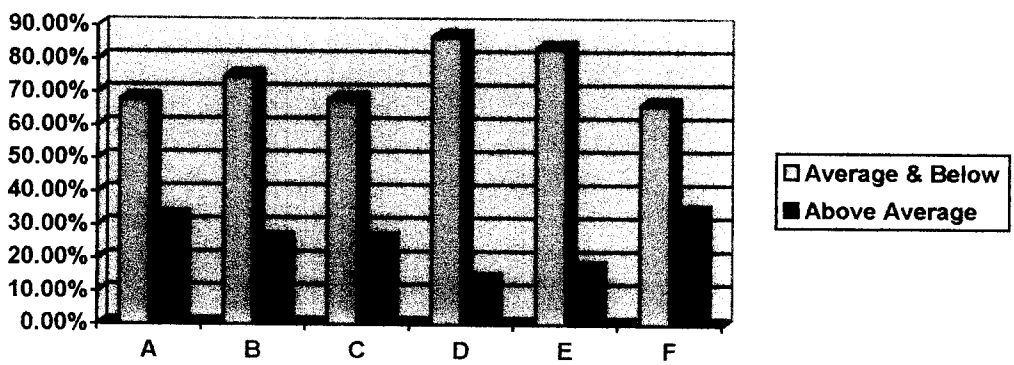

Figure 4.8 – Percentage of Awareness

Legend:	A	B	C	D	E	F
	Procument	Formulation OSL	Demand process	Emerg. Dock Procedure	5 Yr spare	Sqn Concept

Customers' Satisfaction in Defect Rectification

The researchers surveyed the level of satisfaction among fleet officers on rectification of equipment breakdown with respect to efficiency and effectiveness. In the context of the study efficiency is assessed with the readiness and speed of action of support provided and effectiveness is the quality of work done.

With or without logistic system awareness the customers do know what they observed and experienced. They record the ships availability (operational readiness and capability) and report to the immediate superior up the hierarchy of command, that is Commander Naval Area and Fleet Operations Commander. Statistic in Figure 4.9 shows the accumulative report for year 2000. (Researchers consider current statistics as classified and historical data is sufficient for academic research).

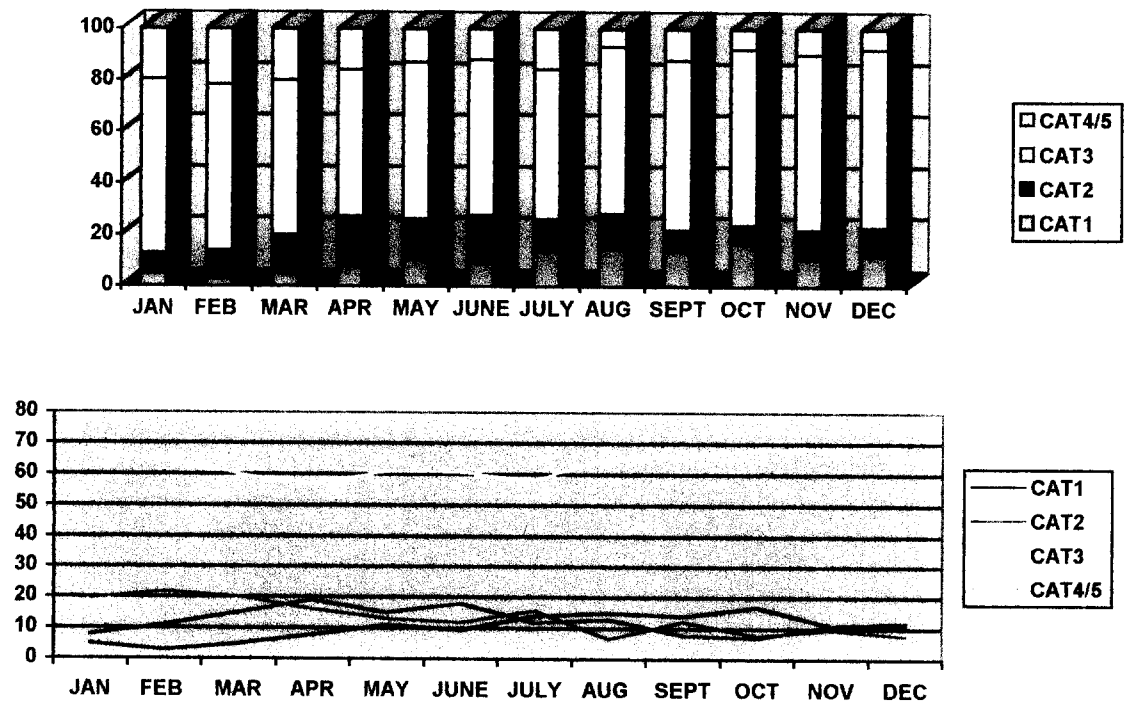

Figure 4.9 - Fleet Operational Readiness 2000

(Source: RMN Warfare Seminar 2002 – Graphic values are estimated and do not represent actual figures)

Majority of the platforms falls under CAT3 throughout the year. This can be directly pointed to the effectiveness of RMN logistic system that can, in the year 2000, sustained majority of its fleet at CAT3 and minimum number in CAT1 and CAT2. This fact remained true as reported in Exercise Kerismas 04 where at the initial phase of the exercise, out of 19 ships only 10.5% (patrol craft) were in CAT1, 26.3% in CAT2 and the remaining were in CAT3. These figures changes as extra effort were given to ensure higher state of ship readiness (those within RMN control).

The researchers attempt to measure the effectiveness and efficiency of the logistics system using customer's satisfaction as the tool. As mentioned earlier, these were measured through four aspects namely mechanical, electrical, electronics and weapon systems and hull. The open ended questions provided avenue for respondents to voice their ideas of how the logistics system could be improved. From the feedback, matters of concern are the on onboard spare list (OSL), the need to replace obsolete equipment, long lead time of spare parts, technical knowledge and skill, poor parts identification, poor implementation of maintenance and refit cycle, need for upgrading of weapon systems, need to conduct parts replacement/repair (not module), inefficiency of spares contract, and difficulty of maintaining old ships.

EFFICIENCY IN DEFECT RECTIFICATION

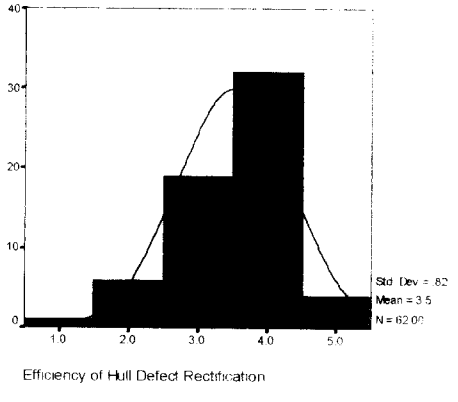

Figure 4.10
Satisfaction in Hull Defect Rectification Efficiency

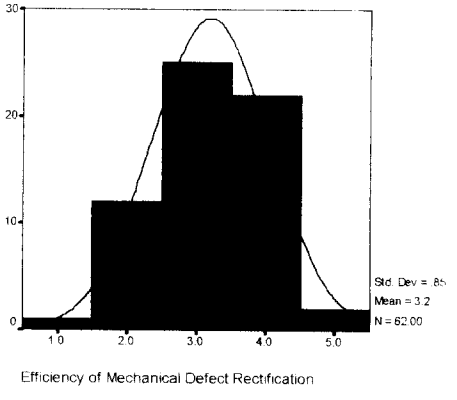

Figure 4.11
Satisfaction in Mechanical Defect Rectification Efficiency

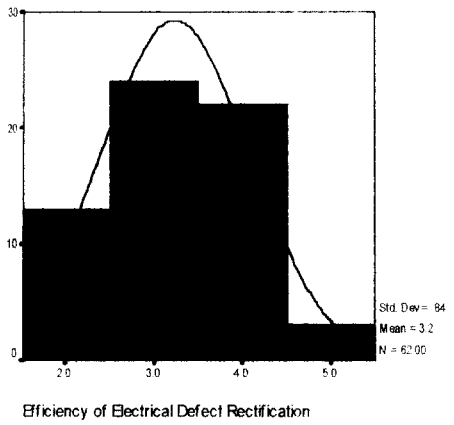

Figure 4.12
Satisfaction in Electrical Defect Rectification Efficiency

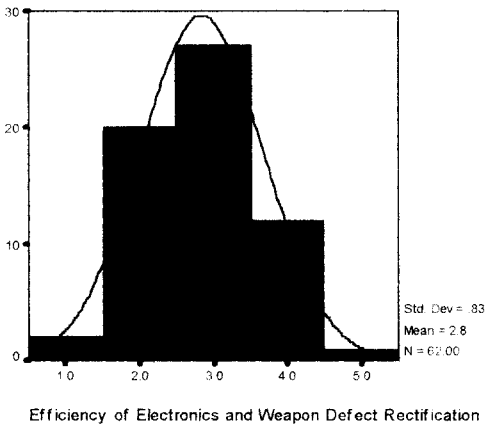

Figure 4.13
Satisfaction in Electronics and Weapon System Defect Rectification Efficiency

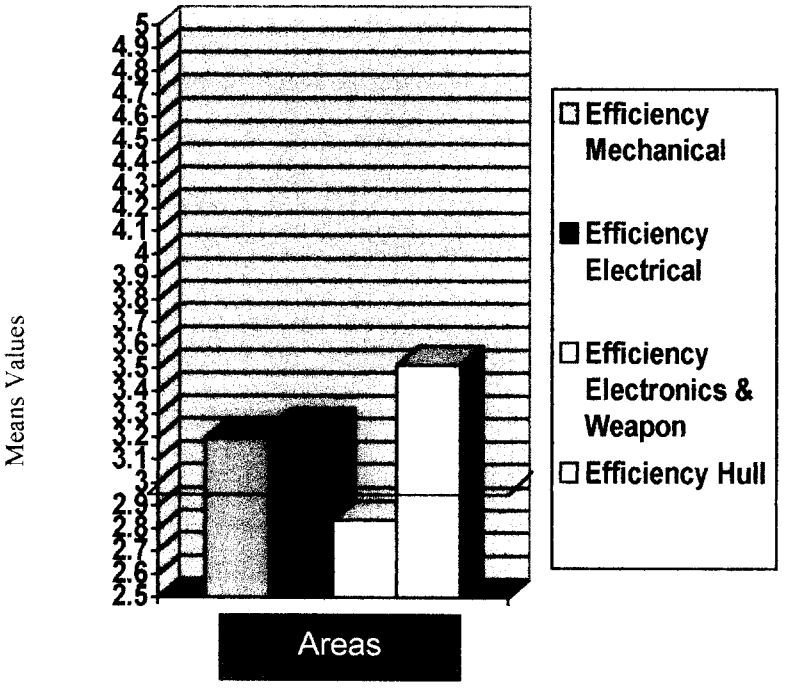

Figure 4.14 - Overall Means Comparison of Efficiency Variables

Satisfaction on Hull Defect Rectification

Efficiency of defect rectification in the customers' perspective is focussed on the responsiveness (timely action) of maintenance and supply support. FMD personnel would only be able to effect repair up to disassembly process where

subsequent process depend on supply of spares and parts. The researchers found that only rank and number of years in service have relationship with the satisfaction where the **p** value were both 0.049. The descriptive statistics of one-way analysis of variance on satisfaction (1 being very dissatisfies and 5 as very satisfied) as displayed in Figure 4.10, 4.13 and 4.14 show that efficiency of hull rectification recorded highest means of 3.52 and efficiency of electronics and weapon system recorded 2.84 (researchers established that 3.0 is a minimum figure for the mean of a satisfied customer) compared to other areas. Detail means as in Table 4A-1 in Annex A.

Even though hull rectification recorded highest, the level of satisfaction is just slightly above average. Further detail analysis of the statistics shows that there is no difference between junior and senior officers on their satisfaction on hull rectification efficiency. Poor knowledge, skill and attitude of the technician is negated as the cause as this aspect does not involve high technology or sophisticated equipment. This issue shall be discussed further in this chapter upon discussing the efficiency of supply support.

Executive officers are most satisfied whilst supply officers are least. However the means between branches is above average. There is no significant difference in between respondents of different of years in service but generally the longer serving officers are more satisfied. PC/OPV are ships designed for patrol with strong hull built have highest means of 3.85 and the MCMV being a fibreglass reinforced plastic hull and minimum ferrous material have a means of 3.75. FAC M hull is deteriorating and its subsystems are designed in a compact manner, render high and difficult maintenance recorded least means of 3.14.

Satisfaction on Electrical Defect Rectification

Electrical defect rectification efficiency is slightly above average with means of 3.19 and senior officers seem to be more satisfied with a means of 3.36. Technical branch officers are the most satisfied group, however it is just slightly above average compared to executive and supply officer. Supply officers onboard ships respond reflect the supply support issue whilst the technical officers respond on maintenance and executive as purely neutral end recipients. The longer serving officers represent the most satisfied respondents (16 to 20 years service with means of 3.83) amongst the number of years in service groups as they are exposed to more types of system and configurations. Respondents from MPCSS and PC/OPV with simpler ship distribution system again recorded highest satisfaction among respondents with means of 3.66. Generally, the more ships the respondents served the more satisfied they be.

Satisfaction on Mechanical Defect Rectification

The overall satisfaction on mechanical defect rectification efficiency is also slightly above average (3.19). However, senior officers responded with higher satisfaction (3.55) compared to junior officers. With respect to branch, there is not much difference in their satisfaction, whilst the most years in service respondents showed higher satisfaction. Respondents from FAC M are least satisfied with means of 2.85 compared to frigate (3.33).

Both electrical and mechanical defect rectification efficiency showing higher customer satisfaction due to the fact that these two are the 'prime mover' aspect of the platform, that is the electrical power generation, distribution and the associated appliances; and the propulsion. It is the basic need of any operational ship as she needs to float and move. These areas are given the appropriate attention and have one of the best maintenance supports, including reliable OEM support like MTU.

Satisfaction on Electronic and Weapon Systems Defect Rectification

Senior officers do not show significant different in satisfaction on rectification of electronic and weapon system compared to the junior officers but the number of years in service reflect the trend of the longer serving officer are more satisfied. This is interpreted as the exposure and experience that they get after serving in the RMN make them 'accept the standard' available. Means for officers serving below 5 years is 2.87 and means for officers serving more than 16 years is 3.00.

The supply officers are more satisfied than the others and executive officers are least satisfied. Officers serving onboard MPCSS are most satisfied followed by Frigate and MCMV. This is possibly due to the fact that MPCSS are bigger platform with lesser systems, the Frigates are fairly new whilst the MCMV system are being upgraded. PC/OPV recorded close to average as PC are simple patrol boats and the OPV are equipped with gunnery weapon system only. FAC M, the old system ships recorded 2.57. Corvettes of Kasturi Class being fairly old and over tasked, whilst Laksamana Class were the "new outdated ships" recorded the least means of 2.50 (below average).

Number of ships served by respondents do not have any relationship to their satisfaction on all four areas discussed when data are studied on full range but isolating and studying only the one, two and three ships served (with average of 17 respondents each), satisfaction increased with increased of ships served with exception on electronic, weapons systems and hull rectification efficiency. Since the relationship is not very significant and not consistent, it is summarised that number of ships served do not contribute to satisfaction.

EFFECTIVENESS OF DEFECT RECTIFICATION

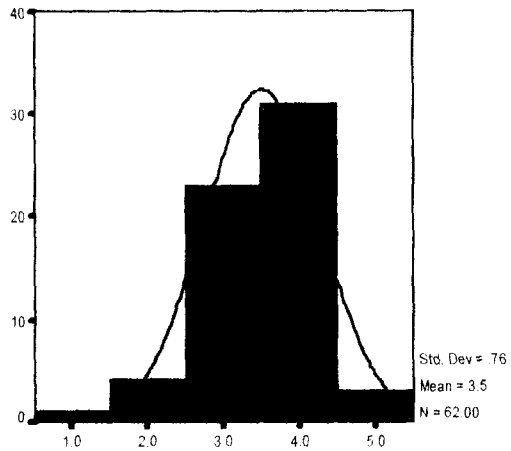

Figure4.15 - Satisfaction in Effectiveness of Hull Defect Rectification

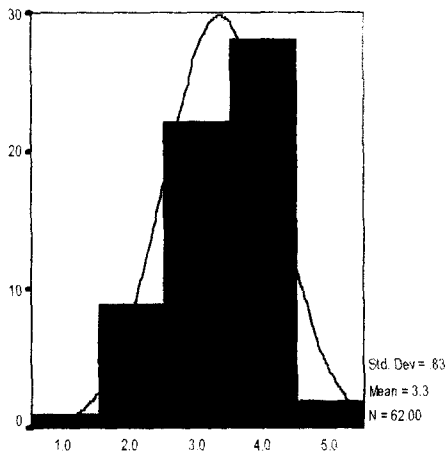

Figure4.16 - Satisfaction in Mechanical Effectiveness of Defect Rectification

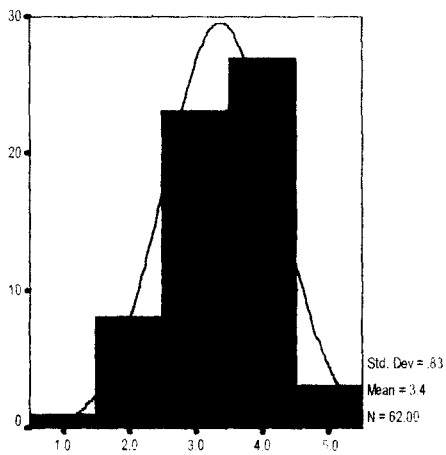

Figure 4.17 - Satisfaction in Effectiveness of Electrical Defect Rectification

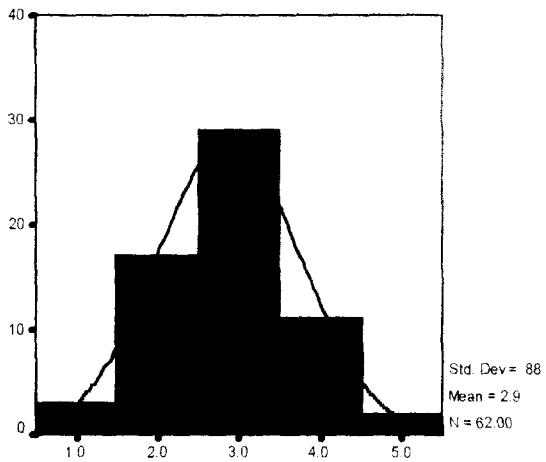

Figure4.18 - Satisfaction in Effectiveness of Electronics and Weapon System Defect Rectification

Effectiveness assessment was focussed on the non-recurring defect or zero maintenance action error by maintainers. These aspect measures the maintenance personnel skill, knowledge and attitude and the quality of spares and parts supplied. The descriptive statistics of one-way analysis of variance on satisfaction (1 being very dissatisfied and 5 very satisfied) as displayed in Figure

4.15 to 4.18 shows that the effectiveness of hull rectification recorded highest means of 3.50 and effectiveness of electronics and weapon system recorded 2.87 (lowest) compared to other areas. Detail means as in Table 5A-1 to 5A-6 in Annex A. The overall comparison of satisfaction on the effectiveness of defect rectification is as shown in Figure 4.19.

Total Defect Rectification Effectiveness Relationship with Years of Service in the Fleet

The chi-square test revealed that the **p** value is less than 0.05 (**p**= 0.049) indicating that there is relationship between satisfaction on defect rectification and years of service in the fleet. The study again covers four main areas namely mechanical, electrical, weapon and electronic and hull. The years of service in the fleet is the accumulation of years the respondents served the fleet onboard the same ship or different types of ships. The result indicates that the respondents who served more time in the fleet believed that the system is very effective and able to support the ships in maintaining mission ready fleet. The respondents who served within 3 – 5 years indicated that the system is not effective and insufficient to support the fleet. This can be concluded that the respondents are relatively inexperience and unable to visualise the whole process of logistics system. However the respondent group of 11 – 15 years also indicate that the system is ineffective in supporting the logistics aspects in the RMN. The level of satisfaction is not something that the RMN can be proud of as it is still considered low.

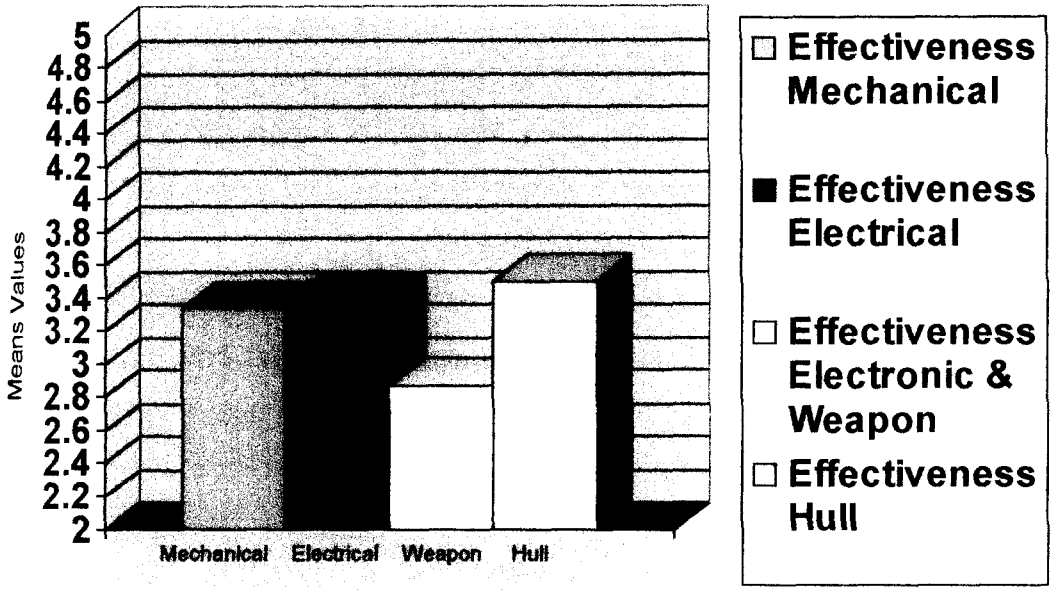

Figure 4.19 Means Comparison of Effectiveness Variables

Satisfaction on Hull Defect rectification

Satisfaction on hull defect rectification effectiveness is similar to the level of satisfaction of its efficiency. Further analysis of the statistics shows that there is no significant difference between junior and senior officers on their satisfaction on hull rectification effectiveness.

As discuss earlier there must be reason(s) behind this situation. If poor knowledge, skills and attitude of the technician is not be the cause, then further study as to the cause of low satisfaction must be made. Besides the physical ship's hull maintenance, other subsystems maintenance and supply support for fire-main system, flushing system and drainage system do contribute to this aspect. Executive officers are most satisfied whilst supply officers are least. Satisfaction level is above average within branches. Generally longer serving officers are more satisfied but 35% of junior officers expressed their full satisfaction compared to only 18.2% of senior officers for the same level. Most senior officers (63.6%) consider effectiveness of hull maintenance as just

satisfied. Both junior and senior officers were 39.2% and 18.2% respectively are dissatisfied on hull maintenance.

The relationship between total effectiveness and rank exist as the p value is 0.049 (less than 0.05). Junior officers are respondents who stayed onboard (as accommodation) and suffer more when defects occur. MCMV being a fibreglass reinforced plastic hull and minimum ferrous material have highest means of 3.75, this is due to the fact that fibreglass maintenance is highly effective and do not have natural recurring defect (not subjected to oxidation). PC/OPV are ships designed for patrol have strong hull built have a means of 3.71. Hull of FAC M is deteriorating and often give way to weather and caused flooding, and its subsystems are designed in a compact manner, render high and difficult maintenance as such it recorded least means (3.28).

Satisfaction on Electrical Defect Rectification

Electrical defect rectification efficiency (satisfaction) is above average with means of 3.37 and senior officers seem to be more satisfied with a means of 3.45. Technical branch officers are the most satisfied group with means of 3.44. Supply officers onboard ships respond reflect the supply support issue whilst the technical officers respond on maintenance and executive as purely neutral end recipients. The supply officers were least satisfied The longer serving officers represent the most satisfied respondents (16 to 20 years service with means of 4.00) amongst the number of years in service groups (as explained earlier) when the relationship on mechanical efficiency.

Respondents from MPCSS and PC/OPV with simpler ship distribution system again recorded highest satisfaction among respondents with means of 3.83 and FAC M recorded lowest (3.00). Corvettes also did not show an encouraging figure either. In summary, systems ship shows lower satisfaction except when they are new and less sophisticated ships recorded higher

satisfaction. Generally, the more ships the respondents served the more satisfied they be (based on up to three ships as the frequency of respondents makes up majority and almost equal).

Satisfaction on Mechanical Defect Rectification

The overall satisfaction on mechanical defect rectification efficiency is also above average (3.34). However, senior officers responded with slightly higher satisfaction (3.45) compared to junior officers. With respect to branch, supply officers show lowest satisfaction with only 3.12 while other at 3.36. Generally longer serving officers are more satisfied except that for officers serving 11 to 15 years assess this aspect at the extreme lower end but still at average level. Respondents from FAC M and Corvettes are least satisfied with means of 3.14 compared other ships.

Both electrical and mechanical defect rectification efficiency showing higher customer satisfaction due to the fact that these two are the 'prime mover' aspect of the platforms, which are the electrical power generation, distribution and the associated appliances; and the propulsion. It is the basic need of any operational ship as she needs to float and move. These areas are given the appropriate attention and have one of the best maintenance supports, including reliable OEM support like MTU. Needless to say satisfaction on hull defect rectification scored highest, but then within the average bracket

Satisfaction on Electronic and Weapon Systems Defect Rectification

Senior officers do not show significant different in satisfaction on rectification of electronic and weapon system compared to the junior officers (means within 2.80) but the number of years in service reflect the trend of the longer serving officer are less satisfied except for the 16-20 years groups (at the average means of 3.00). This is interpreted as the exposure and experience that

they get after serving in the RMN make them 'accept the standard' available. Means for officers serving below 5 years is 2.91 and means for officers serving more than more than 6 and 11 years deteriorate to 2.81. Surprisingly the supply officers are more satisfied than the others (although only at average bracket) and executive officers are least satisfied at 2.83 (below average).

Officers serving onboard MPCSS are most satisfied followed by Frigate and MCMV. This confirmed the fact that respondents' satisfaction is reflected on the type of platform they serves. FAC M, the old system ships recorded least satisfied customers (means of 2.57). Corvettes of Kasturi Class being fairly old (and over tasked), whilst Laksamana Class were the "new outdated ships" records the least means of 2.50 (below average). Ageing ships and its sophistication reduced the satisfaction of fleet officers.

Number of ships served by respondents do not have any relationship to their satisfaction on all four areas discussed when data are studied on full range looking at up to three ships served (with average of 17 respondents each), satisfaction increased with increased of ships served. There is no relationship between satisfaction and number of ships served as the **p** value is more than 0.05. The means also are not very significant (2.60, 2.80 and 3.10) and not consistent.

Ship Staff Dependency of Base Support

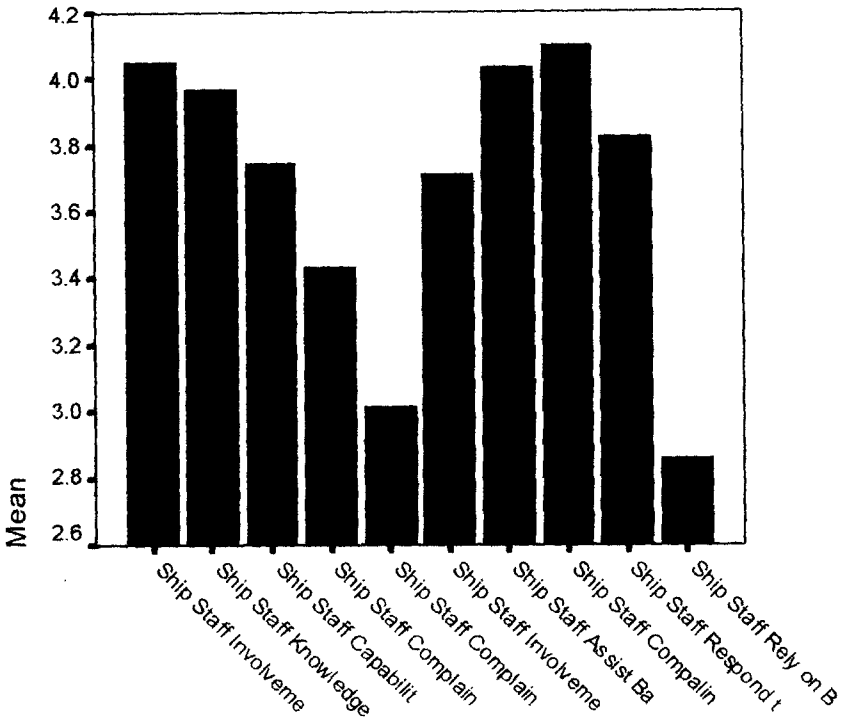

Figure 4.20 – Ship Staff Involvement and Dependency on Base Staff

Crosstab			Total Years Served in the Fleet				Total
			1= 3 - 5 yrs	2= 6 - 10 yrs	3= 11 - 15 yrs	4 = 16 - 20 yrs	
Ship Staff Involvement in Store Demand Process	Sometimes	Count		1			1
		% of Total		1.6%			1.6%
	Neither	Count	5	6	2	2	15
		% of Total	8.1%	9.7%	3.2%	3.2%	24.2%
	Often	Count	14	7	3	2	26
		% of Total	22.6%	11.3%	4.8%	3.2%	41.9%
	Constantly	Count	4	3	11	2	20
		% of Total	6.5%	4.8%	17.7%	3.2%	32.3%
Total		Count	23	17	16	6	62
		% of Total	37.1%	27.4%	25.8%	9.7%	100.0%

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	18.115	9	.034
Likelihood Ratio	17.336	9	.044
Linear-by-Linear Association	2.388	1	.122
N of Valid Cases	62		

a 9 cells (56.3%) have expected count less than 5. The minimum expected count is .10.

Table 7 – Percentage of Ship Staff Involvement in Store Demand Process

The study on the ship dependency of base support reveals a high level of means (3.92 to 4.50) among the respondents (refer to Figure 4.20 and data shown in Table 6 in Annex A) meaning they frequently have to check the progress of the spares demanded. In another words, the ship staff have low dependency on base as they found out that their involvement expedite the process.

The total percentage of respondents reporting *often* and *constantly* follow storedem are 41.90% and 32.35% respectively as shown in Table 7 made the overall total of 74.25% ship staff involvement. This indicates a high level commitment and dedication of ships staffs in getting the defects rectified soonest to meet the operational requirement. Additionally, it indicates FSD is constantly being checked by the ship's staff. Spare parts or equipment demanded are the interest of ship staff rather than the store-man. This fact marry with FSD performance records in fulfilling the demands from the fleet with 30.15% and 23.23% of *priority demand* and *storedem* respectively.

In the aspects of ship's staff managing defect using OSL, respondents indicate that the ship's staff frequently managed defects using onboard spares. The mean ranges from 3.60 (corvette) to 4.14 (PC/OPV) indicates a high level of involvement from the ship's staff. However, the replacement of spares used and timing of delivery is not known. In responding to the URDEF rectification by the ship's staff, the mean (3.57 for PC/OPV and 4.00) reveals that the ship's staff put extra effort to manage the defects with own capability and lesser dependency on the base staff.

The ability of ship's staff in tackling the defects without much dependence on the base staff shows high professionalism of the staff. The ship staff reliance on base staffs is low and ranges from mean 2.57 to 3.08. This can be describes that the ship's staff dependency of base support are low and ship's staff are able to manage defects without much depends on the base support. The main reason

for this is simply that the ship staffs is more knowledgeable and experienced than the base staff as they had hands on the ships machineries or systems.

The descriptive analysis reveals that staffs do complain about the quantity and quantity of OSL issued by FSD (mean of 3.43 and 3.01 respectively). In the aspect of quality of spares issued, the issuing authority should seriously look into the matter in ensuring the quality of spares issued. The sub-standard materials might lead to accident and jeopardise the ship's safety.

The respondents also complain about the delay of spares demanded (mean of 4.00 and 3.70) and frequently being asked to identify the spares by the issuing authority before the spares are issued to the ships. The data indicates that the ship's staffs are extensively involved in getting spare parts for the ships either as a part of OSL or normal demands. The ship's staff involvement in getting the spares showed the low competency level of the supply support systems and its personnel with respect to ships systems including defect nature, spares and parts requirement.

FSD performance report for the *Anugerah Kualiti Kementerian Pertahanan Kategori Teknologi Maklumat* in 1998 and *Kategori Pengurusan Logistik* in 2002 further acknowledge that problems do exist in fulfilment the spares for the ships. Although normal demand requirements are met with a high percentage of 79.87%; *priority demands* and *storedem* are far below the expectation. The involvement of ship's staff in getting the ship to the highest state of readiness can also be observed on the assistance given to the base staff. The mean for ship staff assist base staff is 4.03. The ship's staffs also show a high level of professionalism by indicating the correct reference of document in assessing the defects (mean 3.96).

CUSTOMERS' NEEDS (EXPECTATIONS)

The open ended question were matched to the structured closed question and analysed as the customers' expectation. The fleet officers expect an ideal situation. An ideal system which is perfect is not available in any organisation. Any logistic system evolves and undergoes continuous improvements. RMN logistics support system is a complex system that is not easily designed to meet the challenging demand of dynamic factors that includes political, economics and operations. However, some of the issues highlighted by the fleet officer have relevancies and worth considered for the improvement of the existing system.

Onboard Spare List

Increase in onboard spares is one of the alternatives. The ship staff capabilities in rectifying defects will be enhanced as the ship staff involvement in supporting the efficiency and effectiveness of the present system is 56.5% (medium and high involvement is 24.2% and 32.3% respectively). This shows that the base support will not be effective without ship staff. Respondents indicated that ship staff dependency on the base staff support were low. Low dependency was 38.7%, medium 43.5% and high 17.7%. Ship staff involvement and dependency on base staff statistic as total sum shows that the support received by ship is not satisfactory. Increasing onboard spares which currently is not at its 100% may not solve the problem but would definitely enhance effectiveness and efficiency with respect to ship staff involvement in affecting defects rectification. Onboard spares issue were also raised on new equipment fit. This means to say that the ILS approach on equipment itself has not addressed the basic needs of spares needless to mention on new systems or ship.

The knowledge of personnel tends to stay within the ship especially for crews that attended initial course conducted by shipbuilders and OEM. The percentage of experienced crews retained at base support units/depot to assist defect rectification must be revisited. Respondents expressed their appreciation of the present system and the move to implement ILS. However the concern is not on what system but more towards practicing the particular system.

Human resources get the most feedback. The personnel in questions are the technical advisors at supply depot, RMN supply personnel and the technical staff both ashore and afloat. The training recommended not to only remain within RMN but to include the local suppliers, contractors and vendors. The outstanding highlights was on the competency of RMN supportability for the DA radar that was with RMN for almost 20 years but yet the dependency on OEM is still very high; to the researchers' surprise, setting-to-work for the radar is still referred to the OEM.

Respondents recommended that serious attention given (especially electronics) to ensure proper continuous training and to keep expert supporting the system, at least on contractual basis. Training may be costly (US businesses spend more than USD60 billion each year to provide 1.7 billion hours of formal training) (Bohlander et al,2001) but there is no shortcut to ensure knowledgeable and skilful personnel. The most effective training for ship personnel is the pre-joining training. As proposed by the ILS approach, mock-ups and simulators is required for training not only for equipment operators but also for base staff maintainers who need to use special tools, calibration equipment and test sets.

RMN tendency to outsource repair work contribute to lowering the RMN personnel of the necessary skill and technical knowledge. Skill development by OEM on specialised equipment, machineries, and systems need to be

reinstituted and sustained so that RMN personnel acquire the necessary expertise to maintain and operate systems onboard efficiently and effectively To some extend, supply personnel must possessed the attitude of a technical men toward equipment, defects and spares (parts, module or system). Training shall include the supply personnel when new ship, system or equipment is procured.

Supply Support

Majority of respondents highlighted the issue on delay of spares delivery which include spares under contracts. Ship staff involvement as mentioned earlier support this issue as dependency on base staff is low. Outstanding demands were sorted out by ship technical staff by visiting the supply depot. Repeatedly, spares were identified without the assistance of the base staff or supply depot's personnel. Demand based on pattern numbers most of the time frustrating as it linked up to different parts and match to not only one but many different types of items showing duplicating inventory entries. Surprisingly the issue of late delivery was improved during major exercises like KERISMAS.

Contractual procurement (purchasing through quotation over RM 50,000 per type of item) of spares is much cheaper than BB1 procedure (Surat Pekeliling Perbendaharaan Bil. 4, 2002) (purchasing through quotation not exceeding RM 10,000 per type of item) but bureaucracy is the stumbling block (delays) to contract renewal or awarding contracts. The process of realising a contract need to be re-looked so that is does not affect the ship in terms of equipment reliability, maintainability and supportability. Contractors are partly to be blame as some of them do not perform and a penalty mechanism is to be appropriately introduced. RMN policy on the life of equipment or system also plays part in the availability of platforms. Obsolete equipment faced difficulty in defect rectification or replacement as these parts have to undergo manufacturing, costly and long lead time. Continuous 'cost benefit study' must be conducted on all assets.

Respondents also questioned the speed of processing demand by FSD. The demand procedure using BAT L8 is too slow and suggested that signal message procedure is use instead. The issue here is the speed of data transfer where signal message if used for all administrative requirements will reduce the urgency of action, increase signal traffic and also increases work processes such as data logging, crosscheck and feedback. An integrated computer based management support system that incorporate data on receipts and withdrawal would instead be a better and efficient choice. On line data management will provide quick data transfer, instantaneous logging, quick feedback and up to date data bank on demand and issue statistics.

The 'awareness' level of respondents on RMN logistics support were just about average and coupled with high loyalty to organisation, they responded with an average level of satisfaction of the logistics system. Based on the study on Barriers of FSD Operation Functions (Zainal,1997), the level of satisfaction should be much lower. Amongst barriers identified were:

- Not enough stock in the inventory database for item required.
- The computerization of demand and issue process is only for the purpose of controlling demand and issue process only.
- Demand of item in stock takes two days and out of stock takes 70 to 110 days.
- The purchasing process duration reveals that a lot of unnecessary administrative requirements within the process.
- Purchasing procedure were the same for a single not so costly item to sophisticated and highly expensive item.
- The simple average method used for forecasting is not appropriate for FSD.
- Contents of inventory includes obsolescence items.
- Slow cataloguing process. Only 60% cataloguing completed.
- Database have duplication of items

- The facility of inventory system not utilized intelligently.

Total Quality Management

Respondents felt that there is no shared values and vision between the fleet and logisticians. This is a critical shortcoming as TQM advocate customer focus and should be guided by the top management vision. Customer is not aware of the logistic system in place and not exposed to the information as such they perceived that RMN do not have a stock holding policy. In the model of Organisation Excellent, the management leadership (vision and goal setting) take into consideration of both external and internal factors to achieve outcome or results. Failing to materialise this framework is detrimental to the organisation. Respondents suggested that vendors (suppliers) and RMN relationship to be enhanced.

Profit yearning vendors will not be a long-term partner as such RMN should deal with long-term partnership with OEM and credible suppliers rather than the small-time fly by night vendors. As RMN implement the international quality standards within the organisation, vendor selection also should be ISO 9001-2000 certified to ensure reliability. Taking vendors' contribution as a factor of logistic support efficiency, effective vendors/suppliers rating system should be in place and implement effectively. RMN should take the initiative to conduct training programme to educate suppliers and help build their quality system. Willingness to learn about each other will provide visibility of potential business and preferential opportunities to secure that business.

Summary of Data Analysis

The effectiveness of RMN logistics support system in supporting and maintaining RMN fleet at the mission ready state is easily measured by using the

customers, satisfaction measurement. The awareness of the logistics support system amongst the fleet officers itself is very low. The awareness level however has no relationship to any independent variables. Varying level of awareness was detected on every independent variable. This related to formal training discrepancy. Fleet officers are not sufficiently trained to understand the system that served them. Their awareness was based on their individual exposure to the system. Satisfaction was found to be within the average level only or it can be safely said that the respondents are indifferent to the services provided. The serious dissatisfaction is on electronic and weapon system. The analysed data showed that the present RMN logistic support system is effectiveness and efficiency in any of the four areas (mechanical, electrical, electronics and hull) thus not meet the customers' needs (expectation) and graded just satisfactory in the customers' perspective. A support system should not only satisfy but delight the customers to be assessed as effective and efficient.