UNIVERSITI PUTRA MALAYSIA

IMPROVING THE EFFECTIVENESS OF THE REPAIR OF SCORPION TANK AT 91 ARMED FORCES CENTRAL WORKSHOP

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GSM 1997 14

UNIVERSITY PUTRA MALAYSIA
PM-YPM MBA PROGRAM

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Dedicated with Love
To my family

Che Som Othman
Mohd Ahzaruddin
Mohd Ahzarul Imran
Mohd Ahzaryl Amree
Mohd Ahzamirul Aiman

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PREFACE

I firmly believe that to be excellent and customer oriented, organisations need sound operation strategies. This is particularly true today, given the pressure of global competition and the need to satisfy ever more demanding customers. We approach the operations function as a powerful tool for achieving organisational objectives and strategies.

This project, "IMPROVING THE EFFECTIVENESS OF THE REPAIR OF SCORPION TANK AT 91 ARMED FORCES CENTRAL WORKSHOP", is a real case study and the name of individual and departments appear in this report is true and real. The data presented is true as it appeared in the documentation of the organisation. A copy of this project paper will also be presented to the Ministry of Defence for consideration, and if feasible, will be implemented.

In the Ministry of Defence, this project paper is classified as "RESTRICTED" or "TERHAD". We believe in transparency and there is no 'business secret'. Individuals, particularly the lecturers in Universiti Putra Malaysia are invited to comment and improve this paper . This is to ensure that the future implementation will be smooth and successful. Therefore, the content of this document should not fall to unauthorised person.

Acknowledgements

The success of this project paper, like any other project, requires the help and creative energy of many people and this is certainly not the exception. I especially appreciate the confidence, support, help and friendship the members of my organisation, 91 ARMED FORCES CENTRAL WORKSHOP.

I wish to thank my superior and colleagues who provided extremely useful guidance for this project paper. They are:

Major General Dato' Ghazalee bin Huseynee
Director of Logistics, Ministry of Defence

Colonel Abu Sufian bin Ahmad
Engineering Department, Ministry of Defence

Colonel Othman bin Baba
Logistics Department, Ministry of Defence

Lieutenant Colonel Husin bin Hashim
SO 1 Logistics, Logistics Department

Major Zulkiflee bin Ahmad
Major Johari bin Arshad
Major Yusoff bin Ali
Major Hasan bin Amin
Captain Dollah bin Baba
91 Armed Forces Central Workshop

AHDAR BIN GASAR
LIEUTENANT COLONEL
91 AFCW

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CHAPTER I

INTRODUCTION

1.1 BACKGROUND

91 Armed Forces Central Workshop (91 AFCW) of the Royal Malaysian Elec trical & Mechanical Engineering Corps (EME) is one of the army unit under command of the Malaysian Army Logistic Headquarters. It is located in Batu Cantonment Camp, Kuala Lumpur. It was established since 1st May 1962 as an element of the British Army. The initial role of this organization was to provide maintenance and logistic support and repairing British military vehicles. In 1965, 91 AFCW was handed over to the Malaysian Army. Today, 91 AFCW has totally different outlook, function and character that suit to the Malaysian environment.

The function of 91 AFCW is to carry out base overhaul (complete strip and rebuild) of military vehicle and equipment. Base overhaul, also known as refurbishment, involves the repair of all components and accessories of the parent vehicle and equipment. The responsibility of this organisation is to refurbish all armoured vehicles (tanks, armoured personnel carriers and armoured fighting vehicles), light combat vehicles (Jeeps, Land Rover and three tonner trucks), mortars and artilery long-range guns, small arms, radars and electronic devices used by the Malaysian Army. The 91 AFCW's principal product is therefore 'serviceable vehicles and equipment'.

After A brief introduction of the organisation of 91 AFCW above, this chapter will further highlight the problem statement , objective of the study and the benefit of the study. The aim of highlighting the problem statement is to enable this study to establish issues and subsequently determine the most critical issues or problems that need to be resolve immediately.

1.2 PROBLEM STATEMENT

There is a growing discontent by higher authorities that in the previous years, 91 AFCW failed to deliver products in term of the required quantity and quality, particularly for the repair of Scorpion Tank. The average cost per vehicle for the repair of Scorpion is high. The higher authority in the Ministry of Defence believe that there is a need to improve the performance and reduce the repair cost and a comprehensive is to be conducted immediately. The dissatisfaction highlighted by higher authorities include:

1.2.1. Achievement below the objective set (generally about 70 – 90% of repair can be completed for each category of equipment) by higher authorities. This factor affected the serviceability rate and subsequently affects the military deployment because of insufficient number of tanks that are readily available when the situation warrant for tank deployment.

1.2.2. Long down time and repair time. The repair activities in 91 AFCW taking longer time than expected based on the available standard time manual.

1.2.3. High cost of repair. The cost of repair, particularly for the programme in 1993, 1994 and 1995 are extremely high and exceeding the budgeted allocation. There is a need to significantly reduce the cost.

1.2.4. Inaccurate forecast in term of budget, number of casualties (damaged equipment to be repaired), forward committal for the purchase of spares from oversea, 'dead stock' and capacity requirements.

The key success factor for 91 AFCW is the quality of personnel in this organisation. As a labour intensive organisation, it is highly dependent the level of skill, motivation and commitment towards organisational objective. They must be properly managed, supervised and guided to produce the required output. However the workers, through the union representative, highlighted few points as indication of their dissatisfaction. In the management-union meeting, it was highlighted that the workers satisfied with the working environment, pay (as government servant), career structure and leadership style of the organisation. However, the problems highlighted were centering around the working procedure and this include:

1.2.5 Procedural problem (bureaucratic and time consuming). The workers are complaining that they find difficulties in getting spares. They claimed that this factor affected the individual as well as group target and this will certainly affect their annual performance (SKT) and motivation.

1.2.6. Frequent posting (transfer). Generally, an individual has an opportunity to serve in 91 AFCW for a short duration of about three to four years. Before they acquire the required knowledge and skill, they are due to be transferred to other unit or new appointment in their career advancement

1.2.7. Spares required are not arriving on time or wrong spares received. The cause of this problem is due to improper identification of parts and suppliers inefficiencies.

1.2.8. Insufficient tools and facilities to carry out repair activities. The available machines and test equipment is old and frequent breakdown affecting their performance.

On the other hand, the management of 91 AFCW also identified few problems that hinders the organisation from achieving the target set. The management believes that if these problems can be resolved immediately, the efficiency and effectiveness of this organisation can be increased significantly. The problems raised by management include:

1.2.9 Very high holding of 'dead stock' (spare parts that were purchased previously but very unlikely to be consumed immediately as well as for the near future). This problem arises due to inaccurate forecast in the previous purchases.

1.2.10. Too many workers with highly specialise trades and skill are required to carry out repair activities. This situation (high specialization and low multi-skill) will create job immobilisation and inflexibility within the department and subsequently cause difficulty to adapt to the changing environment.

1.2.11. Too many types of equipment to be serviced and repaired (overhauled). Other than Scorpion Tanks, 91 AFCW also refurbish other vital equipment which is also to be given similar priority. This responsibility caused 91 AFCW unable to focus or give greater attention to a particular critical asset.

In the light of the above conflicts at which the three parties raised their dissatisfaction over the situation, this warrant an immediate study to be conducted. The study is to determine the root cause of the problem and to suggest the mean of overcoming these problems so that the organisational objective can be achieved.

1.3 **OBJECTIVE**

The principal objective of this case is to improve the effectiveness of repair of Scorpion Tank in 91 AFCW. This study will determine the actual cause of the problem and to suggest the strategy in achieving the organisational objective.

This project has been specifically selected due to various reasons, primarily due to the low performance of 91 AFCW in repairing Scorpion Tanks and as well as high repair cost in the previous years. This situation creates low serviceability rate and subsequently

reduces the state of readiness of the Malaysian Army to meet any unforeseen circumstances. Scorpion Tank is one of the vital combat equipment and the deployment in the battlefield is absolutely critical in our environment.

Scorpion Tank is very effective and suitable for operation in our environment because of its mobility and effective firepower. These tanks were introduced to the Malaysian Army in 1985. Due to the old age and excessive usage, a high percentage of these tanks are categorized as non-operational and require immediate repair. The Armed Forces is giving priority to the repair of these tanks. 91 AFCW is the only agency in the organization responsible to undertake repair activities. There is an urgent need to improve the weaknesses on the previous and current performance.

The first program in the repair of Scorpion Tank in 91 AFCW was launched in 1993. This program is expected to be continued for the next eight years. For the first years, the performance was unsatisfactory and need to be improved. This situation arises due to the lack of experience. As the workers gain the knowledge and experience, the performance was increasing tremendously from year to year despite increase in the number of tanks to be repaired. The average cost of repair per vehicle was also declining. However, the higher authorities believed that there is a room for improvement and the past and present performance can be further improve.

1.4 BENEFIT OF THE STUDY

The effective operation management of 91 AFCW in repairing Scorpion Tanks will enable this organisation to meet the objective satisfactorily in term of quantity and quality (cost, reliability, fit for purpose and delivery time). Hence, this will certainly save the government's and taxpayers' money. High level of customers' satisfaction will determine the morale and confidence of soldiers in the battle field. The reliability of these tanks will influence the strategic deployment and success of land battle. Other advantages from this effective operation management include cost reduction, longer mean time between failure (MTBF) and optimization of available resources.

CHAPTER II

RESEARCH METHODOLOGY

2.1 INTRODUCTION

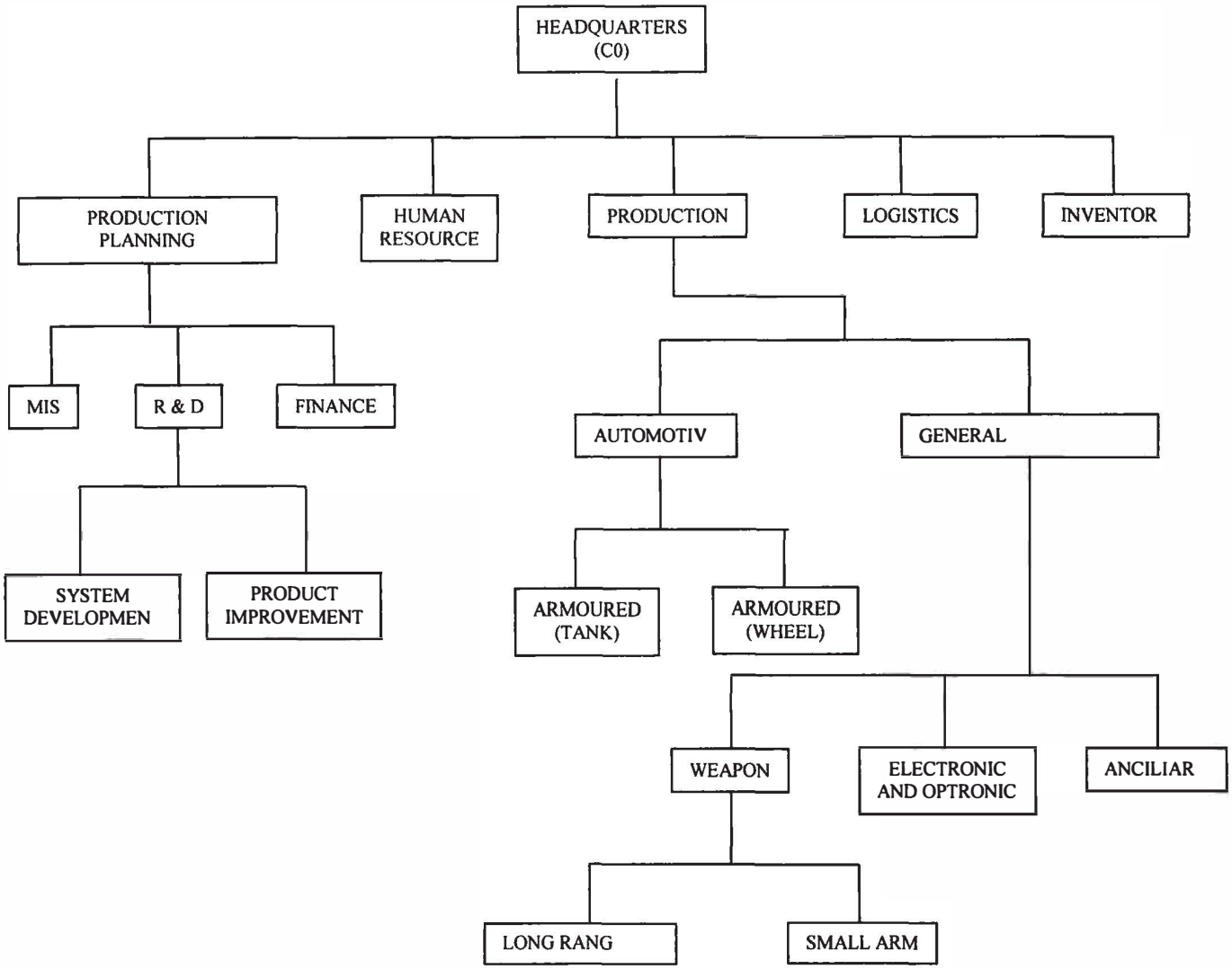
After establishing the objective of the research as define in Chapter 1 above, this chapter will describe the approach on how the research will be conducted. Firstly this chapter will look at the organisation of 91 AFCW, than followed by the brief outline of the research methodology, data collection and analysis. The main reasons for looking at the organisation is to determine the area of study, scope of study and fact finding approach.

2.2 ROLES AND ORGANISATION

91 AFCW is responsible to provide base overhaul repair (refurbishment by complete strip and rebuild) of equipment in the Malaysian Army. Annually, 91 AFCW is to repair about 80 armoured vehicles, 180 light combat vehicles, 30 mortars and guns and about 500 other miscellaneous equipment. The repair requirements are planned in advance on annual basis and therefore it is called as 'annual programme repair'. The annual programme is to start in January and to be completed by 31st December. The type of repair are classified as breakdown maintenance repair or preventive maintenance repair. The casualties (damage vehicles or equipment to be repaired) are also identified in advance, normally six month before the programme commence.

To meet the above role and target set by higher authorities, 91 AFCW is organised into functions as shown in organisation structure Figure 1 below:

Figure 1



ORGANISATION STRUCTURE
91 ARMED FORCES CENTRAL WORKSHOP

91 AFCW is organised into five main departments, namely Production Planning and Control (PP&C) Department, Human Resource Department, Production Department, Logistics Department and Inventory Department. The main responsibility of PP&C Department is to plan the operation (production) activities and the management of financial aspects. Human Resource Department manages the human resource aspects of the organisation. Particular attention to be given by this department is matters relating to staffing, training and career development. Production Department is the heart of the organisation and is classified as the most important department of the organisation, responsible to produce goods and services for the business. Production Department is further divided into ten sub-departments or sections, namely Assemble, Engine, Axle, Gearbox, Hull, Gun and Turret, Electrical, Instrumentation, Communication and Pneumatic and Accessories sections. Logistics Department and Inventory Department are support departments responsible to assist Production Department in producing output for the organisation.

The current strength of 91 AFCW is 8 officers and 425 employees of various trade and skill. About 65% of the employees are skill and experience personnel, serving more than fifteen years in the Army.

2.3 SCOPE

This research is about operation management. The area and scope of the study therefore will cover all the activities in the workshop floor in 91 AFCW and areas related to the operation management in producing the output. The study will also involve the personnel directly or indirectly involve with the operation.

2.4 METHODOLOGY

The facts finding process of this research was conducted by collecting the primary and secondary data. Information sources are classified into primary and secondary types. Primary data come fron the original sources and are collected especially to answer research question. Thus, we collect primary data when we observe certain production operations and measure their cost. Studied made by others for their own purposes represented data. For this research, the primary data is collected through observation, interview, brain storming and expert opinion. The secondary data is collected through inspection of records and documents. The data collected is than validated for the analysis.

2.3.1. Observation. The observation has been conducted on actual repair activities to confirm on the actual repair process and to determine conformance or otherwise to the agreed procedure.

2.2.2. Interview. Selected workers who are directly involved with the repair activities were interviewed, to confirm the facts obtained from inspection of documents and observation.

2.2.3 Brain Storming. A few brainstorming sessions was conducted with key personnel involved in the repair process. The objective of this interview is to confirm on the facts obtained by methods above and to seek additional information.

2.2.4. Expert Opinion. The expert from Alvis Ltd , England (Mr W. Roger, the designer for Scorpion Tank and consultant from Alvis Lte) was consulted mainly on technique of repair and standard time.

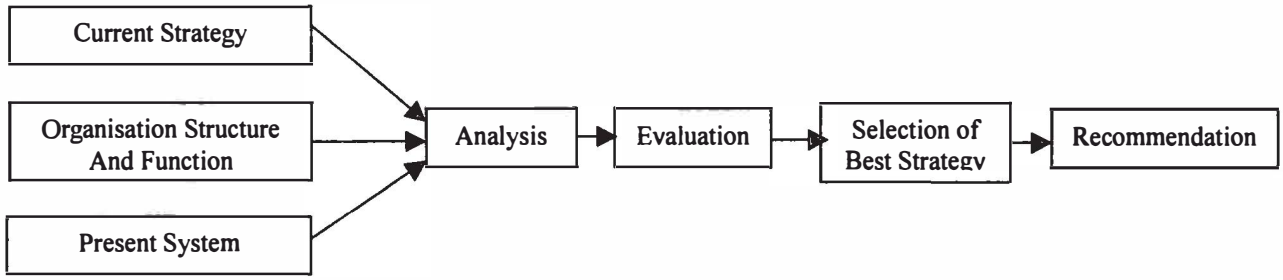
2.2.5. Inspection of records and documents. The research examined the records and documents, internal as well as external to the organisation. The aim of this inspection is to determine the historical performance, policies, procedures and instructions related to the repair activities.

CHAPTER III

ANALYSIS OF CURRENT SITUATION

3.1 INTRODUCTION

The aim of this chapter is to present and analyse the current situation. Firstly, this research will examine the current strategy, current organisation structure and function and present system of how the organisation carry out the activities. These three elements will then be analysed to develop the alternative strategies open to the organisation. The alternative strategies will be evaluated and the best strategy is selected to be recommended for implementation for achieving organisational objective. To clarify the aim of this chapter, the relationship is shown diagrammatically below:



3.2 CURRENT STRATEGY

3.2.1. Mission.

The mission of 91 AFCW is, "To overhaul vital combat equipment to enable the Malaysian Army to achieve and maintain the state of readiness at any time. The product must be able to be deployed efficiently and effectively during

emergency and against any external aggression". The mission is to ensure that the activities and resources are consumed and coordinated towards organisational objective. Employees at all level in 91 AFCW are aware and understood of their commitments.

3.2.2 Objective.

The annual workload (the quantity of Scorpion Tanks to be overhauled) is determined by the Equipment Overhaul Committee (EOC) and the chairman of this committee is Director of Logistic Operation in Mindef. The membership of EOC is shown in Figure 2 below:

Figure 2

MEMBERSHIP OF
EQUIPMENT OVERHAUL COMMITTEE

CHAIRMAN	-	Director of Logistic, Ministry of Defence
MEMBER	-	SO 1 Enginering
		SO 1 Logostic
		SO 1 Transportant
		SO 1 Ordnans
		SO 1 Communication
		SO 1 Management
		Commanding Officer 91 AFCW
SECRETARY	-	PP & C Manager, 91 AFCW.

This committee is equivalent to the Board of Directors in any private sector organisation. The Commanding Officer of 91 AFCW (equivalent to Managing Director) is a member of this committee. The committee will sit every quarter to set the policies and future direction of 91 AFCW as well as to monitor the progress of repair activities.

3.2.3. Policies, procedures and Instructions.

The policies and procedures for maintenance of logistics equipment are issued by the Logistics Department, Mindef. Those polocies, procedures and instructions are further clarified and elaborated by the EOC. For the implementation of repair activities, sufficient repair manuals, illustrated part catalogues (IPCs), work procedures and work instructions (following ISO 9000) approach are also available in 91 AFCW for guide and references.

3.2.4. **ANALYSIS OF CURRENT STRATEGY**

91 AFCW has clear mission, objective and policies for the repair of Scorpion Tanks. However, the current strategy which is Cost Reduction Strategy is not properly documented and the performance indicators was not properly communicated at all level and closely monitored. The procedures and instructions are appropriate, reasonable and achievable. It is because most of the procedures and instruction are 'borrowed' from the British, Australian, Indian Army and NATO standard, than adjusted and modified to meet the local environment. The research also determined that the strategy of cost reduction is achievable because there was a significant improvement. Average cost per year is