FUNCTIONAL JOB ANALYSIS AND MAN POWER PLANNING FOR A CONTAINER TERMINAL BERTH

P-735

Thesis submitted in partial fulfillment of the requirements for the award of the degree of

MASTER OF ENGINEERING IN MECHANICAL ENGINEERING

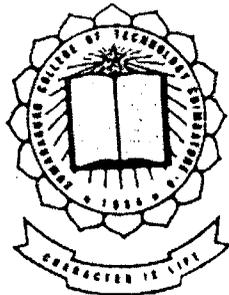### (INDUSTRIAL ENGINEERING)

of BHARATHIAR UNIVERSITY

By
L. ARULMANI
(Reg. No.0037H0002)

Under the Guidance of
PROF. K. KANDASWAMY, M.SC., (ENGG.)

DEPARTMENT OF MECHANICAL ENGINEERING

KUMARAGURU COLLEGE OF TECHNOLOGY

(Affiliated to Bharathiar University)

COIMBATORE - 641 006.

2000 - 2001

CERTIFICATE

Department of Mechanical Engineering

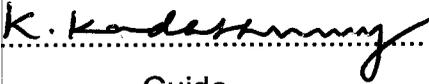Certified that this is a bonafide report of thesis work done by

Mr. L. ARULMANI

(Reg. No.0037H 0002)

at

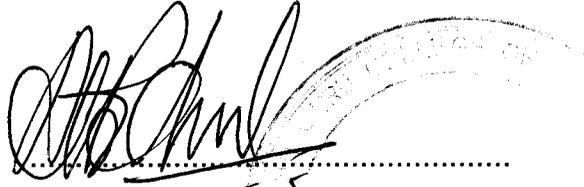### KUMARAGURU COLLEGE OF TECHNOLOGY
COIMBATORE - 641 006.

During the year 2000 - 2001

Guide

Prof. K. KANDASWAMY

Head of the Department
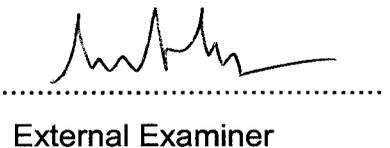
Dr. A. MOHANAKRISHNAN

Department of Mechanical Engineering,
Kumaraguru College of Technology.

Place : Coimbatore

Date :

Submitted for viva - voce examination held at
Kumaraguru College of Technology on ......4 - 12 - 2001........

Internal Examiner

External Examiner

CERTIFICATE

This is to certify that this thesis work entitled "FUNCTIONAL JOB ANALYSIS AND MAN POWER PLANNING FOR A CONTAINER TERMINAL BERTH" being submitted by L. ARULMANI (Reg. No. 0037H0002) for the award of the degree of Master of Engineering in Mechanical Engineering (Industrial Engineering), is a bonafide work carried under my guidance, the results embodied in this thesis have not been submitted to any other university or Institute for the award of any degree or diploma.

Prof. K. KANDASWAMY, M.Sc., (Engg.)
Assistant Professor
Department of Mechanical Engineering
Kumaraguru College of Technology, Coimbatore

ACKNOWLEDGEMENT

I thank the almighty for giving me the strength to complete my project successfully.

I express my immense gratitude to our principal Dr. K.K. Padmanabhan, B.Sc., (Engg.), M.Tech., Ph.D., for his consistent encouragement and for providing extensive facilities for successful completion of this project.

I take this opportunity to express my deep sense of gratitude to Dr. A. Mohana Krishnan, M.Sc., (Engg.), Ph.D., professor and Head of the Department of Mechanical Engineering, for his help and encouragment throughout my project.

I express my heartfelt gratitude to my guide. Prof. K. Kandaswamy, M.Sc., (Engg.) ,for his guidance and help throughout my project.

I take this opportunity to express my deep sense of gratitude to Prof. N. Gunasekaran, M.E., our Class Advisor, for his help and encouragement throughout my project.

I thank Mr. K. Manickam, M.E., Assistant Executive Engineer, Chennai Port Trust, for his valuable help and encouragement for successful completion of this projcet.

L. ARULMANI

SYNOPSIS

This Project was carried out in chennai Port Trust, which operates on various Import and Export Operations. The objective of the project is to study all jobs existing in Electrical and Machanical Department of container terminal berth of Chennai port trust. .

This study involes compiling the time taken by the worker on different activities of job, as judicious use of time is imperative to efficieney.Attempt is also made to understand thecomposition of skills, knowledge and physical abilities in each of the 16 sections of the container terminal berth.

The optimum crew size of both Electrical and Mechanical Service stations were suggested.

CONTENTS

CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

This project work was carried out in Chennai Port Trust. It is one of the major ports of India and has been functioning since the year 1881. This port has 24 berths and 4 moorings to handle all kinds of cargo with minimum turnaround time. It is an all weather port working round the clock, throughout the year.

The Chennai Port commands a very rich hinterland which covers almost the entire Tamilnadu and considerable part of Karnataka and Andhra Pradesh. It is functioning throughout the year, without any lock gate, tidal or other restrictions. The port is ideally suited for developing as a container port. Its geographical location covering the U.K. Far-East Shipping Lines makes this port well suited to develop as a transhipment port.

Around 1600 vessels both Indian and foreign visit Chennai Port every year. The different types of vessels that visit this port include passenger, naval, food, general cargo, container, ores and oil. The Chennai Port operates cargo for both import and export.

1.2 CONTAINER TERMINAL BERTH

The Container Terminal is the first and the most modern one in the country The Containerization is now an integral part of the transport scene in all the developed and developing countries in Europe and Asia. It has ushered in significant changes in the method of handling bulk cargo both for import and export.

Containerization has conferred both monetary and nonmonetary advantages. Segregation of the cargo into larger package and reduction of the handling and transport time has facilitated the movement of large volumes of cargo over long distances within a short time.

By enabling cargo to be in a completely sealed metal box damages due to vagaries of weather, handling and pilferage en-route have been greatly minimized. Containers have also made the concept of door to door movement of cargo possible.

The size of the containers may be 20, 40, or 45, feet. The 40ft containers can handle up to 31 tones of cargo and the 20 ft containers can handle up to 21 tonnes of cargo. There are several types of containers such as General cargo, open top, insulated, refrigerated, half height, tank and platform containers.

The containers Terminal handles both the import and export of cargo. The major departments at the container terminal are the Electrical & Mechanical Department, Traffic Department and Accounts Department.

CHAPTETR - II

IMPORTANCE OF THE STUDY

This project is necessitated on account of the following :

a. Privatization

As Chennai Port Trust is almost heading for privatization, there is a need to relook at the jobs available to understand if there is any inefficency in the design of existing system. Moreover, there is also a threat of possible lay off as there is a widespread talk of too much labour force especially at the lower level. A study of this kind would enable the organization to understand areas where it needs to streamline activities, prevent idleness and enhance productivity.

b. No proper utilization of work force and machinery

The departmental records show that there was no proper utilization of men and machinery to its optimum level.

c. Difference in perceptions about jobs in the same section

Each worker has their own views regarding their jobs in terms of skill, knowledge and physical abilities. It differs from one worker to another.

d. No apparent evidence of job analysis

For a long time management was planning to conduct job analysis as it has under-stood that much of the problems it faces with work force can be solved if it goes in for a through job analysis. Unfortunately, it appears that no such excercise has been done in the past decade or now.

CHAPTER - III

OBJECTIVES OF THE STUDY

1. Major Objectives

The Project has the following main objectives

a.   To understand the composition of skill, knowledge and physical abilities in the jobs as discerned by supervisors and workers. This aspect would enable the management to understand what skills it needs to look out for.

b.   To determine the optimum manpower requirement for each of the sections in the container terminal berth. This will facilitate prevention of idleness and better use of worker capabilities.

2.   Minor Objectives

1.   To determine the job analysis if there is any discrepancy as far as time spent on jobs is concerned.

2.   To determine the functional job analysis of their jobs to find the extent of data , people, things related aspects

SCOPE OF STUDY

The study is done at container Terminal Berth of chennai Port Trust.

The container terminal berth consists of

1.   Electrical and Mechanical Department

2.   Traffic Department

3.   Accounts Department.

Table 1. Details of Electrical and Mechanical Sections

Sl. No.	Sections	Supervisor	Workers
1.	Quay Crane (Mechanical)	1	18
2.	Transfer Crane (Mechanical)	1	21
3.	Top lift trucks (Mechanical)	1	21
4.	Service Station (Mechanical)	1	30
5.	Quay Crane (Electrical)	1	16
6.	Transfer Crane (Electrical)	1	15
7.	Top lift trucks (Electrical)	1	6
8.	Service Station (Electrical)	1	12
9.	Industrial Electronics	1	6
10.	Electronics and Communication	1	12
11.	Power Systems	1	10
12.	Planning and Development	0	81
13.	Deployable Vehicle Drivers	1	81
14.	Operators Transfer Cranes and Quay Cranes	1	70
15.	Operators Top Lift Trucks	1	6
16.	Car / Van Drivers	0	3

Chapter - IV

LITERATURE SURVEY FOR JOB ANALYSIS

Job analysis is a managerial activity performed with in organization and directed at gathering, analyzing and synthesizing information about job's information that serves and the foundation for organization planning and design, human resource management and other managerial functions.

John Lawrance , Ober have studied the problems of job analysis. The study explores tasks characteristics of individual for use of office automation system. The task analysability and amount of information processing of individual job was measured with software. This system implements variable organizational structure measures and expands the use of an instrument with orgins in job analysis.

Hamm Christine identifies skills to the right persons to the right job to successful staff recoverment. Analysing the content of part and precise skills needed to fill it successfully. Defining accounts specification and identifying the candidate with skill were also done. Top priority should be given to analyze the character of a person to fill the post.

Laguardia, Louis Manual have studied the job analysis information based on work activities, related knowledge, skills, abilities personal characteristics and level of experience on the adequate employment plans. A sample of 45 examiners studied the job analysis variance. It shows the statistical significant information.

Lawrance, David Peter has dealt with ship-board organization. It is a social structure and dynamic environment for ships operation. The job task analysis revealed the shipboard industry being forced by technical, social and economic factors to rationalize the man power. The concepts are used to support the fuctional performance abroad-ships. It is essential to use the proposal to introduce matrix manning which is techinically viable as a method of manning of all types of merchant ships. The conventional liner man power policies are inadequate and two dimensional structure provides greater insight in the successful utilization of human resources.

The maning of job analysis for vocational guidance Maree Jacobus Gideon (1987) has given his views on job analysis in vocational guidance. The specific job requirement needs the following determining,analyzing and indentification of gap between job requirement and degree of orientation which the young man has reached.

The job analysis can be used as a method of research on bodily capacity intellect, responsibility and human relationship to establish the content of a scholastic vocational orientation curriculum.

Monnltan Lorel studied the human resources programme. It attempts to study pilot competency, to assure professional competence, to establish standards for professional practice, to increase recognition for the profession with in the corporate organization and community and influence the future direction of the profession, to assess competency administrative procedures and protocol criteria for program evaluation.

Burgess and Lorna Roqers have studied the methodologies to distinguish between two jobs in several contexts. These are examined with previous experience with the same employees. It is to be used as a qualifying credential in labour certification.

Denton designed jobs by simplified or combined tasks in order. It is essential to observe and understand the current decision making process, the document decision by using a flowchart, correct decision for making process proposed changes and implement the change. The re-examining process will enable business to become linear and more competitive.

Job analysis behavior modification methods performance standards , data base management system have been studied by Denis, Joe, Austin Bruce .It is an economical practical alternative methods where work is analyzed. The behavior and standard may be assessed in a concise statement. It is also important to find out technical and non technical work that helps increase and identify the vision.

Ohio Bell has dealt occupational hazards methods. The study on human resources planning on hazardous analysis is a documented procedure used to review job method to explode hazards. It can also document work place changes. The important criteria for the task should be broken. Identify the hazards procedure to be and eliminated the hazards. Management support to develop the change and improve safety awareness. If accident occurs it should be reviewed with employee and procedure should be frequently reviewed.

LITERATURE SURVEY
(MAN POWER PLANNING)

INTRODUCTION

Manpower planning is Defined by Vetter E.W. (1967). The process by which management determines how the organization should move from its current manpower position to its desired manpower position.

According to Beath G.M. (1969), manpower planning involves two stages. The first stage is concerned with the detailed "planning of manpower requirements for all types and levels of employees throughout the period of the plan", and the second stage is concerned with "planning of manpower supplies to provide the organization with the right types of people from all sources to meet the planed requirements".

Manpower planning is the process (including forecasting, developing, implementing and controlling) by which a firm insures that it has the right kind of people, the right places, at the right time, doing things for which they are economically most useful.

Manpower planning examines the gap between staff availabilities (Internal and external to the organization) and staffing requirement (to perform tasks in the organization) over time and prescribes courses, of action to narrow such a gap.

MANPOWER PLANNING (MPP)

Planning for manpower resources is a major managerial responsibility in today's industrial economies. In earlier stages of economic development, quantities of manpower available were frequently in excess of needs or demands, and few special qualifications required consideration. In earlier and more agricultural economies, manpower resources took care of themselves. In transitional stages toward industrialization, financial resources are likely to be critical. In modern, industrialized nations, with rapid technological change and persistent demands for higher and higher levels of skill, manpower planning has achieved a high priority.

FACTORS INFLUENCING THE MANPOWER PLANNING

Internal Environment Factors

    a.   Top Management support and acceptability.

    b.   Changes in the company policy

    c.   Layout of equipment.

    d.   Changes in workers working-nature.

    e.   Changes in the method of work.

External Environment Factors

    i.   Social Factors

        a.   Labour supply and demand

        b.   Local and regional unemployment trends.

        c.   Competitors activities

        d.   Sources of manpower through present employees

OBJECTIVES OF MAN POWER PLANNING

The objectives of (MPP) are

1. To ensure optimum use of human resources currently employed.

2. To assess or forecast future skills requirements if the organizations overall objectives are to be achieved.

3. To provide control measures to ensure that the necessary resources are available as and when required.

4. To determine recruitment level.

5. To anticipate redundancies and avoid unnecessary dismissals.

6. To determine optimum training levels.

7. To provide a basis for management development programs.

8. To assess future accommodation requirements.

CHAPTER - V

FUNCTIONAL JOB ANALYSIS

Operational Definitions

Functional Job Analysis

Functional job analysis is a label given to an approach to job analysis developed by Department of labour in wagner paper act of 1935.

Functional Job Analysis is a job-oriented system that is based on a systematically articulated theory of jobs and people. The primary elements in the Functional Job Analysis conceptual system are the following.

1.   A fundamental distinction must be made between what works to be done and how workers do to get things done.

2.   What workers do, in so far as their job content is concerned, they do in relation to three primitives: things, data and people.

3.   In relation to each primitive, workers function in unique ways. Thus, in relation to things, workers draw on physical resources: in relation to data, on mental resources; and in relation to people, on interpersonal resources.

6.   Human performance is conceived as involving three types of skills : adaptive, functional and specific content.

In functional job analysis there are three different types of scales are used

1.   Data Functional scale

2.   People Functional scale

3.   Things Functional Scale

I. Data Functions Scale

1.   Comparing
2.   Copying
3.   Computing
4.   Compiling
5.   Analysing
6.   Innovating
7.   Co-Ordinating

II. People Functional Scale

1.   Taking instructions / Replying
2.   Exchange of information
3.   Coaching
4.   Persuading
5.   Consulting
6.   Instructing
7.   Supervising
8.   Negotiating

III.   Things functional scale

1.   Handling
2.   Feeding / Off Bearing
3.   Tending
4.   Manipulating
5.   Operating / Controlling
6.   Driving / Controlling
7.   Starting up
8.   Precision work
9.   Setting up

EXPLANATIONS

DATA FUNCTIONAL SCALE

1.   Comparing

Judging the readily observable functional, structural or compositional characteristics are similar to divergent from prescribed standard of data. (Ex) Check the Oil level, tyre pressure, observe hand signal of workers indicating movement of load.

2.   Copying

(Ex) Recording various meters reading.

3. Computing

Performs arithmetic operations to arrive at an answer by simple arithmetic means. (Ex) writing or making a report of the vehicles at the end of each shift.

4. Compiling

Gathers, Collects or classifies information about data following a specific system by using description in application. (Ex) Compiling the data with crane operations.

5. Analyzing

Examines and evaluates data with reference to standards (Ex) To examine a machine in which oil pressure is not shooting up.

Things functional scale

1. Handling

It includes works cuts, shapes, assembles, digs, moves or carriers object or materials. (Ex) A worker assembling bolt and nut.

2. Feeding / Off Bearing

It means an operator placing the container on the prime mover.

3. Tending

It is defined as functioning of machines and equipments (Ex) Adjusting the brakes during daily check.

4. Manipulating

5. Co-ordinating

Decide time, places, and sequence of operations of a process or system based on the analysis of data. (Ex) For every break down the vehicle is drawn to the service station for repair and at the same times, the driver is offered an another vehicle to continue his work.

People Functional scale

The people scale measures live intraction among people, communication and interpersonal actions.

1. Taking instructions

A worker attend work assignment instructions with his supervisor. (Ex) A worker taking instruction about his job.

2. Exchange of information

A worker talks to, converses with or signals people to convey or obtain information or to clarify and work out details of and assignment with in the frame work of well establised procedures. (Ex) A worker clarifying his doubts about the information given by the supervisor or clarifications of doubts through communication system.

3. Coaching

A supervisor giving instruction, advises and personal assistance concerning activities of daily living and the use of various institutional services. (Ex) Providing technical help and encouragement to the apprentice on the job.

4. Consulting

Serves as a sources of gaining technical knowledge, clarify doubts about the job. (Ex) Workers consulting the supervisors about the doubt in his job.

5. Instructing

A worker demonstrates to others or train other through explanations

(Ex) A worker performing demonstration on his job to the students who visit the industry as

(Ex) Fixing the tool on a lathe for an operation.

5. Starting up

Some equipments follow standard procedures to start up an engine and allow warming up and pressure building up is involved.

6. Precision work

Using body members or tools or work aids to work, move, guide or place objects or materials in situations where ultimate responsibility for the attainment of standards occur and selection of appropriate tools, objects, or materials and the adjustment of the tool to the task require exercise of considerable judgment. (Ex) Locking of the container through the main hoist.

CHAPTER - VI

<u>METHODOLOGY</u>

1.   Pilot Study

2.   Questionnaire

3.   Sampling

4.   Statistical Analysis

The study consists of two broad dimensions. The first relates to job related aspects while the second relates to manpower planning.

Pilot Study

All the sections were visited and some time was spent in talking to the workers to gain some knowledge about their work.

All the 16 sections were divided into 4 major divisions like Mechanical, Electrical, Operators, Planning and Development based on similarities of the jobs. Four types of questionnaire were developed for the four divisions.

Questionnaire

Two questionnaire were designed one for the workers and the other for the supervisors. Each of the questionnaires is differentiated on the basis of the field of work of the respondents like Mechanical, Electrical, Operators, Planning and Development.

Considerable number of workers were selected from each of the section. Most of the questions were close ended. In case of a few open ended questions, the form for extracting responses was quit similar to that of the close ended questionnaire.

ANALYSIS OF THE QUESTIONNAIRE

The questionary has got 3 broad areas they are related to

1.   Understand the Job Analysis in order to determine if there is any discrepancy as far as time spent on the activities of the job is concerned.

2.   Understand the composition of skill, knowledge and physical abilities of the job as discerned by supervisors and workers.

Time-spent analysis

One of the most important variables in job analysis is the time-spent by the worker on his job.

Sampling Technique

In a container terminal berth all the sixteen section were divided by 4 Major areas they are

1.   Mechanical Section
2.   Electrical Section
3.   Operators Section
4.   Planning and development section.

CHAPTER - VII

SAMPLING

Definition

A finite subset of statistical individual in a population is called sample. This Technique is called sampling.

TEST OF SIGNIFICANCE

To know the significant difference between two means test of significant (T - TEST) concept is used.

A very important aspect of sampling theory is to study the test of significant which enable us to decide on the basis of the sample result if

i.   The deviation between the sample value is significant

ii.   the deviation between the two sample static is significant.

FORMULA USED

To test the significant difference between two means x1 and x2 with sample size n1, n2 respectively.

The 't' statistics is

$$t \ at \quad = \quad \frac{x1 - x2}{S\sqrt{\dfrac{1}{n1} + \dfrac{1}{n2}}}$$

x1 = Supervisor Mean

x2 = Worker Mean

S = Standard deviation

n1 = Supervisor Size (4 nos)

n2 = Workers Size (40 nos)

From the sampling table the significant value at 5% level of significance are

t < 1.96 (at 5% level of significance), the t value is rejected.

t > 1.96 (at 5% level of significance), the t value is accepted.

CHAPTER - VIII

MODEL CALCULATION

i.   By the use of 't' test formula the significance between the two sample required to complete the activities of job were identified to the areas viz.

1.   Prime Mover (Electrical)

2.   Prime Mover (Mechanical)

3.   Planning and Development

4.   Vehicle Drivers

i.   **PRIME MOVER (ELECTRICAL)**

$$t = \frac{x1 - x2}{s\sqrt{\frac{1}{n1} + \frac{1}{n2}}}$$

$$t = \frac{2.25 - 2.65}{0.52}$$

t = .76

t = 0.76 < 1.96

Section :- 2

Prime Mover - Mechanical

$$t = \frac{1.25 - 2.85}{0.52}$$

Section :- 3

Planning and Development

$$t = \frac{2.52 - 3.61}{0.52}$$

$$t = 2.09 > 1.96$$

t value is rejected

Section :- 4

Vehicle Drivers

$$t = \frac{2.20 - 3.52}{0.52}$$

$$t = 2.42 > 1.96 \text{ (Difference)}$$

Where

X_1 = Supervisors Mean

X_2 = Workers Mean

S = Standard Deviation

From the sampling table assume $S = 1$

n_1 = Supervisors Size (4 Nos)

n_2 = Workers Size (40 Nos)

TABLE-2 TIME REQUIRED TO COMPLETE THE ACTIVITIES OF THE JOB

SECTION : Prime Mover - Electrical

SAMPLE SIZE DETAILS :

supervisors : 4 nos.

workers : 40 nos. All the mean scroes are in minutes

Sl. No.	Activities	Supervisor Mean	Worker Mean	t-Values
1.	Check the meter reading	2.25	2.65	- 0.76
2.	Check the Battery charging	2.23	2.12	- 0.21
3.	Check the fled lights	2.20	2.50	- 0.57
4.	Check the gantry meters reading	1.92	2.50	- 1.10
5.	Check the cooling of AC plants	1.78	2.12	- 0.84
6.	Check the spreader functions	2.23	2.78	- 1.05
7.	Check the operations of terminal connections	1.78	2.23	- 1.01
8.	Check the carbon brushes of generator/motors	2.34	2.67	- 0.38
9.	Check and clean all the Contractors and Relays	2.12	2.45	- 0.63
10.	Check the tightness of all electronics cards	1.67	1.68	- 0.01
11.	Check and clean the limit switches	1.89	2.23	- 0.65
12.	Check all the drives and break connections	1.45	1.56	- 0.21
13.	Check all the resistance panels	1.89	2.12	- 0.25
14.	Consultation leads to unproductive time	2.23	2.23	- 0.17
15.	**Analyzing the break down**	2.32	3.51	**- 2.28 ***
16.	Decision making is required	2.56	2.56	0
17.	Knowledge of routing is required	3.12	3.45	- 0.26
18.	Technical consultation required	2.62	2.62	0
19.	Precision work is required	2.62	2.87	- 0.48
20.	Transportation of spare to the works place	2.66	2.37	- 0.21

*(significant at 5%)

Activity No. 19

Skilled workers are required to complete the work such as making electrical wire connections in tractor. Unskilled workers are doing these type of precise works. Hence, the time involved in completing these works can be reduced by allocating the same to skilled workers.

PRIME MOVERS (ELECTRICAL)

Based on the pilot study, 20 of the activities were taken into consideration for the study. From the table 2 it is observed that the mean scores of the supervisors are slightly different from the workers. However t-values do not significantly differ individually. Expecting the case of.

Activity no. 15

It indicates that supervisors and workers differ in their perception about the time taken by the worker on his job. For instance it was noticed that there was lack of knowledge and skill in identifying the cause of the breakdown.

TABLE -3 TIME REQUIRED TO COMPLETE THE ACTIVITIES OF THE JOB

SECTION : Prime Mover - Mechanical

SAMPLE SIZE DETAILS :

supervisors   :   4 nos.

workers   :   40 nos.   All the mean scroes are in minutes

Sl. No.	Activities	Supervisor Mean	Worker Mean	t-Values
1.	Check daily schedule	1.25	2.85	- 3.07
2.	Record the various meter readings	1.54	2.30	- 1.46
3.	Check for loose bolts and nuts	2.10	2.27	- 0.30
4.	Clean the filters, fans, rings, Engine etc.	2.12	2.25	- 0.25
5.	Greasing and lubrication of all parts	2.50	2.25	0.48
6.	Assemble wheels, pulleys, ropes etc.	2.00	2.25	- 0.48
7.	Check for abnormal sound in the system	2.12	2.62	- 0.96
8.	Change oil, water, etc.	2.50	2.75	- 0.48
9.	Replace damaged bolts, nuts, etc.	2.32	2.50	- 0.34
10.	Check the oil, water, temperature air pressure	2.75	3.00	- 0.48
11.	Inspect frequently engine conditions	2.32	3.41	**2.09 ***
12.	Inspect for an external damage	2.25	3.53	**- 2.45 ***
13.	Check the functioning of all Brakes	2.25	2.50	- 0.48
14.	Check the condition of the tyres	2.37	2.62	- 0.52
15.	Analysing the break down	2.25	2.62	- 0.71
16.	Discussion is required	2.75	3.82	**- 2.01 ***
17.	Technical consultation is required	3.00	3.37	**- 0.71**
18.	Decision work is required	2.75	3.87	**- 2.15 ***
19.	Precision work is required	2.85	3.92	**- 2.05 ***
20.	Transportation of spares to the works place	4.12	4.62	- 0.96

* (Significant at 5 %)

Prime Movers (Mechanical)

Based on the pilot study, 20 of the activities were taken into consideration for the study. From the table 3 it is observed that the mean scores of the supervisor are slightly different from the workers. It indicates that the supervisors and workers differ in their perception about the time taken by worker. Expecting the case of.

Activity No.1

Each of the vehicles differ by its condition. There are few vehicles which take short time for daily checking while the others take a long time.

Activity No.11

To inspect the engine conditions the worker is suppose to go to the machinery. Some times he feels lazy to go or he takes a long time to go. It is better if the work place is very close to the machinery.

Activity No. 12

Though check for external damage is suppose to be done daily, workers overlook it because it does not affect the running of the vehicle or machinery.

Activity No. 16

Discussions are suppose to be made with their colleagues about their job, instead it was noticed that some of the workers spent more time in discussing their personal matters.

Activity No. 18

Though he is given powers to make decisions on his job, he is still waits for his supervisor to get consultation. Some of his productive time is wasted on account of this delay.

TABLE- 4 TIME REQUIRED TO COMPLETE THE ACTIVITIES OF THE JOB

SECTION : Planning and Development

SAMPLE SIZE DETAILS :

supervisors   :   4 nos.

workers   :   40 nos.   All the mean scroes are in minutes

Sl. No.	Activities	Supervisor Mean	Worker Mean	t-Values
1.	Work involves arithmetic operations	3.75	3.75	0
2.	Work involves computing machines	4.25	4.32	- 0.13
3.	Handles information both digital and analog	2.52	3.61	**- 2.09 ***
4.	Stores information regarding employees and equipment's	3.51	3.25	- 0.50
5.	Planning in areas where development is needed	3.12	2.63	0.94
6.	Designes formats for container transactions	3.64	3.54	0.19
7.	Designs formats for employees details	3.62	2.96	1.26
8.	Keep a record of daily status	2.75	2.50	0.48
9.	Decision making is required for some works	3.52	2.87	1.25
10.	Keep a track of latest development	2.54	2.84	- 0.59

* (Significant at 5 %)

PLANNING AND DEVELOPMENT

Based on the pilot study, 10 of the activities were taken into consideration.   From the table 4 it is observed that the mean scores of the supervisors are sightly different from the workers.

Activity No. 3

it is seen that people do not follow standard procedures in their work. (Ex) an operator opening a file from the floppy without scanning for virus.

TABLE - 5 TIME REQUIRED TO COMPLETE THE ACTIVITIES OF THE JOB

SECTION : Vehicle Drivers

SAMPLE SIZE DETAILS :

supervisors   :   4 nos.

workers   :   40 nos.   All the mean scroes are in minutes

Sl. No.	Activities	Supervisor Mean	Worker Mean	t-Values
1.	Transport of containers	2.20	3.52	- 2.42 *
2.	Positioning the vehicle for loading and unloading	3.52	4.31	- 2.69 *
3.	Good driving skills	1.48	2.62	- 2.00 *
4.	Locate the particular crane in the yard	2.65	3.72	- 2.09 *
5.	Report to the controls for work allocation	3.17	4.31	- 2.19 *
6.	Prepare the long sheet along the defects in the vehicle	2.89	3.92	- 3.98 *
7.	Understand the signals of the operator and tally	1.45	3.25	- 3.46 *
8.	Good ability to manage at the turning parts	3.85	4.92	- 2.01 *
9.	Concentration needed to work in third shift	3.80	4.90	- 2.11 *
10.	Keep a track of latest improvement	3.80	4.91	- 2.13 *

* (Significant at 5 %)

VEHICLE DRIVERS

Based on the pilot study, 10 of the activities were taken into considerations. From the table 5 it was observed that all the mean scores of the supervisors are slightly different from the workers. However, t-values differ significantly, in all.

One of the most important aspect of this section is that supervisors does not have his hands on driving the existing vehicle. Hence his perception could be because of the past experience.

Activity no.1

Transportation of containers depends on the distance of the Transfer crane and Quay crane. If the operator is posted to they Quay crane which is close to the transfer crane. Then he takes less time to transport containers and if he is posted to the Quay crane which is far from the Transfer crane, then he will take more time to transport the containers. Hence, this can cause differences in time.

Activity no.2

Positioning of the vehicle depends on the availability of the vacant space in the container packing yard. If the yard is packed with containers it takes a long time to position the vehicle. Some sort of skill is also needed to position the vehicle because the containers have to be locked with the vehicle. Hence, driver is suppose to be skilled.

Activity no.3 good driving skills are necessary to drive the vehicle but still workers feel that with average skill is sufficient to manage and can be improved in the long run.

Activity no.4 since all Transfer cranes are of the same type hence, while loading and unloading operations the driver is suppose

Activity no.3

Good driving skills are necessary to drive the vehicle. Still workers feel that average skill is sufficient to manage. And it can be improved in the long run if necessary.

Activity no.4

Since all the transfer cranes are of same size and type. The drivers find it difficult to locate their cranes. The driver may be asked to undergo training to have knowledge of container packing yard and to identity their cranes so as to eliminate the deviation. The deviation indicates that more time taken to handle loading / unloading by the by the workers. Normally, the transportation of containers depends on the distance between transfer crane and quay crane. The time can be minimized if they are posted to quay crane which would have been arranged nearer to transfer crane.

Activity no.5

This is suppose to be the first activity in their job for each shifts. It is noticed that most of the workers arrive late to their work and miss the work allocation.

Hence, the workers are forced to go to the control room to see their work allocation in the chart displayed in the control room.

Activity no.6

Since it takes some time for the workers to write a report about the status of the vehicle every day. Usually workers run home after their shift ends. Hence, they do not spent time in writing the reports.

Activity no.7.

Since the driver is seated in a closed cabin he cannot hear any message or information told by the tally man. Hence the drive and the tally man are forced to use non-verbal communication.

Since each of the tally man has its own style on his non verbal communication, is not possible for the driver to understand all the signs or signals of the tally man.

Activity no.8

Since all the drivers are not skilled, the time taken for this activity differs.

Activity no.9

The driver who is posted on third shift is supposed to be on rest during the day but some of the drivers get themselves engaged in their personal work during the day. They have lot of strains due to their act during the day.

Activity no.10

Usually when there is a break down in the vehicle, the drivers are supposed to inspect the vehicle to find the cause of the breakdown. If it is a minor repair they are suppose to attend to it and they continue their work with the same vehicle. Some of the drivers feel that it is not their job to rectify the vehicle and they bring the vehicle to the service station.

TABLE- 6 COMPOSITION OF ACTIVITIES

SECTION : Prime Mover - Electrical

SAMPLE SIZE DETAILS :

supervisors   :   All

workers   :   All   All the scroes are in Percentages

Sl. No.	Activities	Skill	Knowledge	Physical Abilities
1.	Check the meters reading	50	30	20
2.	Check the Battery charging	50	30	40
3.	Check the fled lights	30	20	50
4.	Check the gantry meters reading	40	25	25
5.	Check the cooling of AC plants	50	25	25
6.	Check the spreader functions	50	30	20
7.	Check the operations of terminal connections	60	20	20
8.	Check the carbon brushes of generator/motors	60	30	10
9.	Check and clean all the Contractors and Relays	20	20	50
10.	Check the tightness of all electronics cards	50	25	25
11.	Check and clean the limit switches	45	30	45
12.	Check all the drive and break connections	50	35	25
13.	Check all the resistance panels	50	30	20
14.	Consultation leads to unproductive time	40	40	20
15.	Analyzing the break down	30	60	4
16.	Decision making is required	50	50	-
17.	Knowledge of routing is required	50	50	-
18.	Technical Consultation is required	40	45	15
19.	Precision work is required	50	30	15
20.	Transportation of spare to the work place	30	15	50

JOB COMPOSITION ANALYSIS

For each of the activities it is considered essential to determine the skill, knowledge and physical ability components.

This will enable the management to understand the requirements that they need to have in the workers job.

Section 1 : Prime Movers (Electrical)

From the table 6 the activities requiring skill component are identified as follows

(i) PME2 (ii) PME5, (iii) PME6, (iii) PME7, (iii) PME8, (iii) PME9.

The activities requiring knowledge component

(i) PME15 (ii) PME16, (iii) PME17

The activities requiring physical ability component

(i) PME3 (iii PME9 (iii) PME20

TABLE - 7 COMPOSITION OF ACTIVITIES
SECTION : Prime Mover - Mechanical

SAMPLE SIZE DETAILS :

supervisors   :   All

workers   :   All   All the scroes are in Percentages

Sl. No.	Activities	Skill	Knowledge	Physical Abilities
1.	Check daily shedule	45	25	25
2.	Record the various meter readings	45	40	15
3.	Check for loose bolts and nuts	30	30	40
4.	Clean the filters, fans, rings, & Engine	25	30	40
5.	Greasing and lubrication of all parts	40	30	25
6.	Assemble wheels, pulleys, ropes etc.	30	30	35
7.	Check for abnormal sound in the system	50	45	15
8.	Change oil, water, etc.	35	30	35
9.	Replace damaged bolts, nuts, etc.	40	25	30
10.	Check the oil, water, and temperature	50	30	10
11.	Inspect frequently engine conditions	60	35	5
12.	Inspect for an external damage	40	35	25
13.	Check the functioning of all Brakes	40	30	40
14.	Check the condition of the tyres	35	50	10
15.	Analysing the break down	50	45	5
16.	Discussion is required	40	45	10
17.	Technical consultation is required	35	50	15
18.	Decision making is required	50	50	0
19.	Precision work is required	60	30	5
20.	Transportation of spares to the work place	30	25	40

Section 2 : Prime Movers (Mechanical)

From the table 7 the activities requiring skill component are identified as follows:

(i)PM10, (ii) PM11, (iii) PME15, (iv) PME19,

The activities requiring knowledge component are identified as follows

(i) PM18, (ii) PM14, (iii) PM17

The activities requiring physical ability component are identified as follows

(i) PM4, (ii) PM20

TABLE- 8 COMPOSITION OF ACTIVITIES

SECTION : Planning and Development

SAMPLE SIZE DETAILS :

supervisors   :   All

workers   :   All   All the scroes are in Percentages

Sl. No.	Activities	Skill	Knowledge	Physical Abilities
1.	Work involves arithmetic operations	30	60	0
2.	Work involves computing machines	60	40	5
3.	Handles information both digital and analog	45	55	10
4.	Stores information regarding employees and equipment	50	50	0
5.	Planning in areas where development is needed	30	50	0
6.	Design formats for container transactions	60	60	0
7.	Design formats for employees details	40	40	0
8.	Keep a record of daily status	60	60	0
9.	Decision making is required for some works	60	30	5
10.	Keep a track of latest development	40	50	0

Section 3 : Planning and Development

From the table 8 activities requiring skill component are identified as follows:

The activities requiring skill component are identified as follows

(i) PD2, (ii) PD4, (iii) PD6, (iv) PD8, (v) PD9

The activities requiring knowledge component are identified as follows

(i)PD1, (ii) PD3, (iii) PD5

There is no physical ability component.

TABLE- 9 COMPOSITION OF ACTIVITIES

SECTION : Vehicle Drivers

SAMPLE SIZE DETAILS :

supervisors : All

workers : All   All the scroes are in Percentages

Sl. No.	Activities	Skill	Know-ledge	Physical Abilities
1.	Transport of containers	35	30	35
2.	Positioning the vehicle for loading and Unloading	60	25	15
3.	Good driving skills	45	40	10
4.	Locate the particular crane in the yard	45	20	30
5.	Report to the controls for work allocation	40	25	30
6.	Prepare the log sheet along the defects in the vehicle	40	20	35
7.	Understand the signals of the operator and tally	40	25	20
8.	Good ability to manual at the turning parts	50	25	20
9.	concerntration needed to work in third shift	50	10	45
10.	To handle minor break downs	45	20	25

Section 4 : Vehicle Drivers

From the table 9 activities requiring skill component are identified as follows:

(i) PVD2, (ii) PVD8, (iii) PVD9, (iv) PVD10

The activities requiring knowledge component are identified as follows

(i) PVD1, (ii) (iii) PVD3

The activities requiring physical ability component are identified as follows

(i) PVD5, (ii) PVD6, (iii) PVD7, (iv) PVD10

FUNCTIONAL JOB ANALYSIS

Functional job analysis was applied in each of the section and the nature of work was surveyed on three dimension namely data, people and things.

Prime Movers (Electrical)

From the table 10, it was observed that the means scores are different between the workers and the supervisors.

Prime Movers (Mechanical)

From the table, 11 it was observed that the mean scores are different between the supervisors and workers.

TABLE - 10 FUNTIONAL JOB ANALYSIS

SECTION : Prime movers (Electrical)

SAMPLE SIZE DETAILS :

supervisors : 4 nos.

workers : 40 nos. All the mean scroes are in minutes

DATA RELATED ASPECTS

Sl. No.	Activities	Supervisor Mean	Worker Mean	t-Values
1.	Comparing	2.45	2.88	- 0.82
2.	Copying	2.33	2.88	- 1.05
3.	Computing	1.55	1.55	0
4.	Compiling	1.56	1.56	0
5.	Analyzing	3.20	3.77	- 1.09
6.	Innovating	1.66	1.66	0
7.	Coordinating	3.44	3.66	- 0.42
8.	Synthesizing	1.55	1.55	0

PEOPLE RELATED ASPECTS

Sl. No.	Activities	Supervisor Mean	Worker Mean	t-Values
1.	Taking instructions/ Replaying	3.44	3.55	- 0.11
2.	Exchanging information	2.66	2.77	- 0.21
3.	Coaching	2.88	3.00	- 0.23
4.	Persuading	1.33	1.33	0
5.	Consulting	2.66	2.88	- 1.18
6.	Instructing	1.66	1.77	- 0.21
7.	Supervising	2.44	2.44	0
8.	Negotiating	2.33	2.33	0
9.	Mentoring	2.50	2.50	0

THINGS RELATED ASPECTS

Sl. No.	Activities	Supervisor Mean	Worker Mean	t-Values
1.	Handling	3.22	3.44	- 0.42
2.	Feeding / off bearing	1.77	1.77	0
3.	Tending	2.00	2.11	- 0.19
4.	Manipulating	3.00	3.00	0
5.	Operating / Controlling	2.56	2.56	0
6.	Driving / Controlling	1.45	1.45	0
7.	Starting up	1.76	1.76	0
8.	Precision working	2.52	2.52	0
9.	Setting up	1.88	1.88	0

* (Significant at 5 %)

TABLE - 11 FUNTIONAL JOB ANALYSIS

SECTION : Prime movers (Mechanical)

SAMPLE SIZE DETAILS :

supervisors : 4 nos.

workers : 40 nos. All the mean scroes are in minutes

DATA RELATED ASPECTS

Sl. No.	Activities	Supervisor Mean	Worker Mean	t-Values
1.	Comparing	2.25	2.75	-0.96
2.	Copying	1.37	2.00	-1.21
3.	Computing	1.62	1.75	-0.25
4.	Compiling	1.37	1.37	0
5.	Analyzing	2.75	2.75	0
6.	Innovating	1.50	1.37	0.25
7.	Coordinating	2.12	3.12	-1.92
8.	Synthesizing	1.50	1.50	0

PEOPLE RELATED ASPECTS

Sl. No.	Activities	Supervisor Mean	Worker Mean	t-Values
1.	Taking instructions/ Replaying	2.75	3.00	- 0.48
2.	Exchanging information	2.50	2.75	- 0.48
3.	Coaching	2.00	2.12	- 0.23
4.	Persuading	1.25	1.50	- 0.48
5.	Consulting	2.25	2.25	0
6.	Instructing	2.37	2.87	- 0.96
7.	Supervising	1.87	2.00	- 0.25
8.	Negotiating	1.87	2.25	- 0.73
9.	Monitoring	1.25	1.50	- 0.48

THINGS RELATED ASPECTS

Sl. No.	Activities	Supervisor Mean	Worker Mean	t-Values
1.	Handling	2.87	3.25	- 0.73
2.	Feeding / off bearing	1.82	1.87	- 0.09
3.	Tending	2.00	2.50	- 0.96
4.	Manipulating	2.50	2.75	- 0.48
5.	Operating / Controlling	2.37	2.50	- 0.23
6.	Driving / Controlling	2.37	2.37	0
7.	Starting up	1.62	1.62	0
8.	Precision working	2.87	3.50	- 1.21
9.	Setting up	1.37	1.37	0

* (Significant at 5 %)

TABLE - 12 FUNTIONAL JOB ANALYSIS

SECTION : (Planning and Development)

SAMPLE SIZE DETAILS :

supervisors : 4 nos.

workers : 40 nos. All the mean scroes are in minutes

DATA RELATED ASPECTS

Sl. No.	Activities	Supervisor Mean	Worker Mean	t-Values
1.	Comparing	1.00	1.00	0
2.	Copying	1.34	1.34	0
3.	Computing	1.27	1.27	0
4.	Compiling	1.34	2.50	- 2.23
5.	Analyzing	2.48	2.75	- 0.51
6.	Innovating	1.24	1.24	0
7.	Coordinating	4.50	4.50	0
8.	Synthesizing	1.00	1.00	0

PEOPLE RELATED ASPECTS

Sl. No.	Activities	Supervisor Mean	Worker Mean	t-Values
1.	Taking instructions/ Replaying	3.40	3.40	0
2.	Exchanging information	3.20	3.24	- 0.07
3.	Coaching	1.44	1.47	- 0.05
4.	Persuading	1.10	1.10	0
5.	Consulting	2.73	3.80	- 2.05
6.	Instructing	1.65	1.65	0
7.	Supervising	1.45	1.45	0
8.	Negotiating	1.25	1.26	- 0.01
9.	Mentoring	1.30	1.30	0

THINGS RELATED ASPECTS

Sl. No.	Activities	Supervisor Mean	Worker Mean	t-Values
1.	Handling	3.34	3.44	- 0.19
2.	Feeding / off bearing	2.45	3.50	- 2.01
3.	Tending	1.34	1.41	- 0.13
4.	Manipulating	1.37	1.55	- 0.34
5.	Operating / Controlling	3.03	3.13	- 0.19
6.	Driving / Controlling	3.24	3.34	- 0.19
7.	Starting up	1.17	1.48	- 0.59
8.	Precision working	1.58	1.75	- 0.32
9.	Setting up	1.34	1.37	- 0.05

* (Significant at 5 %)

TABLE - 13 FUNTIONAL JOB ANALYSIS

SECTION : Vehicle Drivers

SAMPLE SIZE DETAILS :

supervisors : 4 nos.

workers : 40 nos.   All the mean scroes are in minutes

DATA RELATED ASPECTS

Sl. No.	Activities	Supervisor Mean	Worker Mean	t-Values
1.	Comparing	1.00	1.00	0
2.	Copying	1.34	1.34	0
3.	Computing	1.27	1.27	0
4.	Compiling	2.46	3.50	**- 2.00 ***
5.	Analyzing	1.34	2.50	**- 2.23 ***
6.	Innovating	4.50	4.50	0
7.	Coordinating	1.20	2.30	**- 2.11 ***
8.	Synthesizing	1.00	1.00	0

PEOPLE RELATED ASPECTS

Sl. No.	Activities	Supervisor Mean	Worker Mean	t-Values
1.	Taking instructions/ Replaying	3.44	3.44	0
2.	Exchanging information	2.70	3.80	**- 2.11 ***
3.	Coaching	1.44	1.48	- 0.07
4.	Persuading	1.17	1.17	0
5.	Consulting	3.20	3.24	- 0.07
6.	Instructing	1.65	2.70	**- 2.01 ***
7.	Supervising	1.44	1.62	- 0.34
8.	Negotiating	1.24	1.24	0
9.	Mentoring	1.34	1.24	0.19

THINGS RELATED ASPECTS

Sl. No.	Activities	Supervisor Mean	Worker Mean	t-Values
1.	Handling	3.35	3.35	0
2.	Feeding / off bearing	2.58	3.60	**- 1.97 ***
3.	Tending	1.34	1.41	- 0.13
4.	Manipulating	1.37	1.55	- 0.40
5.	Operating / Controlling	3.03	3.13	- 0.19
6.	Driving / Controlling	3.24	3.34	- 0.19
7.	Starting up	1.17	1.48	- 0.59
8.	Precision working	1.58	1.75	- 0.32
9.	Setting up	1.34	1.37	- 0.05

* (Significant at 5 %)

Planning and Development

From the table 13, it is observed that there is a significant different in two of the aspects. It indicates that the supervisors and workers differ in their perceptions of composition of variables in the workers jobs.

Vehicle Drivers

It is observed that the mean scores are different between the workers and supervisors and some of the variables were also found to be significant. This indicates that the supervisor and workers differ in their perception of composition of variables in the workers job.

VD5 (Analyzing)

It is noticed that the driver analyzes the weight of containers with respect to the speed of vehicle. He also analyses the type of turns at the turning points. Difference may occur on the type of load on the container.

VD7 (coordinating)

The driver is suppose to coordinate along with the Transfer crane for the positioning of the vehicle. It depends on the arrangements of the containers in the container packing yard.

VD2 (exchanging information)

It is noticed that some of the drivers understand the signals of the tally man and carry out the activities while some, take time to understand the signals.

VD6 (Instructing)

It is noticed that a driver instructs the other traffic equipment operators in the yard while at work, especially during bottle necks.

VD (feeding / off bearing)

Feeding the container is done through Transfer crane and Quay crane, as container comes in two sizes namely 20 ft. and 40 ft. And the capacity of the prime movers is restricted to 40 ft. Hence while feeding the containers in the prime mover, the care should be taken to see that either two of the 20 ft. containers or one 40 ft. container is placed in the prime mover. If any change occurs in the sequence it leads to unproductive handling.

CHAPTER -IX

EXISTING SETUP OF THE SERVICE STATION

Existing Setup

The study is made in the Electrical and Mechanical Department of container terminal berth, Service Station forms a Small Section of the Electrical and Mechanical Department. It is divided into two sections namely Electrical Service Station and Mechanical Service Station. At present there are 50 tractor tailors running in the yard. The are used for two main operations.

i. Import (to carry containers from ship to the container packing yard)

ii. Export (to carry containers from ship to the container packing yard).

At present there are 30 crews in the mechanical service station and 15 crews in the electrical service station.

During the export and import operation there are very high chances of were and tear and this can cause break downs. The break downs can be of two types :

i. Electrical break down
ii. Mechanical break down

The 30 crews in the Mechanical Service Station are responsible for service and repair of mechanical break downs while the 15 crews in the Electrical Service Station are responsible for service and repair of electrical break downs. Apart from break downs scheduled maintenance are also done for all the vehicles once in 250 hours of running by the same crews of Electrical and Mechanical Service Station.

Each of the Electrical and Mechanical Service Station is headed by supervisor followed by workers. Their salaries are given below.

MECHANICAL SERVICE STATION (WAGES PER DAY)

 i. Supervisors   390/-

 ii. Workers   370 /-

ELECTRICAL SERVICE STATION (WAGES PER DAY)

 i. Supervisors   390 /-

 ii. Workers   370 /-

The objective of the study

The main objective of the study is to obtain the optimum manpower required for the electrical and mechanical service stations.

TABLE - 14 SERVICE TIME REQUIRED FOR ELECTRICAL BREAKDOWNS

Sl. No.	Types of Breakdown	Service Time (Hrs.)	
		Min.	Max.
1.	Wiper Motor Defect	0.5	1.5
2.	Charging Problem	0.5	1.5
3.	Horn Problem	0.5	1.5
4.	Lighting Problem	0.5	1.5
5.	Starting Problem	1	2

MAN POWER RECOMENDED FOR ELECTRICAL BREAKDOWNS

Sl. No.	Types of Breakdown	Man Power
1.	Wiper Motor Defect	2
2.	Charging Problem	1
3.	Horn Problem	1
4.	Lighting Problem	1
5.	Starting Problem	2

TABLE - 15 SERVICE TIME REQUIRED FOR MECHANICAL BREAKDOWNS

Sl. No.	Types of Breakdown	Service Time (Hrs.)	
		Min.	Max.
1.	Steering defect	1	3
2.	Break defect	1	3
3.	Cooling defect	3	6
4.	Trailer defect	5	10
5.	Engine defect	5	15
6.	Tyre Puncture	2	4
7.	Fuel Injection and Lubrication	6	12

MAN POWER RECOMENDED FOR MECHANICAL BREAKDOWNS

Sl. No.	Types of Breakdown	Man Power
1.	Steering defect	2
2.	Break defect	2
3.	Cooling defect	2
4.	Trailer defect	2
5.	Engine defect	2
6.	Tyre Puncture	2
7.	Fuel Injection and Lubrication	3

RESULTS

Cost of worker : Rs. 370 / Per day

Sl. No.	Details	Electrical Crews (Nos)	Mechani-cal Crews (Nos)	Cost of Electrical Crews Per day (Rs.)	Cost of Mechanical Crews Per day (Rs.)
1.	Present Details	15	30	5550	11,100
2.	Recomended Details	7	15	2590	5550
3.	Reduction Details	8	15	2960	5550

CONCLUSION

The present system of the container terminal berth is analysed in terms of its job related activities .

1. Time spent by the worker on the jobs

2. Job composition in terms of skill, knowledge and physical abilities.

3. Functional job analysis to find the composition of data, people and things related activities.

Conclusion can be drawn to avoid idleness. From the knowledge of the time spent by the worker on his job. As for as the result of job composition is considered, it gives a clear idea that people could be differentiated on their capabilities and allocate jobs according to their capabilities.

BIBLIOGRAPHY

1. Gael Sidney (1998). *The Job Analysis Hand book for Business Industry*, and Government, Vol.II John Wiley and Song. New York.

2. Gael Sidey, (1988). *The job Analysis Hand book for Business Industry*, and Government, Vol.II John Wiley and song, New York.

3. Ghorpade Jai, (1988). *Job Analysis hand book for the Human Resource* Director Prentice Hall, Englewood Cliffs, New Jersey.

4. Davar R.S. (1976). *"Personnel Management and Industrial Relation"*. Vikas Publishing House Pvt Ltd.

5. Dale Yoder (1967), *"Personnel Management and Industrial Relations"*, Prentice Hall of India Pvt. New Delhi.

6. Decenzo D.A. and Robbins S.P. (1998), *Human Resource Management, 6th Edition,* John Wiley and Song New York.

7. Decenzo. D.A. and Robbins S.P. (1997), *Personnel / Human Resource Management,* Prentice Hall of India, New Delhi.

8. Jonathan Casor and Malcom Bennisom (1995) *The Man Power Planning Hand Book,* John Wiley and Sons, New York.

9. *"Project Management"* by Harvey Maylor Cardiff Business School, University of Wales Cardiff. Mac Millian India Limited Publications.