

# Emphasis on Maintenance as Traffic Increasing Every Years -Ports

G. Vara Prasad Babu, M. Pramila Devi



**Abstract:** Maintenance plays a very pivotal role in the availability of the equipment's, by eliminating of failure defects, forestall rapid wear of components, enhance performance level, reduce idle hours due to component malfunctioning, reduces the cost factor by identifying the fatigue in the early stage, by the early stage of detection the wear out can be drastically reduced and maximising the operational efficiency and prevent break down during operational working hours. The proper maintenance schedules yields minimisation of downtime by which the availability of the system improves and extends the useful life of the equipment and safety of the personnel working in the site conditions be secured optimistically. As the loose cargo and container shipments increasing in every years progressively the emphasis in the availability and probability of restoration of a failed equipment to operational effectiveness within a specified period of time, mean time to repair, mean time between failures parameters will certainly increases the customer satisfaction.

**Keywords:** Maintenance, Trade, Maintainability, Reliability, Check Lists.

## I. INTRODUCTION

### A. Maintenance

Maintenance is a continuous process of keeping a particular machine or assets in its normal operating condition so that it can deliver its expected performance or service without causing any loss of time on account of accidental damage or breakdown, the work that is required to be done to keep equipment in a running condition such that it can be utilised to its full designed capacity and efficiency for maximum amount of time.

### B. Principles of Maintenance

To meet the organization goals and objectives certain established principles should be followed which guides the maintenance personals to have a line of command during discharging of their responsibilities. Production /service desires at time oriented completion of goals to accomplish the job in simulated time. Establishing the work order and record systems, parametric series of operations that should be followed for a particular job, the reliable information systems provides the guidelines for optimal complication of a particular job and adhering to planned maintenance systems ensures optimal unitisation of man power and to have a control on the cost factor, time factor, sufficient field data should be planned, quality and spares parts availability is the main key source of the maintenance factors to be implemented for the utmost availability of the equipment's to the organization.

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### C Maintenance evaluation

The maintenance evaluation yields the criteria of availability of the equipment's and lessen the man power utilization to that particular job where overstaffing and understaffing factors can be taken off in to optimal considerations. The evaluation helps in overall performance improvement, reduction in delays, and reduction in equipment down time and improves the preventive maintenance through proper recordings of the reports and job evaluation. The time required for particular job completion should be assessed so that the relevant availability of the spares and sub-assemblies be planned accordingly.

### D Motivation in maintenance

In the motivation of maintenance apprentice training, short range programmes, concurrent training programmes, passive training, and training facilities should be evaluated so that it suits to the organization requirements for job description, job specification and job evaluation by which the job analysis can be performed with full knowledge and with safety measures the job will be completed within the time constraints.

### E Financial Aspects of the Maintenance

The maintenance expenditures should evaluated for the maintenance activities for proper allocation of resources for maintenance throughout the year, hence appropriate budgeting, fixed budget, and variable budgeting techniques should be considered by which preventive vs breakdown maintenance, replacement vs repair, hired vs departmental services, overhaul periods, maintenance in time vs time availability maintenance, cost obsolescence, and control over the cost to various maintenance activities can be evaluated and the budget can be distributed among all the planned and un-planned maintenance jobs.

## II. METHODOLOGY

### A Traffic Increase

As traffic increasing every year whether loose or container cargos, mentioned in table no.3 (state wise traffic handled at non major ports), indicates the importance of availability of the equipment's through proper maintenance strategies.

### B The maintenance factors

The overstaffing and understaffing should be avoided due to the man power involves cost factors, which drastically improves the overall accomplishing of the work. The works planning whether short term or long term should set the standards for different types of works should be pre-planned.

Proper evaluation of maintenance function through indices will yield optimal results.

The effectiveness of maintenance will be reflected in the good housekeeping and better equipment conditions will reduce critical harms to personnel working in the work at heights, and low oxygen level areas.

**C Maintenance teams**

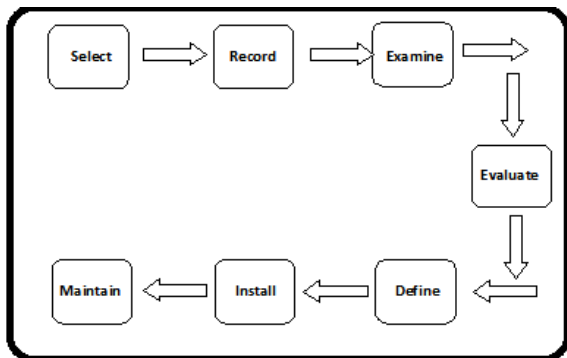
The subdivision of the available man power in to teams plays a crucial role in the maintenance activities.

- general team
- shifts team
- breakdown and shut down team
- lubrication team
- general inspection team
- trainee teams
- semi and unskilled teams.

By identifying the roles of different persons with their capabilities of completion of jobs with minimum down time have to be analysed by the management and to fill the gap by proper training methods to enhance the potential in them.

**D Decision Making In Maintenance**

- In the decision making process we have to
- Select: select the all relevant problems.
- Record: record all the information about the particular job.
- Examine: examine the alternatives available.
- Evaluate: evaluate the best possible alternatives.
- Define: define the given problem solution.
- Install: install the evaluated ideas.
- Maintain: maintain the proper records/log books.



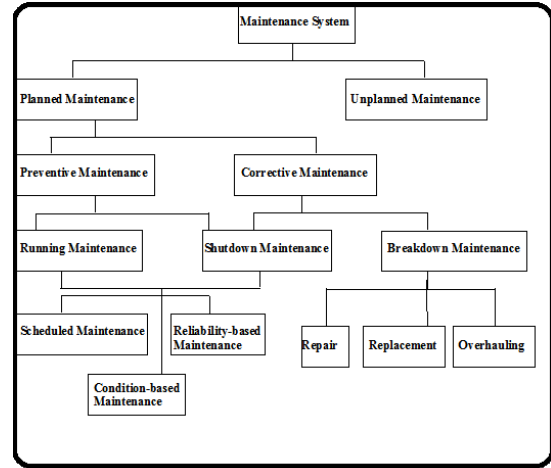
**Figure No.1 Decision Making Process**

- In the decision making process we need to analyse
- identify the priorities and objectives.
- identify the best suitable working methods for optimal completion of job.
- maintaining the data regarding failures
- predicting the external factors which are beyond the reach.

**E Classification of maintenance systems**

The types of maintenance can be classified in to breakdown and planned maintenance. The breakdown maintenance will be carried out effectively with the proper tools and tackles available at the site and with skilled man power resource the down time can be reduced with proper knowledge regarding the equipment's.

The planned maintenance can be performed with the sub-classification as scheduled, preventive, corrective, condition-based, and reliability-centred maintenance. The unplanned maintenance arises from emergency caused by unforeseen damage and accidents.



**Figure No.2 Types of maintenance**

**III. RESULTS AND DISCUSSIONS**

1. The vessel turnaround time will be decreased with proper maintenance schedules.
2. With the proper turnaround time yields optimal customer satisfaction.
3. With the proper customer satisfaction rate the reputation of the organization will rapidly grow.
4. With the positive organizational reputation in the market, market penetration grows higher and business will flourish optimistically.
5. Which further helps in the turnover of the organization and helps in the further expansion of facilities in the organization to meet the competitiveness the global market scenario

**IV. CONCLUSION**

Considering rapid increase in traffic every year, special emphasis should be given to maintenance activities so that the availability of the equipment's will be ensured for proper operational requirements, Safety aspects, quality and environmental issues.

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**Table No.1: State-Wise Traffic Handled At Non-Major Port Source: Indian Ports Association**

YEAR	Gujarat	Maharashtra	Goa	Karnataka	Kerala	Tamil Nadu	Andhra Pradesh	Orissa	Other States#	TOTAL
2016-17	345.739	34.894	0.119	0.691	0.141	1.17	69.611	22.46	10.388	485.213
2015-16	339.779	28.849	0.43	0.835	0.144	0.856	72.732	14.99	7.297	465.912
2014-15	336.093	27.295	0.599	0.651	0.155	0.825	83.418	15.452	6.114	470.602
2013-14	309.946	24.774	0.284	0.503	0.107	0.866	58.938	14.376	7.43	417.224
2012-13	287.817	24.198	3.441	0.61	0.082	0.933	51.999	11.076	7.975	388.131
2011-12	259.03	19.948	14.47	0.59	0.118	1.21	45.63	5.07	7.115	353.181
2010-11	230.907	14.875	14.581	3.095	0.124	1.611	43.269	0.32	6.066	314.848
2009-10	205.54	12.511	13.897	8.545	0.115	1.174	43.624	0.421	2.968	288.8
2008-09	152.814	10.416	11.901	4.968	0.12	0.898	29.735	0.295	2.056	213.2
2007-08	147.6	11.611	12.825	8.899	0.105	0.887	19.291	0.095	2.17	203.483
2006-07	132.44	11.56	14.31	6.56	0.18	0.81	18.61	0.05	1.6	186.12
2005-06	103.2	11.11	11.86	2.44	0.08	0.71	15.09	-	1.04	145.53
2004-05	97.13	12.12	8.46	3.21	0.08	0.85	15.07	-	0.91	137.83
2003-04	89.35	10.33	8.44	1.17	0.05	0.69	10.02	-	0.79	120.84
2002-03	84.12	8.63	5.36	0.68	0.08	0.6	5.01	-	0.69	105.17
2001-02	82.55	4.98	2.9	0.68	0.13	0.53	3.51	0.02	0.97	96.27
2000-01	71.1	6.05	2.78	0.67	0.16	0.38	4.83	0.14	0.79	86.9
1999-00	48.8	5.91	2.02	0.48	0.1	0.41	3.81	0.15	0.67	62.35
1998-99	25.8	5.2	2.17	0.4	0.1	0.47	3.08	0.12	0.72	38.06
1997-98	26.84	4.68	0.37	0.52	0.2	0.27	1.77	0.2	0.57	35.42
1996-97	19.19	2.59	0.06	0.37	0.02	0.03	2.12	0.14	0.41	24.93
1995-96	17.15	3.65	0.06	0.35	-	0.11	2.31	0.17	0.36	24.16
1994-95	16.94	2.45	0.21	0.46	0.2	0.12	1.39	0.2	0.32	22.29
1993-94	13.09	0.65	0.21	0.31	0.1	0.08	1.81	0.21	0.36	16.82
1992-93	10.64	0.3	0.21	0.47	0.13	0.26	1.44	0.21	0.37	14.03
1991-92	8.9	0.53	0.01	0.38	0.13	0.19	1.18	0.15	0.39	11.86
1990-91	7.55	0.93	0.001	0.61	0.13	0.23	1.13	0.06	0.38	11.02