

AN EFFECTIVE MANPOWER PLANNING APPROACH FOR MAINTENANCE DEPARTMENTS: A CASE STUDY OF A COCOA PROCESSING INDUSTRY, ONDO

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ABSTRACT

The level of maintenance activities of a cocoa processing factory in Nigeria was studied. Data on critical machine parts involved in the maintenance work were collected and the different jobs carried out according to sections and nature of the activities were classified. The workloads for each type of maintenance activities were evaluated and the effective manpower requirements were determined. Most of the maintenance activities centre around repetitive jobs in both Mechanical and Electrical sections (69.23%) as against 3.10% for non-repetitive jobs and 27.67% for routine jobs. This calls for concern and a work study is recommended to reduce this. Also there is a short-fall in personnel requirement in both Electrical and Mechanical sections and it is recommended that additional 4 men be employed in respective sections.

KEY WORDS: Maintenance Departments, Routine Jobs, Repetitive Jobs, Non-Repetitive Jobs and Effective Manpower.

INTRODUCTION

The maintenance of engineering facilities which include equipment and infrastructures, constitute a great challenge for industries all over the world. Maintenance refers to all activities which assist in keeping plants and equipment in good working condition (Priel, 1974, Radford, 1984). Therefore, well trained maintenance personnel should be available at all times so that production can continue without interruption. It is imperative that human resources should be carefully planned and utilized (Ronald, et al, 1978). This will provide corporate information on manpower needs over a one year period and possibly over the next five or ten years (Ronald, et al, 1978). Direct labour requirement can be calculated using standard times for manufacture and assembly and it can be adjusted for expected change in operator efficiency. If time standards are not available, labour needs can be estimated from existing planning levels. Planning for manpower is the responsibility of both engineers and personnel managers, and if a departmental manager is to be held responsible for the work in his department, it is only right and proper that he selects whosoever would do the job (Aderoba, 1994).

The final decision as to which applicant should be employed rests entirely on the manager under whom he is going to work (Ubeku, 1975). Effective manpower planning has been receiving attention by researchers. Aderoba and Lawal (1997) developed heuristics based on queuing model, Lindley, (1988) used multi-activity process chart approach and Priel (1974) used maintenance performance ratio approach to determine effective manpower requirements. The objective of this work is to determine effective manpower in the maintenance departments of a cocoa processing industry using workload approach.

METHODOLOGY

Quantitative workload approach for determining the effective manpower requirement

for a cocoa processing industry includes the identification of critical machine parts involved in maintenance work and the classification of the different jobs carried out according to sections and the nature of activities in the Mechanical and Electrical sections. The following assumptions are made:

- (i) Craftsmen in a given section of the department are equally skilled to carry out any maintenance task arising there.
- (ii) The use factor from the survey is 0.70.

ROUTINE JOB ACTIVITIES

Actual time taken for inspection and repair for a part is the sum of time taken divided by the number of times the repairs are done (Priel, 1974). This gives the average adjustment time for the part; that is:

Average time taken for a task = Sum of time taken task//Number of times repair is done.

The workload in routine activities is computed in man-hours. That is; for any activity I, the workload is given as:

Man hours = Average time taken for a task (t) x Frequency of occurrence of planned period (n) x Number of repairmen involved in task (m)

Mathematically, for the two sections being investigated in this research,

$$WL_{ij} = t \times n \times m \dots\dots\dots (1)$$

$$W_R = \sum_{i=1}^R \sum_{j=1}^2 WL_{ij} \dots\dots\dots (2)$$

Where,

WL_{ij} = Workload in average man-hours for an activity i in section j.

$$\sum_{i=1}^R WL_{ij} = \text{cumulative average man-hours.}$$

REPETITIVE JOB ACTIVITIES

Repair time is developed for each job by finding the sum of time taken and dividing by the number of occasions it occurs to arrive at the time for completing the job. This is then multiplied by the frequency of occurrence to arrive at the total time. If there is more than one craftsman on the job, then the effective time will be the number of men who did the repair multiplied by one hour.

For a repetitive job which is concerned primarily with the repair of parts, the parts were arranged in descending order, starting from machine part on which the highest number of man-hours was spends. The percentage total man-hours for the machine was cumulatively added until a sum of at least 80% is reached. All parts constituting this 80% were classified as "A" i.e. machine parts requiring more attention. The cumulative up to 95% of parts (but including 80% of that group A) were classified as the "B" group. The remaining 5% were classified as the group "C". The machine parts in group "C" did not give much problem hence, attention was focused on machine parts in groups 'A' and 'B'. Similar expression for the routine jobs can be written for repetitive jobs as follows:

$$WL_{ij} = t \times n \times m \dots\dots\dots (3)$$

$$W_A = \sum_{i=1}^A \sum_{j=1}^2 WL_{ij} \dots\dots\dots (4)$$

Table 1: List of Parts for which Repair Work was Done, Recorded and Arranged in Descending Order of Percentage Standard – Hours.

| Job description | Frequency | Man-power | Standard time (mins) | Standard man-minutes | Standard man-hours | Cumulative man-hours | Standard man-hours |
|-------------------------------------|-----------|-----------|----------------------|----------------------|--------------------|----------------------|--------------------|
| Beater blade mill | 1440 | 2 | 40 | 115200 | 1920 | 1920 | 9.11 |
| Kibbling machine | 260 | 2 | 170 | 88400 | 1473.33 | 3393.33 | 6.99 |
| Beans cup elevator | 1720 | 2 | 25 | 86000 | 1433.33 | 4826.65 | 6.8 |
| Shell aspirator unit | 230 | 3 | 110 | 75900 | 1265 | 6091.66 | 6 |
| Winower | 1560 | 2 | 20 | 62400 | 1040 | 7131.66 | 4.93 |
| Micronizer | 356 | 2 | 85 | 62050 | 104.17 | 8165.83 | 4.91 |
| Agitated Ball mill | 420 | 1 | 145 | 60900 | 1015 | 8180.83 | 4.82 |
| Powder plant unit | 208 | 2 | 145 | 60230 | 1005.33 | 10186.16 | 4.78 |
| Air compressor | 36 | 1 | 1640 | 59040 | 984 | 11170.16 | 4.67 |
| Nibs screw Conveyor and Elevator | 480 | 1 | 110 | 52800 | 880 | 12050.16 | 4.18 |
| Chiller compressors | 12 | 2 | 2040 | 48960 | 816 | 12866.16 | 4.18 |
| Beans chain conveyor | 104 | 2 | 190 | 39520 | 658.67 | 12534.83 | 3.12 |
| Scale hopper | 560 | 2 | 35 | 39200 | 653.33 | 14178.16 | 3.1 |
| Schule filter | 312 | 1 | 120 | 37440 | 624 | 14802.16 | 3.1 |
| Vacuum mixer | 210 | 2 | 75 | 31500 | 525 | 15327.16 | 2.49 |
| Destoner | 52 | 2 | 285 | 29640 | 494 | 15821.16 | 2.34 |
| Nibs hopper with pneumatic conveyor | 48 | 3 | 200 | 28800 | 480 | 16301.16 | 2.28 |
| Tornado roaster | 156 | 1 | 180 | 28080 | 468 | 16769.16 | 2.22 |
| Boiler | 25 | 1 | 1120 | 2800 | 466.67 | 17235.83 | 2.21 |
| Main transfer conveyor | 114 | 2 | 120 | 27360 | 456 | 17691.83 | 2.16 |
| Air handling unit | 535 | 1 | 50 | 20750 | 445.83 | 18137.66 | 1.88 |
| Power generating set | 12 | 1 | 1980 | 23760 | 396 | 18533 | 1.88 |
| Tempering machine | 2 | 2 | 5760 | 230440 | 384 | 18917.66 | 1.82 |
| Cooler unit | 45 | 4 | 120 | 21600 | 360 | 19277.66 | 1.71 |
| Control switches | 312 | 3 | 20 | 18720 | 312 | 19589.66 | 1.48 |
| Roasted nibs hopper | 162 | 2 | 54 | 17496 | 291.6 | 19881.26 | 1.38 |
| Electric motors | 36 | 2 | 150 | 10800 | 180 | 20061.26 | 0.85 |
| Automatic weigher and hopper | 520 | 1 | 20 | 10400 | 173.33 | 2.234.59 | 0.82 |
| Cake silo and screw conveyor | 26 | 1 | 360 | 9360 | 156 | 20390.89 | 0.74 |
| Silo | 18 | 1 | 490 | 8820 | 147 | 20537.59 | 0.7 |
| Water station | 18 | 2 | 180 | 8840 | 144 | 20681.59 | 0.68 |
| Press | 12 | 1 | 650 | 7800 | 130 | 20811.59 | 0.62 |
| Beans cleaning machine | 125 | 1 | 45 | 5625 | 93.75 | 20905.59 | 0.44 |
| Butter pump | 69 | 1 | 45 | 5175 | 86.25 | 20991.59 | 0.41 |
| Mass pump | 345 | 1 | 15 | 5175 | 86.25 | 21077.84 | 0.41 |

$$W_B = \sum_{i=1}^B \sum_{j=1}^2 WL_{ij} \dots \dots \dots (5)$$

The percentage man-hour for the repetitive jobs was obtained as:

$$\text{Man-hours (\%)} = \frac{(\text{Man hours for each part}) \times 100}{\text{Total man - hours}} \dots \dots \dots (6)$$

NON-REPETITIVE JOBS

Jobs in this class were segregated according to section in the maintenance departments. Most jobs classified as non repetitive jobs are non regular jobs. The man-hours were obtained as described for routine and respective jobs as follows:

$$WL_{ij} = t \times n \times m$$

The work load for the non-repetitive jobs is obtained as:

$$W_P = \sum_{i=1}^P \sum_{j=1}^2 WL_{ij} \dots \dots \dots (8)$$

Table 2: Standard Man-Hours for Repetitive Job Undertaken by Mechanical Craftsmen

| Job description | Frequency | Manpower | Standard time (minutes) | Standard man-minutes | Standard man-Hours |
|---------------------------------|-----------|----------|----------------------------|----------------------|-----------------------|
| Beans cup elevator | 1720 | 2 | 25 | 86000 | 1433.33 |
| Beans Chain conveyor | 104 | 2 | 190 | 39520 | 658.67 |
| Automatic weigher and hopper | 520 | 1 | 20 | 10400 | 173.33 |
| Beans cleaning machine | 125 | 1 | 45 | 5625 | 93.75 |
| Distoner | 52 | 2 | 285 | 29640 | 494 |
| Silo | 18 | 1 | 290 | 8820 | 147 |
| Micro nozer | 365 | 2 | 85 | 62050 | 1034.17 |
| Winnower | 1560 | 2 | 20 | 62400 | 1040 |
| Air compressor | 36 | 1 | 1640 | 59040 | 984 |
| Scale hopper | 560 | 2 | 35 | 39200 | 653.33 |
| Tornado roaster | 156 | 1 | 180 | 28080 | 468 |
| Cooler unit | 45 | 4 | 120 | 21600 | 360 |
| Beater blade mill | 48 | 3 | 200 | 28800 | 480 |
| Vacuum Mixer | 210 | 2 | 75 | 31500 | 525 |
| Boiler | 125 | 1 | 1120 | 28000 | 406.67 |
| Schule filter | 312 | 1 | 120 | 37400 | 624 |
| Press | 12 | 1 | 650 | 7800 | 130 |
| Main transfer conveyor | 144 | 2 | 120 | 27360 | 456 |
| Kibbling machine | 260 | 2 | 170 | 88400 | 1473.33 |
| Powder plant unit | 208 | 2 | 145 | 60320 | 1005.33 |
| Butter pumps | 69 | 1 | 75 | 5157 | 86.25 |
| Tempering machine | 2 | 2 | 5760 | 23040 | 384 |
| Shell aspirator unit | 230 | 3 | 110 | 75900 | 1265 |
| Chiller compressors | 12 | 2 | 2040 | 48960 | 816 |
| TOTAL | | | | | 1525.16 |

Table 3: Standard Man-Hours for Routine Job Undertaken by Mechanical Craftmen

| Job description | Frequency | Manpower | Standard time (minutes) | Standard man- minutes | Standard man- Hours |
|-------------------------------------|-----------|----------|----------------------------|--------------------------|------------------------|
| Beans chain conveyor | 52 | 1 | 25 | 6240 | 104 |
| Destorner | 52 | 2 | 190 | 14040 | 234 |
| Micro nizer | 52 | 2 | 20 | 15600 | 260 |
| Winnower | 52 | 1 | 45 | 6240 | 104 |
| Schule filter | 52 | 2 | 285 | 12480 | 208 |
| Press | 52 | 2 | 290 | 14040 | 234 |
| Beans cup elevator | 52 | 1 | 85 | 6240 | 104 |
| Shell aspirator | 52 | 1 | 20 | 7800 | 130 |
| Boiler | 52 | 4 | 1640 | 24960 | 416 |
| Agitated ball mill | 52 | 1 | 35 | 15600 | 260 |
| Beater blade mill | 52 | 2 | 180 | 15600 | 260 |
| Kibbling machine | 52 | 2 | 120 | 12480 | 208 |
| Tornado roaster | 52 | 4 | 200 | 24960 | 416 |
| Fork lift | 52 | 1 | 75 | 18720 | 312 |
| Automatic weigher and hopper | 52 | 1 | 1120 | 7800 | 130 |
| Roaster nibs hopper | 52 | 1 | 120 | 6240 | 104 |
| Silo | 52 | 2 | 650 | 24960 | 416 |
| Nibs screw conveyor and elevator | 52 | 2 | 120 | 12480 | 208 |
| Scale hopper | 52 | 1 | 170 | 6240 | 104 |
| TOTAL | | | | | 4212 |

DETERMINATION OF THE EFFECTIVE MANPOWER REQUIREMENT

For any activity i in section j , the manpower requirement was computed from:

Number of personnel for a particular skill (Q)

$$= \frac{\text{Total man-hour for that particular skill, } W}{\text{Total available working hours, } H \times \text{use factors, } F}$$

Mathematically,

$$Q = W / (H \times E) \quad \dots \dots \dots (9)$$

DATA COLLECTION AND ANALYSIS

Maintenance data were collected from Mechanical and Electrical maintenance departments of the cocoa processing industry.

Table 1 shows the list of parts arranged in descending order of percentage man-hours. Calculation of total man-hours was done according to job classification in the sections of the departments.

Table 2 and 3 show the classification of repetitive and routine jobs in the mechanical section respectively. For each of the jobs in the mechanical section respectively. For each of the job classifications, the total man-hours were calculated.

The same procedure was used in determining the number of man-hour for the electrical section are shown in Table 4 and 5 respectively, while, Tables 6 and 7 show non-repetitive jobs for both mechanical and electrical sections respectively. Table 8 shows the summary of time spent on jobs carried out in the department. Table 9 details the percentage of maintenance activities according to sections and job classification, while Table 10 details the comparison between the numbers of men currently employed and the computed manpower required.

Calculation of Percentage Man-hours

Calculation of percentage man-hour for each section and job classification were carried out from equation (6) as follows:

Mechanical Craft (MC)

From Table 8 it could be shown that % man-hour for MC

$$= \frac{\text{Total man - hours for jobs in Mech. Depts}}{\text{Total man - hours for jobs in both depts}}$$

$$MC = 64.54\%$$

Table 4: Standard Hours for Repetitive Jobs Undertaken by Mechanical Craftmen

| Job description | Frequency | Manpower r | Standard time (minutes) | Standard man- minutes | Standard man- Hours |
|----------------------|-----------|---------------|----------------------------|--------------------------|------------------------|
| Control panel | 1420 | 2 | 35 | 99400 | 1656.67 |
| Boiler | 36 | 2 | 180 | 12960 | 216 |
| Electric motor | 15 | 2 | 315 | 9450 | 157.5 |
| Butter pump | 42 | 2 | 362 | 30408 | 506.8 |
| Main faster conveyor | 12 | 2 | 660 | 15840 | 264 |
| Power generating set | 18 | 2 | 1105 | 39780 | 663 |
| Beans chain conveyor | 10 | 2 | 615 | 12300 | 205 |
| Tornado roaster | 11 | 2 | 710 | 15620 | 260.33 |
| Cooler unit | 45 | 2 | 180 | 16200 | 270 |
| Tempering machine | 21 | 2 | 930 | 39060 | 651 |
| Agitated ball mill | 01 | ~ | | | |

Table 5: Standard Man-Hours for Routine Job Undertaken by Electrical Craftmen

| Job description | Frequency | Manpower r | Standard time (minutes) | Standard man- minutes | Standard man- Hours |
|-------------------------------------|-----------|---------------|----------------------------|--------------------------|---------------------------|
| Beans chain conveyor | 52 | 2 | 120 | 18720 | 312 |
| Control panel | 52 | 2 | 120 | 18720 | 312 |
| Electric motor | 52 | 2 | 180 | 12480 | 208 |
| Generator brushes | 52 | 1 | 300 | 15600 | 206 |
| Switch boxes | 52 | 2 | 90 | 9360 | 156 |
| Main gear switch | 52 | 2 | 120 | 12480 | 208 |
| Air handling unit | 52 | 2 | 180 | 18720 | 312 |
| Chiller compressors | 52 | 2 | 360 | 37440 | 624 |
| Butter pump | 52 | 1 | 300 | 15600 | 260 |
| Fan motors | 52 | 1 | 120 | 6240 | 104 |
| Water pump | 52 | 1 | 180 | 9360 | 156 |
| Boiler | 52 | 2 | 360 | 37440 | 624 |
| Various automate systems | 52 | 4 | 120 | 24960 | 416 |
| Replacement of dead bulbs | 52 | 2 | 90 | 9360 | 156 |
| Cleaning of maintenance workshop | 52 | 2 | 150 | 15600 | 260 |
| TOTAL | | | | | 4368 |

Table 6: Standard Man-Hours for Non-Repetitive Jobs Undertaken by Mechanical Craftmen

| Job description | Manpower r | Standard time (minutes) | Standard man-minutes | Standard man-Hours |
|-------------------------|---------------|----------------------------|----------------------|--------------------|
| Control panel | 2 | 1440 | 2880 | 48 |
| Boiler | 2 | 1800 | 3600 | 60 |
| Electric motor | 2 | 1860 | 3720 | 62 |
| Butter pump | 2 | 1650 | 3300 | 55 |
| Main faster conveyor | 2 | 2520 | 5040 | 84 |
| Power generating set | 2 | 3000 | 6000 | 100 |
| Beans chain conveyor | 2 | 1200 | 2400 | 40 |
| Tornado roaster | 2 | 1500 | 6000 | 100 |
| TOTAL | | | | 549 |

Similarly, for other sections:

Electrical Craft (EC)

% Man-hour for EC = 35.46%

Calculation for % Man-hour for job Classification

Routine Jobs (RJ)

% Man-hour for RJ = 27.67%

Repetitive Jobs (EJ)

% Man-hour for EJ = 69.23%

Non Repetitive Jobs (NJ)

% Man-hour for NJ = 3.10%

COMPUTATION OF MANPOWER REQUIREMENTS

The maintenance department operates a 3-shift system and is opened all days of the year except during public holidays. Each of the craftsmen work for only 292 days in a year with an average of 8 hours per craftsman per day. It was observed (from the survey) that the

maintenance workers are on the average, physically busy on their jobs 70% of the time each day.

Total Manpower Requirements for Mechanical Section

Total man-hour = 20012.16 (Table 8)

Average No. of working days per year = 292

Use factor = 0.70

Number of working hour per day = 24

Number of shifts operated = 3

From equation (9)

$$Q_M = W/(H \times F)$$

i. e. Number of men required

$$Q_M = \frac{\text{Total man - hours} \times \text{No. of shift}}{\text{Average No. of days/year} \times \text{Use of factors} \times \text{No. of hours per day}}$$

$$Q_M = 12.24 \text{ men}$$

$$= 13 \text{ men (approx.)}$$

Total Manpower Requirement for Electrical Section

The electrical section where total man-hours was 10996.30 (Table 8)

$$Q_E = 6.73 \text{ men}$$

$$= 7 \text{ men (approx.)}$$

RESULTS AND DISCUSSION

From the results obtained the man-hour for carrying out maintenance in the Mechanical section accounts for about 64.5% of the total man-hours for the maintenance time

Table 7: Standard Man-Hours for Non-Repetitive Jobs Undertaken by Electrical Craftmen

| Job description | Manpower | Standard time (minutes) | Standard man-minutes | Standard man-Hours |
|---|----------|-------------------------|----------------------|--------------------|
| Removal of old chiller compressor | 2 | 2400 | 4800 | 80 |
| Installation of new chiller compressor | 2 | 2400 | 4800 | 80 |
| Erection of security lights | 2 | 1500 | 3000 | 50 |
| Installation of central power generating sets | 2 | 1260 | 2520 | 42 |
| Overhaul of all air conditioner | 2 | 2910 | 5820 | 97 |
| Installation of pumping machine | 2 | 1920 | 3840 | 64 |
| TOTAL | | | | 413 |

Table 8: Summary of Time (Standard Man-Hours for Jobs carried out according to sections and Classifications.

| | Routine | Repetitive | Non-repetitive | Total |
|-----------------------|-------------|-----------------|----------------|-----------------|
| Mechanical | 4212 | 15251.16 | 549 | 20012.16 |
| Electrical compressor | 4368 | 6215.3 | 413 | 10996.3 |
| TOTAL | 8580 | 21466.46 | 962 | 31008.46 |

Table 9: Tabulation of Percentage Total Time in Maintenance.

| Section of maintenance | % Total time in maintenance | Classification maintenance work | Total time in maintenance |
|------------------------|-----------------------------|---------------------------------|---------------------------|
| Mechanical | 64.54 | Routine | 27.67 |
| | | Repetitive | 69.23 |
| Electrical | 35.64 | Non-repetitive | 3.1 |

Table 10: Tabulation of Manpower Currently Being Employed and Calculated Manpower Required (Q)

| | Mechanical section | Electrical section |
|----------------------------------|--------------------|--------------------|
| Number of men currently employed | 9 | 5 |
| Required number of men | 13 | 7 |

while Electrical craft work accounts for about 35.46%. This shows that maintenance work in the Mechanical section is higher than in the Electrical section by 29.04%. Therefore, more hands would be needed to perform effectively.

In the case of jobs classification, the results revealed that Routine Jobs (RJ) accounts for about 27.67%, Repetitive jobs (EJ) accounts for about 69.23% and Non-Repetitive job (NJ) accounts for about 3.10% of the total time for maintenance activities. Repetitive jobs therefore, have the highest percentage of maintenance time, which implies that special attention must be focused on such class of jobs.

The number required to be engaged in mechanical section is estimated to be 13 men and that of Electrical section is estimated to be 7 men for effective maintenance activities. Presently, only 9 men and 5 men are engaged in the two sections respectively. This shows a manpower shortage of 4 men for mechanical section and 2 men for electrical section. The present arrangement engender over working of the maintenance crews. Hence, the deficit number of personnel obtained from the research should be engaged so that production work can continue smoothly without overworking the current manpower.

CONCLUSION

Since the bulk of maintenance activities centres around repetitive jobs in the maintenance departments efforts should be made to carry out a work study for the organization so that the areas which utilize this type of maintenance activities could be identified and measures taken to redesign the processes in the long run. Also, since the manpower requirement has not been met, it is suggested that as a short-time measure additional 4 and 2 men be employed in the mechanical and electrical maintenance sections respectively to reduce the overtime (overwork) of the present level of personnel.

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REFERENCES

- Aderoba, A. A., 1994. Tools of Engineering Management Vol.1 Besade (Nig.) Ltd., Ondo
- Aderoba, A. A. and Lawal, K. O., 1997. Development of Commercial Industrial Maintenance Centers in Nigeria. Proceeding of the 1997 International Engineering Conference: 96-103.

- Dwivedi, R. S. 1980. *Manpower Management, An Integrated Approach to Personnel Management and Labour Relations*. Prentice-Hall, Eaglewood cliffs.
- Lindley R. H., 1988. *Maintenance Engineering Handbook*. McGraw-Hill Inc. U.S.A.
- Priel, V. Z. 1974. *Systematic Maintenance Organization*. MacDonald and Evans Ltd., London.
- Radford, J. D. 1984. *The Engineer and Society*, Macmillan Books. London.
- Richard, L. W. 1991. *Managers' guide to Machinery maintenance, a Master plan for Organization and Control*. McGraw-Hill Books co. New York.
- Ronald, J. E., Evertte, A., Jr. 1978. *Production and Operation Management*. Prentice-Hall Inc., New Delhi.
- Ubeku, A. K., 1975. *Personnel Management in Nigeria*. Ethiopie Publishing Company, Benin.