

A STUDY ON REDUCTION OF TRUCK TURN AROUND TIME AT AAVIN MILK DAIRY, ERODE

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ABSTRACT

The purpose of this paper is to provide solution to increase the efficiency of Turnaround time of truck at Aavin milk dairy Erode. The time taken to complete the tasks assigned to the trucks inside the industry is known as the turnaround time of the truck. If the number of processes is higher then automatically the vehicle turnaround time will be also higher. There are some movements that could be omitted where the time consuming is large. Logistics plays an important role in every industry where the arrival time and the exit time of the truck matters a lot. The research project is mainly focused on finding the turnaround time of the trucks and reducing it. The readings were taken manually by studying the time of truck at check in process, in weighment area, in taking sample, clearance, time study in unloading and time study of truck in the cleaning & exit area. The crew size management is also studied. Here the size of the crew is not enough to carry out the operations in a well efficient phase. Time is wasted in some operations that affects the efficiency, so relevant crew size is suggested to cut down the wastage of time. During the cleaning of the milk tanker there is a wastage of some raw milk from the tanker after the unloading the process, for this the fish bone diagram is drafted to give solutions to the problem. Thus, on implementing these would definitely bring a huge change to the company by increasing its efficiency and competing effectively with their competitors.

Keyword: - Turnaround time, Crew size management, Fish bone diagram

1. INTRODUCTION

Humans were consuming milk from 10000BC. Mesopotamian and Sumerian dynasty domesticated cow for milk. Then slowly other dynasties started consuming milk. In Egypt milk was reserved as royalty and it should be consumed by wealthy persons, priest and high-class people. Before introduction of transportation facilities farmers grow cow for milk. With the help of railways milk consumption was increased around the world. By the 14th century, cow's milk began gaining popularity around the world. European dairy cows were imported into the U.S. around 1600s. In India farmers domesticated cow for milk consumption within their village. For commercial purpose farmers started a co-operative movement to distribute their milk to other cities. The co-operative was started to avoid intermediaries between farmers and consumers. There is separate act for dairy co-operative in India "Co-operative Act 1913". White revolution was initiated by Mr. Varghese Kurian who is known as father of white revolution. The dairy development department took over the control of milk cooperatives on February 1, 1981. The commercial activities of the cooperative were handed over to Tamil Nadu Co-operative milk producer's federation limited which sold milk and milk products under the trademark as "AAVIN". Aavin collects the milk from various parts of the TamilNadu mainly from villages and store it in a certain place. Then the milk has been transported to the main storage and converted into several different products and delivered to different areas. Aavin has also sending their products nearby states.

1.1 Need for study

Turnaround time of the truck is very high and needs to be optimized. No proper crew size allotted in each area. Wastage of milk occurs while cleaning the tanker after unloading.

2. OBJECTIVES OF THE STUDY

2.1 Primary Objective:-

To study the turnaround time of truck in the plant and optimizing by reducing it.

2.2 Secondary Objectives:-

Optimization of crew size in every functional area based upon the needs. Identifying the problem in the cleaning of the truck after unloading of the Raw Chilled Milk.

2.3 Research Methodology

The type of research method used here is descriptive research. Descriptive research is defined as a research method that describes the characteristics of the population or phenomenon that is being studied. In other words, descriptive research primarily focuses on describing the nature of a demographic segment, without focusing on “why” a certain phenomenon occurs. In general there are 3 main reasons to conduct descriptive research they are:-

- To identify the areas for further research.
- To help in planning resource allocation.
- To provide information about the condition.

Data was collected from the supervisor and the workers from various departments through interaction with several constructs for completion of the project.

2.4 Primary Data

Primary data was collected from the company by face to face interviews with the employees.

3. ANALYSIS AND INTERPRETATION

3.1 Time study for existing layout

The turnaround time of various truck capacities such as 6000 litres, 9000 litres, 16000 litres, 20000 litres and 30000 litres are studied based on the various operations performed by the truck inside the industry. The average time taken at all operations by the truck is calculated. Time study for 6000 litres capacity is shown below

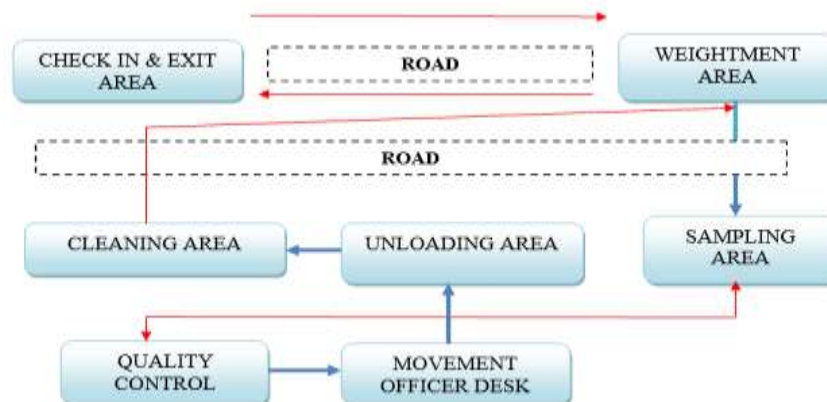


Fig -1: Existing Layout

Table -1: Time study of truck at check in process

Check in time of truck	Document verification	Movement time from entry to weighment	Average time of truck from entry to weighment
10:05	7	6	13
11:10	8	8	16
10:25	7	5	12
12:20	5	7	12
14:45	6	7	13
11:55	4	5	9
13:40	9	5	14
13:45	8	5	13
15:05	8	7	15
Avg	6 mins	6 mins	13 mins

Table -2: Time study of truck in weighment

Weighment data entry	Truck movement time to unloading area	Average time in weighment
5	5	10
6	7	13
5	6	11
4	7	11
4	8	12
5	5	10
4	7	11
6	8	14
6	7	13
Avg: 5 min	6 mins	11 mins

Table -3: Time study in taking sample and clearance

Time of BMC dispatch note to movement officer	Time taken to check seal numbers	RCM sample collection time	Clearance given time	Average time in sampling and clearance
6	15	8	8	37
4	13	6	11	34
6	8	9	8	31
5	14	7	10	36
5	8	8	9	30
4	11	8	10	33
6	16	9	10	41
3	12	7	8	30
4	13	9	8	34
Avg: 4 mins	12 mins	7 mins	9 mins	34 mins

The time of staff movement from QC section to take sample and from sampling area to QC section takes an average of 15 mins.

Table -4: Time study in unloading

Unloading start time	Average time difference taken to start unloading after QA clearance given	Unloading finish time	Average difference between unloading start and end time
11:45	40	12:05	20
13:10	55	13:20	10
12:30	71	12:45	15
15:05	105	15:15	10
16:20	40	16:33	13
14:12	90	14:25	15
16:55	130	17:15	20
15:33	53	15:50	17
17:15	68	17:35	20
Avg	72 mins		15 mins

Table -5: Time study in cleaning and exit time

Cleaning start time	Cleaning finish time	Average time to clean after unloading	Average time difference in cleaning starting and finishing	Out time	Overall turnaround time
13:10	13:30	65	20	13:40	225
13:45	14:10	25	25	14:20	170
13:40	14:00	55	20	14:10	225
15:25	15:40	10	15	15:50	210
17:45	18:05	108	20	18:15	180
15:35	15:55	70	20	16:05	240
17:20	17:45	5	25	17:55	255
16:40	17:00	50	20	17:10	275
18:10	18:25	35	15	18:35	220
Avg		47 mins	20 mins		246 mins

An average time of 6 mins is taken for the movement of truck from cleaning area to weighment, which is being added to the overall turnaround time. The overall turnaround time for the 6000 litres capacity is found out to be an average of 246 mins for the existing layout. Similarly, the turnaround time for the remaining capacities of the trucks is studied and overall turnaround time is calculated.

3.2 Summary for existing layout

Table -6: Summary for current layout

Tanker capacity	Current turnaround time (in mins)
6000 LTR	246
9000 LTR	310
16000 LTR	582
20000 LTR	601
30000 LTR	707

The above table shows the current turnaround time of the truck for the existing layout, this layout is changed for better results and new layout is being proposed where the movement of truck from check in area to weighment, movement time of QC staff, movement time of truck from cleaning area to weighment area and movement time from weighment to exit area is reduced.

3.3 Time study for proposed layout

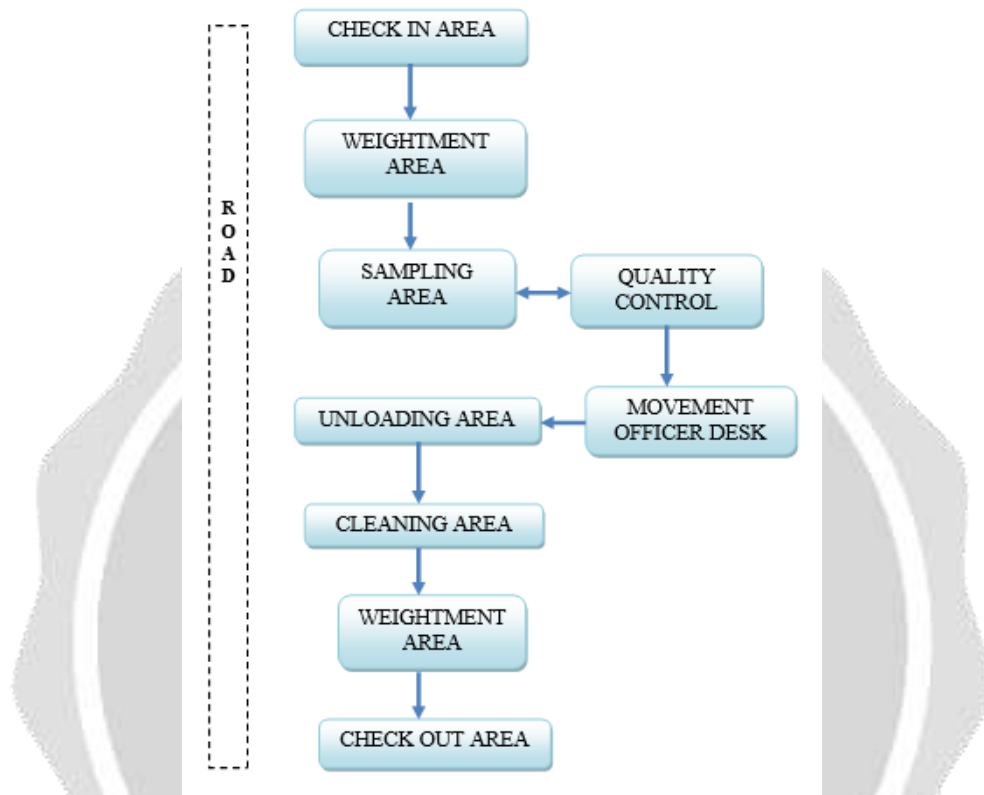


Fig -2: Proposed layout

3.4 Summary for proposed layout

Table -7: Summary for proposed layout

Tanker capacity	Existing turnaround time	Proposed turnaround time	Difference in mins	Productivity %
6000 LTR	246 mins	209 mins	37 mins	84.95
9000 LTR	310 mins	272 mins	38 mins	87.74
16000 LTR	582 mins	542 mins	40 mins	93.12
20000 LTR	601 mins	557 mins	44 mins	92.67
30000 LTR	707 mins	661 mins	46 mins	93.49

As mentioned above the time taken for the movement of truck from check in area to weighment, movement time of QC staff, movement time of truck from cleaning area to weighment area and movement time from weighment to exit area is reduced for all the truck capacities and the following productivity is obtained.

3.5 T-test for turnaround time of the truck

Table 8: T-Test for turnaround time of truck

	<i>before optimising</i>	<i>after optimising</i>
Mean	489.2	448.2
Variance	39951.7	38545.7
Observations	5	5
Pearson Correlation	0.999969328	
Hypothesized Mean Difference	0.05	
df	4	
t Stat	23.64249352	
P(T<=t) one-tail	9.48825E-06	
t Critical one-tail	2.131846782	
P(T<=t) two-tail	1.89765E-05	
t Critical two-tail	2.776445105	

Interpretation: Null Hypothesis: There is no significant difference between the turnaround time of the truck before and after optimizing in mins.

Alternate Hypothesis: There is significant difference between the turnaround time of the truck before and after optimizing in mins.

The tankers of all capacities turnaround time were analyzed and it is found out that there is a significant difference between before and after optimization of the turnaround time where the p value is less than the level of significance value which is assumed as 0.05. If the p value is less than the significance value the null hypothesis is rejected and alternate hypothesis is accepted.

3.6 Crew size management

Table 9: Crew size optimization

Area type	Current crew size	Current time in mins	Suggested crew size	Proposed time in mins	Difference in mins	Productivity %
Check in area	1	8	2	4	4	50
Weighment area	1	6	2	3	3	50
Sampling area	2	22.8	3	15.2	7.6	66.6
Cleaning area	2	29.6	3	19.73	9.87	66.6

The current crew size is studied, and optimized level of crew size is suggested to reduce time for better efficiency and is been tabulated.

3.7 T- test for crew size management

Table 10: T- test for crew size management

	BEFORE	AFTER
Mean	16.6	10.4825
Variance	131.2533333	68.59389167
Observations	4	4
Pearson Correlation	0.999560111	
Hypothesized Mean Difference	0.05	
df	3	
t Stat	3.806983494	
P(T<=t) one-tail	0.015926573	
t Critical one-tail	2.353363435	
P(T<=t) two-tail	0.031853145	
t Critical two-tail	3.182446305	

Interpretation: Null hypothesis: There is no significant difference between the crew size before optimization and after optimization.

Alternate hypothesis: There is significant difference between the crew size before optimization and after optimization.

The crew size in all the areas where studied and optimized and it is found out that there is significant difference between the crew size before and after optimization where the p value is less than the level of significance value which is assumed as 0.05. If the p value is less than the significance value the null hypothesis is rejected, and alternate hypothesis is accepted.

3.8 Fishbone diagram

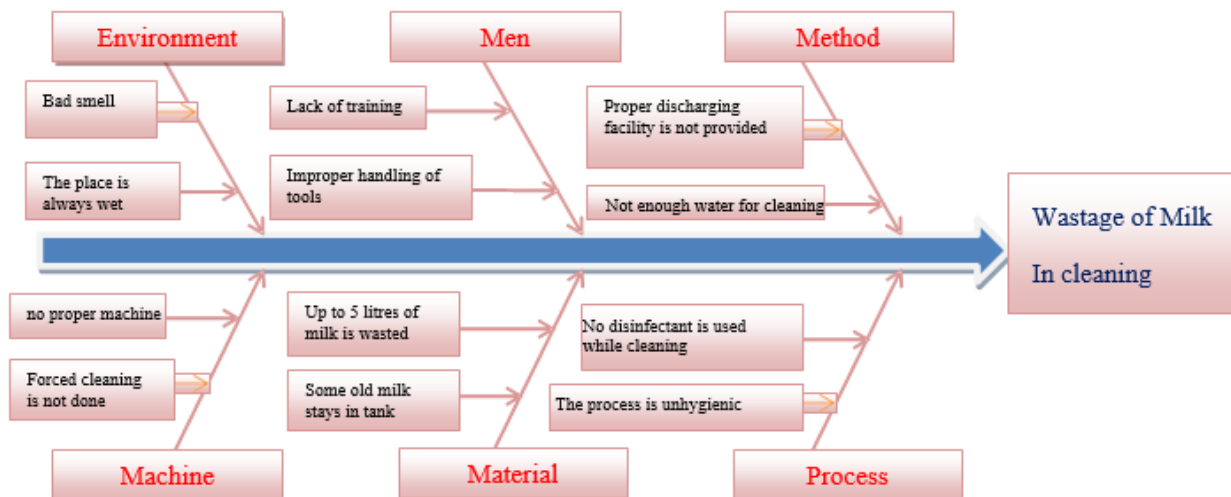


Fig 3: Fishbone diagram

From the diagram the causes and effects of the wastage of milk is being drafted. In this diagram, the problem in Environment, Men, Method, Machine, Material and process were analyzed and these problems were corrected.

4. CONCLUSION

Some useful insights regarding the optimizing turnaround time for the trucks at Aavin milk dairy erode. This project provides an opportunity to experience the actual industrial conditions related to all the departments in the Industry. Logistics plays an important role in procurement and managing transportation, maintaining a supplier relationship. This project helps to identify the problem in Turnaround time of the truck, crew size management and the problem in the cleaning of the tanker. There is also lack of stations in unloading and cleaning area which could be optimized. Any kind of model when applied to practical problems will show some defects, but this does not mean that these models are not useful. As long as the actual computing process revised constantly, the result of calculation will be high reliability. The company should experience the promising trend, if it implements the above said suggestions and it can ensure the profitability in the near future of the company.

5. REFERENCES

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