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Productivity Improvement in Milk Processing Plant

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ABSTRACT:

The economical condition of country, mainly depend upon agriculture sector. While the milk industry is the side & co - business of farmers along with agricultural sector .It is better to said both are mutually correlated. All small scale & large scale farmers focusing on the milk business, there is a net profit in milk business, but both businesses are depend mostly on natural conditions. Along with the advantages in the milk sector farmers and manufactures are facing a lot of problem at various stages. The milk is a natural product so it required the proper preserving condition for quality maintenance. So that it is most important that in productivity improvement of milk plant the milk collection, incoming milk in plant, processing, dispatching of the milk and selling milk product in market. Thus the main aim is to improve the productivity of plant by various observations and suggestion by applying tools and techniques to increase the productivity

The milk plant capacity is 10,000 lpd. Daily 7000 litre milk is collected by the plant system by using following sections:

1. Milk procurement section
2. Milk processing section
3. Milk product manufacturing section
4. Milk & milk products packing section
5. Milk & milk products dispatching section

In procurement section the routes and scheduling is not proper, thus leading higher transportation cost which will able to reduce by studying routes & distance analysis.

Milk is unloaded from milk van and passed to pouring point manually which require more time and unnecessary processes which will be reduced by applying conveyor system properly in plant by method study analysis. Optimisation in wastages of milk can be brought by using the wastage calculation. By using the drop test method the leakage of pouches is optimised which is beneficial for handling the easy transportation of pouches. Optimization of pouches wastage can be rectified by adjustments in packing machine and by suggesting high capacity packing machine.

In plant, there isn't any separate department for research and development so they require some technical suggestions from people of engineering regarding some accurate remedies on such different conditions, so it is related to our educational field industrial production. It is a good opportunity to study the productivity improvement in milk industries efficiently. There is great scope of improvement in productivity by developing milk plant. By applying engineering tools and techniques it is possible to improve productivity very efficiently. The following mentioned department of plant focuses the productivity improvement requirement according to engineering after primary study of plant in present condition.

SECTIONS WHICH REQUIRE IMPROVEMENT:

1) Milk procurement section
2) Plant layout section
3) Method study
4) Time study
5) Wastage analysis

MILK PROCRUMENT SECTION-

PRESENT SYSTEM —

Total no. of routes-	=	11
Total distance covered-	=	387kms
Total time-	=	24hrs/shift
Total milk collection-	=	4000.9litre/day

Total transportation cost- = total distance/day *cost/kms.

= 774×5.80 = Rs . 4489.2/-

Cost per litre. - = total transportation cost/total milk collection

= 4489.2/4000.9 =Rs.1.12/ltr.

NEW DESIGN

Total no. of routes- = 8

Total distance covered- = 345kms

Total time- = 22.43hrs/shift

Total milk collection- = 4000.9litre/day

Total transportation cost- = total distance/day *cost/kms.

= 690×5.80 = Rs . 4002/-

Cost per litre. = total transportation cost/total milk collection

=4002/4000.9 =Rs.1.00/ltr

TOTAL SAVINGS

No. of routes reduces = 3

Total distance saved = 42kms/shift

Total time saved = 2.35hrs

Transportation cost saved = Rs.487.2/day

Reduced cost/litre- = Rs0.12/ltr

%Kms saving = 10.85%

%time saving = 9.63%

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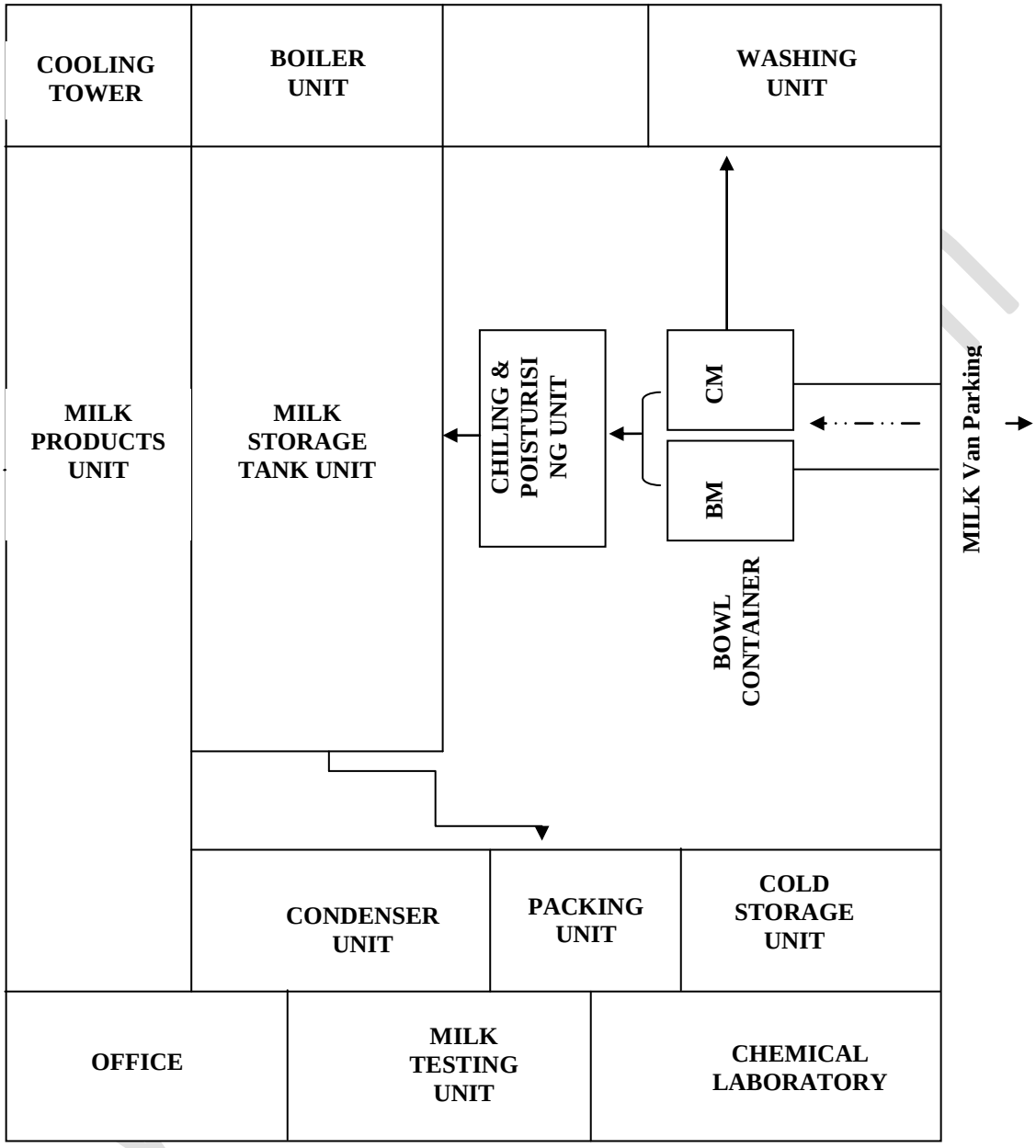
PLANT LAYOUT SYSTEM-



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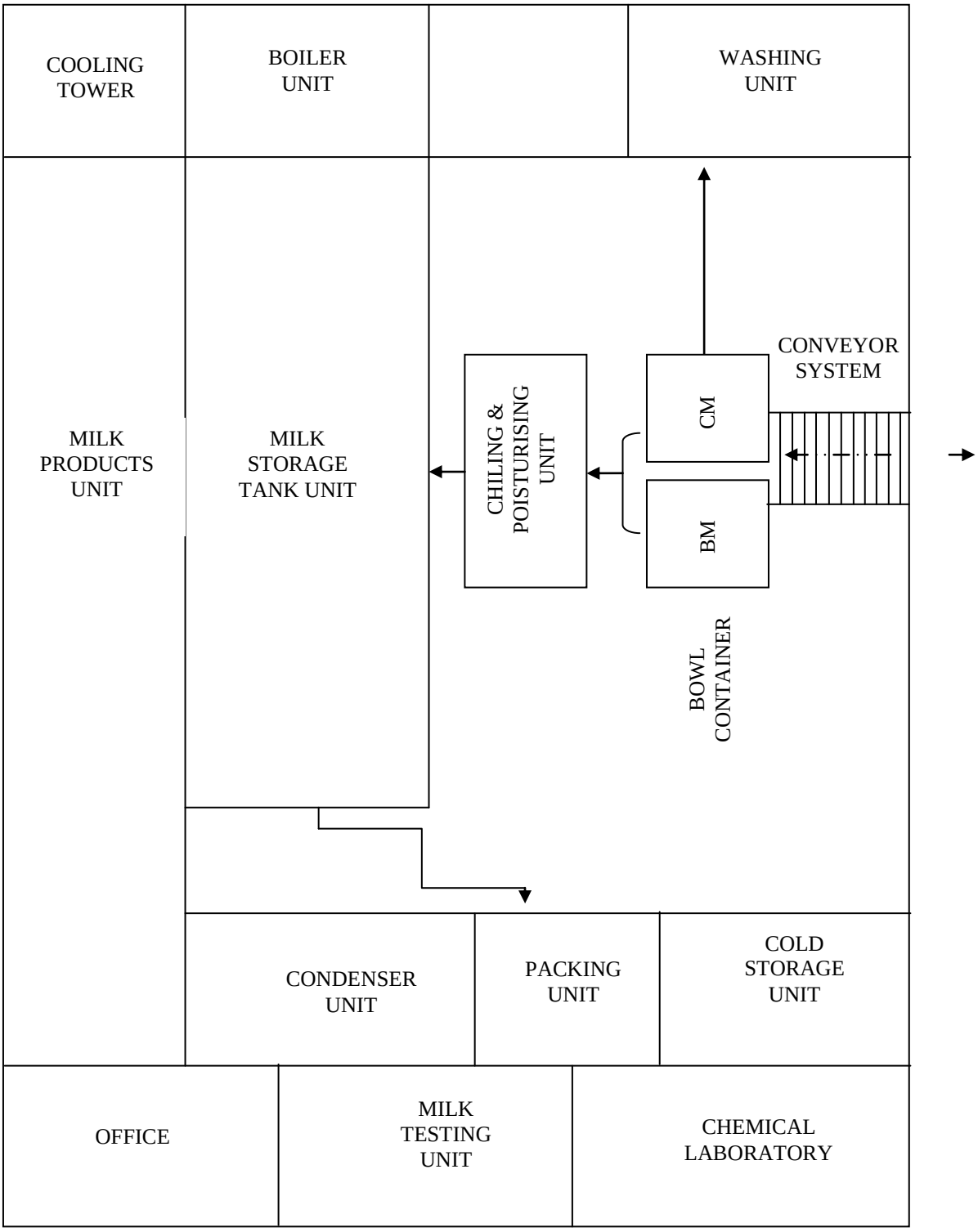
PROPOSED PLANT LAYOUT



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PRESENT FLOW PROCESS CHART

Sl.no	Description	Dist (foot)	Time (SEC)	Symbol	Remarks
1	Storage				VAN
2	Move to flat form	5	2		
3	Delay on flat form		9.6		
4	Pushing on	5	1.7		
5	Removal of caps		5		
6	Delay		43		CONV
7	Move to inspection Section	10	50		CONV
8	Inspection of milk		10		CONV
9	Delay		57		CONV
10	Move to pouring point	17	120		
11	Pouring of milk		4		
12	Cleaning of Empty cans				
13	Cleaned cans move to van				
	Sum		302		

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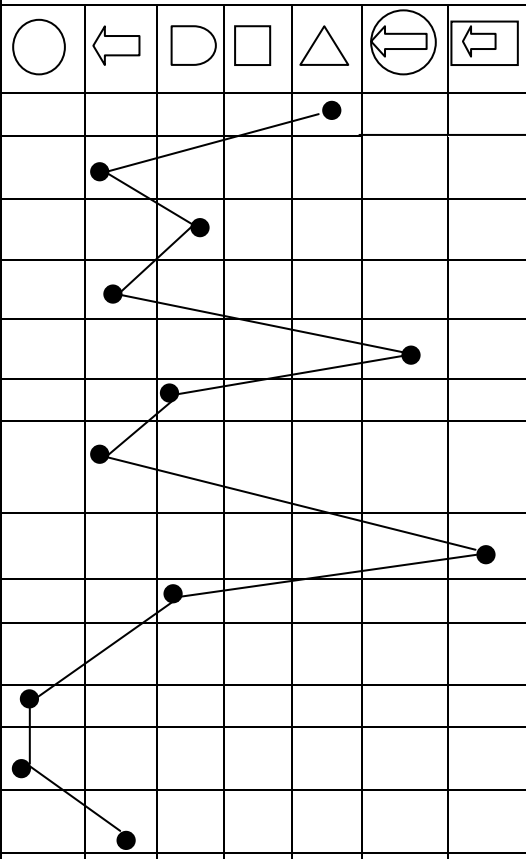

3.1 PRESENT SYSTEM-

PACKING CAPACITY	STANDERED LENGTHS
1 1 Litre	22.5cm
2. 500 ml	15.5cm
3. 250 ml	10.5cm
4. 200 ml	10cm

TABLE 13.1

According to standard length the packing is done daily by the packing unit. But each roll having some amount of definite wastage at the starting & end of roll which minor in quantity but following PRESENT observation shows the extra wastages per roll.

PACKING CAPACITY	AMOUNT OF WASTAGE PER ROLL
1 1 Litre	9 POUCHES
2. 500 ml	15 POUCHES
3. 250 ml	20 POUCHES
4. 200 ml	25 POUCHES

TABLE 13.2

13.2 AFTER RECTIFICATION OF ADJUSTMENT-

It is observed that the packing machine having proper photocell mark on roll due to improper printing of photocell, sensor coding defect was produced so that it effects on more no. of wastage of the pouches per roll.

Result:

PACKING CAPACITY	AMOUNT OF WASTAGE PER ROLL
1 1 Litre	2 POUCHES
2. 500 ml	4 POUCHES
3. 250 ml	7 POUCHES
4. 200 ml	9 POUCHES

WASTAGE ANALYSIS

In any type of industries the wastage factor is mostly common so no exceptional in milk industries here along with the milk many items wastage at the various levels of processing .in milk industries wastage find at two levels 1.Quality, 2.Quantity

Wastage of milk contents at various levels-

DEPARTMENTS	FATS	%S.N.F.
Collection/sampling	0	0
testing	0	0
weighting	0	0
Flashing, pipeline,storage tank	0.06	0.06

Flashing,can	0	0
Flashing tanker	0.025	0.025
TOTAL	0.085	0.085
Dripsaver can	0.166	0.166
Process dept.	0.20	0.20
Leakage	0	0
Sample	0	0
TOTAL	0.20	0.20
Packing dept.	0.33	0.33
Flashing	0.01	0.01
Extra in pouch	0.2	0.2
Pouch leakage	0.1	0.1
Pouch sample	0.001	0.001
TOTAL	0.64	0.64
In butter processing-		
Cream pasteurising	0.18	-
Churning & washing	0.27	-
Extra fat	0.125	-
Instrument washing	0.15	-
Extra wt.in packing	0.1	-
Damage pouches	0.02	-
TOTAL	0.85	
Ghee processing	Total	0.4
Powder manufacturing	Total	0.98

TABLE10.1

10.1WASTAGE OBSERVATION & CALCULATION

10.1.1MILK WASTAGE ON FLOOR-

1). Milk remaining in caps of cans-

= 3ml/can

=3ml×140/shift

=420 ml/shift

2) Milk spillage at pushing the cans-

=10ml/can

=10×140/shift

=1400 ml/shift

3) Testing milk manually & spittle on ground-_

= 14.71ml/can

=14.17×140/shift

=1938.8ml/shift

4) Milk remaining in testing bottles-

=0.48ml/can/bottles

=0.48×140

=67.9ml/shift

5) Milk on testing plunger- =4.36ml/can

=4.36×140

611.1ml/shift

6).Milk remaining in empty cans-

=23ml/can

=23×140

=3220ml

10.1.2 MILK WASTAGE FROM LABORATORY

1) Milk analyser testing

=1.94ml/sample

=1.94×48/tray

=93.12ml/tray

2) Wastage milk in sampling bottles tray

=11.64ml/tray

=11.64×10/day

=116.4ml/day

10.1.3. OTHER WASTAGES-

WASTAGE OF BUTTER MILK

= 4Kg butter / 40 litre/can

= 36 litre/can

Residual of ghee (berry) = per 10kgs ghee-

= 0.5kg berry produced

CONCLUSION-

After studying all input and output parameter of total plant system it is concluded that procurement department can save transportation cost without disturbing total procurement of milk and other scheduling if the new design is followed. By using the conveyor at RMRD the optimization in time can avoid unnecessary processes with the help of method study. By using time study method we can reduces cycle time. While in milk packing department the wastages of pouches per roll can be minimized by proper rectification of packing machine and taking precautions.

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