

**RAYMOND LIMITED**  
(TEXTILE DIVISION-JALGAON)

**Unit Profile**

**Raymond Limited ( Textile division)** under the flagship of **JK Group** (Worsted and woollen Division) is undoubtedly numero Uno in the Indian Textile Industry comprises of four units. **Textile Division-Jalgaon** is situated at M.I.D.C. area, Jalgaon. which became operational in March,1979. Ours unit started with spinning and weaving activities. Our unit has latest internationally available technologies on many machines. We have quality circles for quality improvement. We are following KAIZEN – doing autonomous maintenance on many machines. Ours is an ISO-9001 company.

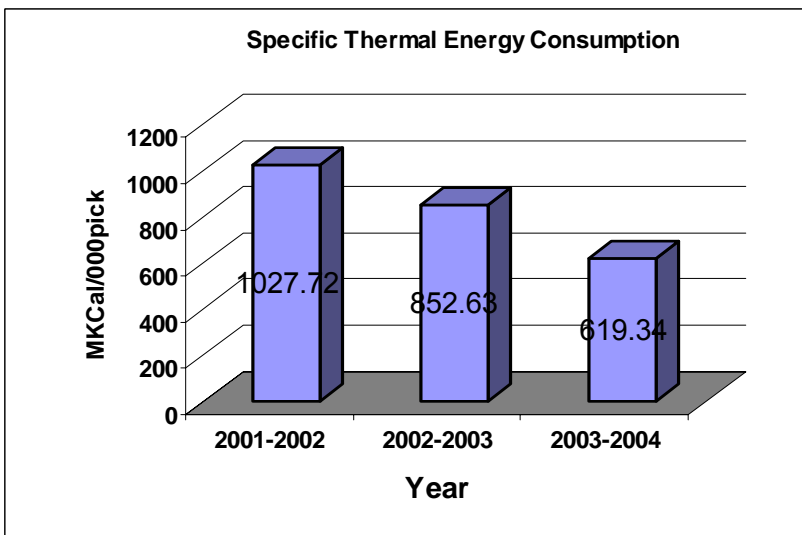
The composite woollen division started its activity at Jalgaon in the year 1986-87. The Woollen division is manufacturing blankets /shawls / blazers / billiard fabric/ Milton fabric in varieties of shades, sizes, colours and blends as per customer requirements. It is a composite unit having latest plant and equipment, various processes like, dyeing, rag-tearing, preparatory, carding, spinning, yarn checking, yarn room, weaving preparatory, weaving, grey mending, dry and wet finishing, finish-perching, folding, warehouse and dispatch to customers. Its raw material is blends of woollen rags, hosiery, nylon, noil etc. We are following KAIZEN – doing autonomous maintenance on many machines.

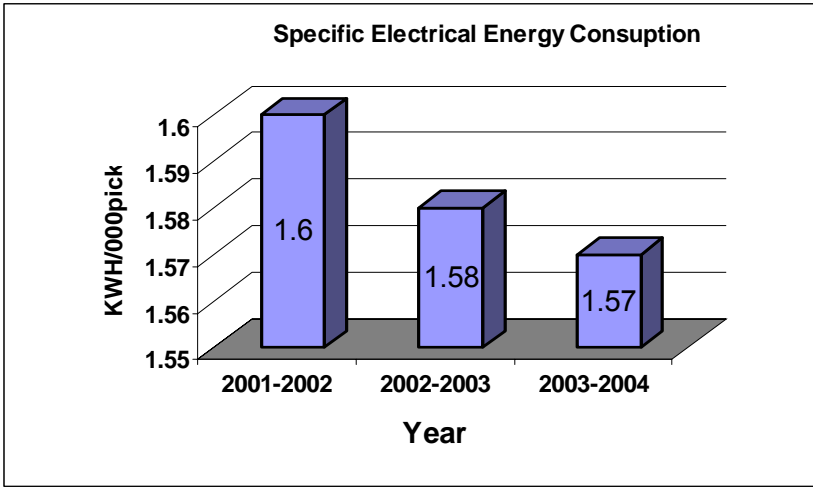
Total we have eleven quality circles in entire mill. we have received quality circle awards from Nagpur chapter.

We have a team of twenty members for Task Force from various departments to carry out energy saving activities, system improvements and to carry out innovative ideas from different section of the departments. The outskirts area of the factory building, main gate and other available area is decorated with lawns, gardens, flower, trees etc. in order to motivate people and better house keeping and this has improved the total impact of our unit.

The success of our company has improved the quality of life in general. This all round growth is an ongoing process at RAYMOND.

**Energy consumption:**





### **(iii) ENERGY CONSERVATION COMMITMENT, POLICY AND SET-UP.**

Section & equipment wise specific consumption is regularly monitored to know how much we are consuming & where. For this we are providing metering equipment in each of the utilities and production departments wherever possible to keep close watch on consumption pattern to avoid inefficiencies. In an unending venture to improve energy efficiency & optimization of all resources study and audits are carried out on every energy consuming equipment on its each aspect for conservation of energy. Different training programmes, seminars, are arranged for plant personnel for making them energy conscious.

A clear-cut strategy has been formulated and full-fledged Energy Conservation Cell has been formed at corporate level & at unit level also. The Energy Conservation Cell is being well equipped with measuring instruments like Digital Load Manager, Flue Gas Analyser, Hygro Meter, Digital Energy Meter, Lux Meter Digital calibration meter etc. The implementation of energy conservation scheme through Energy Conservation Cell is given the highest priority. Based on the recommendation made by EC Cell and reviewed by various level committees, the decisions are taken for implementation of energy conservation programmes.

The Energy Conservation Cell at Raymond Ltd., Jalgaon is headed by Sr.Manager – Engineering, who is reporting directly to Works Director, to carry out energy audit and find out potential areas where energy can be saved.

### **(iv) Energy Conservation Achievement :**

**Project undertaken during 2003 -04 with details are as below:**

#### **1) To lay separate Compressed Airline for cleaning to reduce compressor power consumption, as cleaning air will operate at low pressure**

Present consumption of Air compressor is = 2280 units  
40% of it is used for cleaning.  
Unit consumption = 912 units  
Saving is 15% considered.  
Unit saving =  $912 \times 15\%$   
= 135 units  
Rs. Saving =  $135 \times 360 \text{ days} \times 3.71\text{Rs/unit}$   
= Rs. 180306/annum  
Investment = Rs. 85000

#### **2) Reduce 5-foot Tube lights on 55 mending tables from 4 no. to 3 no. in Mending**

##### **Observations :-**

- A) As per m/c design there were 4 nos of tube lights 40 watt each on one mending table.
  - B) By re-arrangement of tube lights, lux remained same and observed working
- By reducing 1 No of tube light.  
By reducing 1no tube light of 40 watt on 55 no of mending tables.

Actual saving observed by energy meter installed in dept. is ---  
Saving =  $138 \text{ kwh} \times 3.71 / \text{unit}$ .

**Rs. 512/month or Rs.6000/year**

#### **3) Periodic Survey of compressed air leakages**

##### **Observation:-**

- 1) 1/2" air leakage observed and attended in Sulzer dept. cleaning / service line.
- As per chart attached of air flow at various pressures through different orifice plate.  
For 1/2 air line & at 80 PSI pressure.  
Air flow = 340 CFM  
Now leakage attended & considered compressed air loss in terms of percentage as per general practice

So loss considered is 0.01

As air compressor delivers 480 CFM  
 Air compressor delivery per Month -  
 Power required / month = 1800 X 30 = 54000 KWH  
 Cu. Ft. / Unit = 20736000 / 54000 I.e.384 CFM

Loss = 3 X 60 X 24 X 30  
**Units saved**  
 = 129600 / 384 ≈ 337 Unit/month

**Calculated saving for one month**  
 = 337 X 3.71=1250.27 Rs/month  
 =15003.24 Rs/year

**4) Reduce 80 tube lights of 36 W in Zinser spg. by relocating fittings**

**Technical Analysis:**

Location	No. of tube-rods removed	Wattage
Zinser Department	80 Nos.	40 Watts

**Saving Calculations:**

No. of rods removed x kw/Rod x No. of working hours x No. of day x Rate of unit  
 80 x 0.03 x 24 x 360 x 3.71 Rs./Unit = Rs.76930/annum

**Financial Analysis:**

Saving in Rs.  
**RS. 76930 per annum**

**Investment:** Nil

**5)Saving in power by installing Invertor on Mach coner suction motor**



Before installation of  
 Inverter on 20 H.P suction motor current was = 16.5 Amps. -----(A)  
 After installation of  
 Inverter motor current has reduced to = 14.0 Amps.------(B)  
 So reduction in current = A-B = (16.5-14) = 2.5 Amps.  
 $Kwh = \frac{\sqrt{3} VI \cos \phi}{1000} = 1.61 Kwh$   
 Saving = KWH x HRS x DAYS x Rates of Unit  
 = 1.61 x 22hours x 358 x 3.71  
 = 47044Rs/annum

Investment = RS 88,000/  
 ROI = 88,000/47044 = 1.87(year)

**6) Replacement of 8 Nos. of 500 watt halogen lamp by 70 watt CF lamps Dyeing Dept.**

In Dyeing Dept. 8 No. Of 500w were replaced with 70w CFLamp are on for 8hr/day and 310day/annum 500w lamp use to consuming =0.35kw/hr while 70w lamp are consuming=0.05kw/hr  
 saving=(0.35-0.05)kwh x 8hr x 8no. x 310days/amnnum x 3.71RS/kwh=0.22lac/annum  
 Investment=0.24lca  
 ROI=14 month.

**7)Replacing 40 watt tube lights with 20 watt fl. Tube lights in mill premises.**

In passage & Toilet blocks we replaced 50 Watt tube lights by 20watt tube light Total 47 No.  
 40 watt tube light consume power = 0.03 kwh  
 20 watt tube light consume power = 0.015 kwh  
 Saving = (0.03-0.015) kwh x 47 No. x 24 hours x 358 days x Rs.3.71  
 = Rs. 22472/ annum  
 Investment = Rs.4000  
 ROI = 2.5 months.

**8)Gas analyzer to maximize boiler efficiency & save fuel**

As per principle of correct air oil mixture produces proper combustion & mproper efficiency of boiler. Gas analyser indicates O<sub>2</sub> ,CO<sub>2</sub>, Temp. , Pressure & η directly, so we can monitor & regulate supply air through damper opening / closing

Pervious Reading: -

O <sub>2</sub>	CO <sub>2</sub>	η	Temp.(stack)
4.5 %	12.7 %	86 %	189° C
3.5 %	13.2 %	86.1 %	185° C

Present Reading after Regulation of air thro' damper

O <sub>2</sub>	CO <sub>2</sub>	η	Temp.(state)
4.5 %	13.4 %	86.6 %	197° C
2.4 %	14.4 %	87.1 %	193° C

Due to O<sub>2</sub> % regulation η has increased to 0.5 %

For 1 kg of fuel burn 9800 kcal / kg of fuel  
 For 8 kg/cm<sup>2</sup> steam pressure

Heat added = 592 kcal / kg of fuel

As Feed water temp is 72° C,

Therefore Heat added = 72 kcal / kg of fuel

Net heat to be added = (592 -72 )

= 520 keal / kg

i/p = 1 X 9800 kcal /kg.

1) η = out put / input      0.866 =  $\frac{Q1 \times 520}{9800}$

2)      0.871 =  $\frac{Q2 \times 520}{9800}$

O/P = Q X net heat added      Q1 = 16.3      Q2= 16.4

Diff Q= (Q2-Q1) = 0.1 kg.

For 1 kg of fuel 0.1 kg steam is generated extra.

For 2000 litre of furnace oil daily

200 kg steam extra generated

For 25 days working = 200 X 25 days

= 5000 kg extra steam

furnace oil required for generating this steam is

$$= \frac{5000}{13.8} \approx 362 \text{ lit}$$

Calculated saving is

$$= 362 \text{ litre.}$$

**Actual saving**

$$= \text{Rs.2370/- (200 litre)/month}$$

$$= \text{Rs 28440/-(2400lit)/annum.}$$

#### 9) Installation of Auto blow system with recovery unit.

Please find the savings through Heat Recovery system of Forbes Marshall.

We are recovering flash steam of blow down also through Forbes Marshall vessel.

We have noticed following saving by installing this system.

85 deg. C water is recovered through waste heat of automatic

B/d and we can get 56,000 ltr. water per day.

$$\text{Heat Recovery} = 56000 \times (85 - 70) \times 1$$

$$= 56000 \times 15$$

$$= \frac{840000}{1000} \text{ Kcal/day}$$

$$= 540$$

$$= 1555 \text{ Kg of Steam per day}$$

$$= \frac{1555 \times 350 \times 420}{1000}$$

$$= 2,27,850$$

$$= \text{Rs. 2,27,850/- per annum}$$

$$\text{Saving} = \text{Rs. 2.27 Lac/annum (19156lit/annum-F.O.)}$$

#### 10) Minimise losses by steam trap survey & maintain with infrared temp. Sensor.

Steam Trap Monitoring, maintenance and Saving Calculations

Consider average – 2 traps repaired / week. If trap is blowing then steam loss is 10 kg/hr at 80 PSI pressure.

5 Days trap blowing in a week then steam loss from end trap is –

$$240 \text{ kg/day} \times 5 \text{ days} = 1200 \text{ Kg/week.}$$

$$\text{i.e. } 1200 \text{ Kg} \times 4 \text{ week / month} = 4800 \text{ KG/month.}$$

If 2 traps blowing steam/month then 4800 x2 Nos.= 9600 Kg steam loss.

$$\text{Cost of steam} = \text{Rs. 0.85 Kg.}$$

$$\text{Steam saved} = \text{Rs. 8160 per month.}$$

$$\text{Annual Saving} = \text{Rs. 97920/-(8263lit-F.O./Annum.)}$$

#### 11) Installation of Swiss make slapdash automiser for humidification plant of sulzer.



After installation of Swiss make automiser in peak summer ie around 46°C temp.

Plant will be running only with one 10 HP pump.

Power consumption with 16 Nos. swiss automisers.

Load upto 70%	= 5.25 Kw
70% of 7.5Kw (10 HP)	= 5.25 units x 20 hrs x 30 days
Power consumption per month units	= 3150
Power consumption for 3 months(summer)	= 3150 x 3 months = 9450 units
Power consumption for 4 months (winter)	= 5.27 x 10 hrs x 30 days x 4 months
	= 6300 units.
Total Power consumption for 7 months	= 9450+6300= 15750 units.
Saving in power for 7 months	= 25200 – 15750= 9450 units.
Saving in terms of money for 7 months	= 9450 x Rs.3.71 = Rs.35059/-
Total investment of 16 nos. automiser	= Rs. 4916 x 16 nos.= Rs.78656

## **(V) ENERGY CONSERVATION PLAN AND TARGETS**

- 1) To install variable frequency drive on various Blower Motors of humidification Plant
- 2) To replace heavy weight M.S. Impeller of Zinser R/F machines Jacobi overhead cleaners with light weight Impellers.
- 3) To replace all window A.C. Consuming high power and which are 10-15 years old with Energy Efficient new type of Window Air Conditioner
- 4) To replace M.S. Exhaust Fan with F.R. P. Fans at various locations.
- 5) To replace conventional Spray Nozzles of Batliboi Humidification Plant for Sulzer loom shed with power saving "Swiss" Nozzles.
- 6) To keenly monitor day-to-day specific Energy Consumption.
- 7) To carry out Rain harvesting by way of collecting roof water from various factory buildings & putting PVC pipes & collecting the water.
- 8) Recharging of dead Bore wells by putting filter media, slit on casing pipe & collecting rain water into Bore well.
- 9) Installation of energy efficient water pumps for air conditioning & humidification plant
- 10) To install "Luwa" make vacuum cleaning device in spinning & Weaving departments in order to save compressed air - saving in power.
- 11) It is proposed to change "fenner" make special energy saving belts on Two for One Spinning machines

## **(VI) ENVIRONMENT AND SAFETY**

We have identified major accident hazards and taken adequate step for Prevention and Control and provided to the persons working on the site; information, training, and equipment including antidotes. We have information safety data sheets. We are encouraging personal to use protective equipment like earplugs, safety goggles, safety shoes etc.

### **Steps taken for environment up gradation (in 2000– 2003)**

- We have installed various types of guards on production machines, water tanks, and open tanks. All ladders have pipe railings.
- Till now we were treating industrial and domestic effluent in conventional manner. Now we have implement the "Effective Microorganism Technology" consisting of two stages of treatments, i.e. anaerobic bacteria followed by aerobic bacteria stages. The entire pollution load of this stream will be degraded considerably by this special type of bacteria. This technology is originally developed in University of Okinawa (Japan).
- In the process, we have eliminated dyes and chemicals which were not Eco-friendly
- We have installed Exhaust Ducting with Exhaust Fan on Mach-coner and Steaming Machine for healthy environment.
- In Raymond Staff Colony we have implemented "Effective Microorganism Technology" for the treatment of Septic Tank and Soak Pit thereby the bad odour is reduced and the treated effluent is re-cycled / reused for gardening.

**" We Firmly Believe in Co-Existence of Man, Machine and Environment"**  
**"Clean Raymond – Green Raymond"**



## **SMALL GROUP ACTIVITY**

**(Energy conservation project)**

**◆ Objective:**

The Small group of workers will monitor energy (compressed air/ steam, water, conditioned air etc) of their respective dept. & will report waste of energy & will suggest energy conservation measures.

**◆ Name of Department: -**

**1) Worst Division: -**

**a) Zinser:**

- Ring frame
- Two for one

**b) 5700 Department:**

- Ring frame
- Two for one
- Preparatory

**c) Yarn Room**

**d) Old Sulzer**

**e) New Sulzer**

**f) Warping & healding**

**g) Mending**

**h) Engineering**

**2) Woollen Division:**

- Dyeing
- Rag Tearing
- Carding
- Spinning
- Warping
- Weaving
- Mending
- Finishing

**◆ From each Department there will be 2 workers preferably from different shifts along with one supervisor. Department head will give the names.**

**◆ Procedure :-** Observations & activities as a group like-

- i) Switching off light & fans when machine is not in use.
- ii) Switching off suction motors, main motors when machine is under maintenance.
- iii) Closing compressed air, water & steam valve during off time.
- iv) Switching off nearby exhaust fans whenever not required.
- v) He will run the machine to the specified full capacity. e.g. Running ring frames with the material on all spindles.i.e. no idle running of any machine.
- vi) Compressed air will not be use for floor cleaning, false cleaning.
- vii) To report abnormal sound in machine, motors.

Small group team will take initiative of motivating fellow workers regarding energy conservation measures like-

- 1) In the department to look for air, water, steam leakages & report to Engineering department.
- 2) Avoid to use of compressed air for floor cleaning or false ceiling.
- 3) Reporting damaged false ceiling, damaged air curtain, abnormal sound of the machine conditioned air leakages.

- 4) To create awareness among his fellow workers about activities so that all above listed points will be attended by individual workmen.
- 5) To evaluate themselves & fellow workers about advantages of energy saving activities such as with increased machine utilization & less breakdown, productivity increases & small group will have monitor benefit from their activity.
- 6) To prepare display boards & pocket cards with important points of our activity & significance of saving power. The list of workers along with their supervisor of each department with their group photograph & important points of group activity to be displaced on notice board.
- 7) Small group activity will have a monthly meeting & will discuss above action taken by each group of department & future action plans to be discussed in each meeting. The meeting will try to evaluate energy saved in terms of rupees by the way of action plans.
- 8) To consider some rewarding system for best small group activities of individual department group & to carry out competition among the different department 'small group' workers.

## SMALL GROUP ACTIVITY

### (First Meeting)

The small group activity meeting was held on dated 26<sup>th</sup> June-04 at 2:30 pm. This meeting was conducted by Mr.S.M.Agrawal.Mr.Agrawal addressed all the managers, officers & workers present in this meeting.

Mr.H.G.Bal made the workers to understand, the activities, which should be carried out in small group activity, in Marathi.

The following persons were present in this meeting,

Mr. S.M.Agrawal.

Mr. Sanjay Sharan.

Mr. H.G.Bal.

Mr. G.B.Pandit.

Mr. A.Mukharji

Mr. Chandiwai.

Mr. N.C.Dongre.

Mr. S.P.Ghodke.

Name of the workers present in this meeting

Sr.No.	Name	Token No.	Department
1.	Mr. Y.M. Zope.	801	Mending
2.	Mr. S.D. Mahajan.	639	Mending
3.	Mr. S.J. Chaudhari.	1917	Carding
4.	Mr. S.D. Chaudhari.	1529	Carding
5.	Mr. A.P. Shrivastav	2068	Carding
6.	Mr. D.P. Chaudhari	744	Weaving
7.	Mr. P.P. Mahajan.	1617	Finishing
8.	Mr. S.K. Sonawane	148	Spinning

Some of the workers gave a good suggestion during this meeting which is our 'Energy conservation project', that are as under,

One Worker has suggested that the passage between spinning department to weaving department there were lot of tubes which is actually doesn't required. That is why we have to reduce that tubes.

Also the machine FM-7 has a compressed air point near the wall but it should be near to the machine.

## SMALL GROUP ACTIVITY

### (Second Meeting)

The Small Group activity was held on 14<sup>th</sup> July 2004 at 3:30 pm. This meeting was conducted by Mr.H.G.Bal with Mr.S.P.Ghodke & addressed all the officers, supervisor & workers present in this meeting.

Mr.Bal again explained all the points, which was discussed in previous meeting, the activity that is to carry out in small group.

The following workers were present in this in this meeting,

Sr.No.	Name	Token No.	Department
1.	Chaudhari Digamber Pralhad	744	Weaving
2.	Kulkarni Anil Shantaram.	1601	Mending
3.	Bhojane Sukhalal Ramdas	1584	Weaving
4.	Yousuf Shaikh	1657	Dyeing
5.	Sonawane Suresh Kashinath	148	New Spinning
6.	Bhole Namdev Jagannath	1771	Dyeing
7.	Chaudhari Shrikrishna Devidas	1529	Carding
8.	Kolhe Yogeshwar Krishana	695	Helding
9.	Mjahajan Sanjay Damodar	639	Mending
10.	Chaudhari Shashikant Jankiram	1917	Spinning
11.	Zope Yuvraj Madhukar	801	Mending

The following points were discussed,

- 1) In 5700 spinning department near FM-7 Roving m/c it required to shift the air point from wall, which should be near to the machine to minimize air losses and save energy.
- 2) To check diffuser locations in New Sulzer department. It is pointed that there are three diffusers, which are nearer to each other.
- 3) In Grey Perching department, four ceiling fans switch required to be isolated so that effective utilization will save energy.
- 4) In mending department, to check for isolation of ceiling fans for all machines.
- 5) To reduce tube lights on the walls of Grey Mending without affecting the illumination.
- 6) Tube lights in chemical shade of Dyeing department to be kept off in the night shift.

## SMALL GROUP ACTIVITY

### (Third Meeting)

The Small Group activity was held on 12<sup>th</sup> August 2004 at 3:10 pm. This meeting was conducted by Mr.H.G.Bal & addressed all the workers present in this meeting.

Mr.Bal explained all the points, which was discussed in previous meeting, the activity that is to carry out in small group i.e. Energy conservation project.

The following workers were present in this in this meeting,

Sr.No.	Name	EDP No.	Department
1.	Chaudhari Digamber Pralhad	744	Weaving
2.	G. A Chaudhari	331	Spinning
3.	B. G. Bari		Spinning
4.	Yousuf Shaikh	1657	Dyeing
5.	A. P. Lalvanjari	148	Weaving
6.	Jivade Dilip Raghunath	1572	Weaving
7.	Chaudhari Shrikrishna Devidas	1529	Weaving
8.	Kolhe Yogeshwar Krishana	695	Helding
9.	Mahajan Sanjay Damodar	639	Mending
10.	Chaudhari Shashikant Jankiram	1917	Spinning
11.	Zope Yuvraj Madhukar	801	Mending
12.	H. E. Patil	2056	Warehouse
13.	S. B. Waykole	1983	Warehouse
14.	V.R. Nemade		Weaving

**The following points were discussed,**

- 1) To arrange the focus & tube lights properly i.e. from side to center. In the woollen warehouse division --- Mr. J.H.Rane.
- 2) To arrange the switch of tube light, In front of Mr. Anup Chaudhari's cabin --- Mr. J.H.Rane.
- 3) To arrange the separate ckt & button for tube lights in woollen carbonizing --- Mr. J.H.Rane.
- 4) To re-arrange properly fans & tube lights in woollen lunchroom. --- Mr. J.H.Rane.
- 5) To arrange tube light switch near to tube in the woollen passage. --- Mr. J.H.Rane.
- 6) To arrange all three exhaust fans in the woollen weaving. --- Mr. J.H.Rane.
- 7) To arrange emergency light in dyeing & spinning. --- Mr. J.H.Rane.
- 8) To have the identification of switches of tube lights in terms of numbers. --- Mr. J.H.Rane.
- 9) In Worsted division, Spinning Department, it is required to stop the compressed air leakage due to damage of compressed air pipeline near Gill Box & FM-7 machine. --- Mr. S.P.Ghodke.
- 10) To have a new point of compressed air near Ring Frame Bay No.2 machine to clean the pipes in 5700 Worsted Division. --- Mr. S.P.Ghodke.
- 11) To have new point of compressed air near TFO in 5700 Worsted division. --- Mr. S.P.Ghodke.
- 12) To have the latches to all the Toilets & Water proofing of whole Toilet Room in New Sulzer in Worsted division. --- Mr. Khadse.
- 13) To Repair the Water cooler in New Sulzer of Worsted Division. --- Mr. A.H.Joshi.
- 14) To clean the lunchroom & open the drain of that lunchroom which gets choked. --- Mr. Khadse.
- 15) The East sidewalls of N.P.Loom have more leakage problem in Woollen Division. --- Mr. Khadse.
- 16) To repair semi central duct Humidification unit which gets damaged. The suggestion is to use the FRP sheet for repairing purpose. --- Mr. Khadse.
- 17) To stop the leakages of oil in Woollen Division in Weaving Department (Concern Mr. Sanap)
- 18) To have separate Water cooler to reduce the downtime of production in Woollen Weaving Department. --- Mr. A.H.Joshi.
- 19) To repair the push cock knob in Woollen Toilet. --- Mr.Khadse.
- 20) To spray the Mosquito Repellent pesticide in Factory. --- Security
- 21) To solve Attendance Card problem. --- HRD