

## **CHAPTER IV**

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## PROFILE OF HINDUSTAN LATEX LIMITED, KANABALA

## INCEPTION AND GROWTH:

Hindustan Latex Limited(HLL) has, over the past two decades, been a part and parcel of the Government of India's Family Welfare Programme. Over the years it has supplied to the Family Welfare Department more than 4 billion condoms.

The Company commenced operations in the year 1969 with an annual production capacity of 144 M.pcs. This was doubled in 1977 (to 288 M.pcs.) by putting additional manufacturing lines to the existing plant. In 1986, two additional plants were commissioned, with the latest Japanese Technology, each with an annual capacity of 160 M.Pcs; one at Trivandrum and another in Belgaum, an industrially backward area. Today HLL is the largest manufacturer of contraceptive condoms in the country with a production capacity of 608 Million pieces of condoms. All the plants have been set up in collaboration with the world leaders in this field- M/s. Okamoto Industries Inc., Japan.

In the process HLL has grown to meet by and large a major portion of the national demand for this popular spacing aid, which has played a significant role in keeping a tight rein on population growth.

While maintaining a high profile in the area of Family Welfare, HLL has recorded consistently, over the past nine years, excellent working results, high productivity and capacity utilisation, and excellent industrial relations.

The company has progressively recorded high productivity and profitability also. The Company has achieved consistently high capacity utilisation at its plants. The figures for the past three years are:

TABLE Q

	CAPACITY UTILISATION AT HLL (1987-1989)		
	1987-88 (%)	1988-89 (%)	1989-90 (%)
New Plant Trivandrum	99.14	91.21	109.02
Old Plant Trivandrum	79.93	90.07	121.77
New Plant Belgaum	57.42	104.94	101.26

As a result of efficient and effective monitoring and quality control at every production stages, wastage and rejections were brought down considerably, from over 34 percent during 1984-85 to 10 percent during 1989-90.

HLL has recorded a profit of Rs.3,572 crores for 1989-90 the highest, so far achieved by the Company. Over 42 percent of the Profit has been through cost reduction and with the active participation and support of all the employees.

A comparison of some of the financial results of HLL during 1987, 1988, 1989 and 1990 is given below:

(Rupees in Lakhs; Production in Million Pcs.)

TABLE b

PROGRESS OF HLL (1986-87 to 1989-90)

	1986-87	1987-88	1988-89	1989-90
Turnover (Rs.lakhs)	1127.21	1868.34	2140.02	2491.20
Production (Million pieces)	357.59	455.66	549.51	590.00
Cash Generation (Rs.lakhs)	200.95	501.46	546.42	651.44
Gross Block (Rs.lakhs)	2695.00	2764.00	2859.00	3062.03

The Growth and achievements have been the result of: (a) Higher productivity (b) Tight Financial Management and Inventory control (c) Fast realisation sales and (d) Excellent co.operation of the employees.

Hindustan Latex Limited has emerged as the nucleus of condom manufacturing technology in the country. The company has acquired a sound technology base for the manufacture of condoms and has made process improvements over that of its Japanese Collaborators.

The company is now able to handle trade enquiries and offers from abroad and from within for setting up of new factories for manufacture of condoms. The company has already signed an

agreement for the transfer of technology to M/s.Polar Latex Limited for setting up of a condom plant at Balasore, Orissa with an installed capacity of 160 million pieces.

To keep pace with the technological advancement in the manufacture of contraceptive condoms that has been taking place the world over and to produce condoms of quality comparable to International standards, HLL is in the process of a massive Modernisation Programme of its old plant set up in 1969. The project scheduled to be implemented in two phases at a total cost of Rs.496 lakhs is progressing well. This will result in enhancement of production capacity as well as improvement of product quality through conversion of existing manually operated plants into fully automatic ones, and using indigenous components, except special type level controller for which no equivalent could be located in the domestic market.

The Phase-I stage of the programme commissioned in June,1989 has yielded expected results. The wastage and rejections at different stages of production have been reduced considerably, as also the down-time of the machines.

The total cost of the modernisation programme would have been Rs.1,000 lakhs if import of machinery were resorted to. Against this HLL will achieve the total modernisation of the plant at less than half the cost of Rs.496 lakhs, bringing about a saving of over Rs.504 lakhs, besides helping to save valuable foreign exchange equivalent of Rs.10 crores.

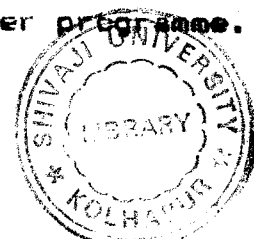
The company has laid great emphasis on effective quality control at every manufacturing stage, right from the checks on the raw materials, to the final product during its various production stages.

Besides this the condoms are tested on the computerised Electronic Pin Hole Testing Machine. They also undergo further screening as prescribed under schedule 'R' of the Drugs and cosmetics Act. The emphasis on quality has resulted in the Company's bagging valuable export orders from advanced nations such as Canada and the USSR. The company exported over Rs.175 lakhs worth of condoms during 1989-90.

It is a testimony to the high quality maintained by the company that it has today several enquiries for exports, from advanced countries such as Canada, USA and from countries in Europe and ~~for~~ repeat orders from the USSR.

To meet increasing demand for high quality and newer varieties HLL launched Company's own brands in the domestic market through direct commercial channels. 'Moods' a premium brand, was the first of such brands introduced in the market on a National Scale. Two more brands targetted at the middle and lower income groups have been developed. These are 'New Share' and 'Rakshak' - India's first spermicidal condoms.

The company spends over Rs.6 lakhs every year for training of its employees at various levels, including a 3 tier programme.



one-third of the employees have already been covered in the various training programmes. Quality circle movement has taken firm roots in the company since 1986-87 at the initiative of the employees. Today 13 quality circles cover the entire spectrum of the company's activities. A productivity linked incentive scheme introduced in 1986 has also played an effective role in improving productivity and employee participation for better organisational performance.

Hindustan Latex Limited today employs over 1703 persons at its plants at Trivandrum and Belgaum. Cordial employee-employer relationship over the past nine years has made the company a trend setter in the area of Industrial Relations. Long term wage agreements have been arrived at through bipartite negotiations. A productivity linked incentive bonus scheme was introduced in 1987-88 after direct negotiations with Unions. Better communication and information sharing have resulted through participation at all levels. A comprehensive study on occupational health of every employee was undertaken by the company with the assistance of the Regional Occupational Health Centre, Bangalore.

House visits of employees who are regular absentees have been made by the Chairman and Managing Director and Executive Director to understand their problems. All assistance is given to employees for urgent medical aid. Immediate assistance is given to an employee's family. Awards are given to employees for

innovative suggestions to improve productivity, performance. Educational awards have been instituted for employees children for their academic achievements. Recreation Club of the Company's employees has been a forum which binds them through cultural and sports activities. A creche for employees children is also provided. Employees run their own co-operative society within the factory premises. Top officials of the company visit houses of every employee at all social family functions.

The company has an enviable record in the area of effective safety management. There has been no serious accidents in the company ever since its inception in 1969. The company has a safety Officer to monitor safety operations at its plant. High priority is given in the area of pollution control at the company's plant.

The company has got clearance for the setting up of an URAL PILLS Unit with an investment outlay of nearly Rs.3 crores. These Pills are to be taken only once a week.

Other Family Planning Aids Planned to be introduced are:

- 1) INJECTIBLE CONTRACEPTIVES -- which need be administered only once in three months.
- 2) NORPLANT-Subdermal Implants-- a long acting hormonal contraceptive which is implanted subdermally and protects against conception for five years.
- 3) HYDROCEPHALUS, SHUNT -- an implanted plastic device for the management of Hydrocephalus disease.



4) BLOOD BAGS -- (with technology to be provided  
by Sri Chithra Centre)

Hindustan Latex Limited is a fast growing organisation diversifying in various lines. The consistent efficiency in production and productivity and higher profitability and return on capital employed have projected it on the National Stage as a model Public Sector Undertaking in the Country.

Hindustan Latex Limited today has an objective to fulfil its organisational perspective being to share the responsibilities of the Nation in the area of Family Planning and Health care, and assist in creating a healthier, more hygienic and happier tomorrow.

## HINDUSTAN LATEX LIMITED AND ITS EXPANSION PROJECT

Hindustan Latex Limited, is a public sector undertaking established in 1967 by the Government of India, Ministry of Health and Family Welfare to solve the increasing problem of population.

This expansion project is located at Kanagala, a remote village 60 kms from Belgaum, while the main branch and head office are located at Thiruvananthpuram (Trivandrum).

Hindustan Latex Limited plays an important role in the complex task of population control. The expansion project was initiated to meet the increasing demand of condoms for Government of India's family planning programmes.

Hindustan Latex Limited is regarded as the World's largest manufacturer of the condoms. The condoms manufactured are thinnest type of 0.4 to 0.5 mm thickness. The technology is provided by "OKOMOTO RIKENGOMU CO.LTD" from Japan. Hindustan Latex Limited is the first to bring out the spermicidal type of condoms in India. Out of many brands, two brands of condoms from Hindustan Latex Limited are exported.

The expansion project has a capacity of 160 million pieces for a year.. The production side is divided into two parts.

The two main parts are primary section and secondary section. The primary section is again divided into compounding, moulding and vulcanizing section. The secondary section consists of inspection and packing sections.

The condoms are produced in automatic moulding machine. There are two such types of machines. The condoms are electronically tested for pinholes using pinhole testing machine, they are rolled up in the same machine. They are lubricated and then wrapped in alluminium foils.

This Belgaum project produces four brands of condoms. It manufactures "Nirodh" for the Government of India in two brands under commercial and free supply schemes. The marketing brands are "Deluxe Nirodh" and "Super Deluxe Nirodh" which are lubricated brands. The commercial brands include Deluxe, Super Deluxe, New lubricated, Masti, Sawan, Bliss. Free supply brands are supplied by Government on free basis.

The factory has a manpower of 344 members including Administrative section.

#### DISCRIPTION OF PROCESS

Condom Production Process:

Production of condoms consists of the following processes.

- 1 Receiving of Raw materials.
- 2) Compounding process.
- 3) Moulding process.
- 4) Vulcanising process.
- 5) Half product laboratory
- 6) Inspection process
- 7) Lubricating process
- 8) Packing process.

### 1) Receiving of Raw materials:

All raw materials including raw rubber latex and various chemicals are accepted and stored only after sample inspection and after getting clearance from the laboratory. Sample from each lot is checked in laboratory as per the standard specified and clearance for acceptance is given, only if each lot confirms to the specifications.

**Raw Latex Analysis:** Total solid content- about 2 to 5 gram of the sample is weighed in a petridish and is evaporated to dryness in an oven at 70 degree C for 16 hours. Then it is cooled in a desiccator and weighed.

**Dry Rubber Content:** About 10 to 15 grams of the latex sample is weighed into a beaker. It is then diluted by adding 10-15 ml of distilled water and then coagulated by adding 5 percent acetic acid dropwise. The coagulated sample is boiled for 10 minutes and is spread out and dried in an air oven for sixteen hours at 70 degree C.

**Total Alkalinity:** About 1 to 3 gram of the latex sample is weighed and it is titrated against 0.1 normal hydrochloric acid using methyl orange as indicator. The test is conducted in water medium.

**Mechanical Stability Test:** Total solid of the sample for testing mechanical stability test is reduced to 55 percent by adding 1.6 percent ammonia solution. The sample is heated to 35 Degree C and 80 gram of the heated sample is sieved in 80 mesh and tested for mechanical stability test by using mechanical stability tester.

## 2) Compounding Process:

It is in this section the actual process of production starts. Various chemicals such as vulcanising agent, vulcanizing activator and accelerator, antioxidant, stabilizers, dispersion agents etc. are mixed throughly and are compounded with rubber latex. Stand grinder, pot mills are used to make the dispersion particularly for sulphur, zinc oxide, and antioxidants of the chemicals. They are mixed and grind into ultrafine stable particles. Demineralized water is used for mixing the chemicals are charged to the mixing by using charging pump. These chemicals are mixed and compounded with rubber latex in the compounding tank. After completion of compounding the mixture is heated and cooled in order to prevulcanize and it is done by automatic temperature control system.

The compounded mixture is clarified with the help of super centrifuge. Further the mixture is tested and controlled with respect to specified density, viscosity, mechanical stability test,

prevulcanized degree etc. Finally it is transferred to the supply tank, from where it goes to the dipping tank of moulding section.

The chemicals casion, potassium oleate, ammonia, vulkacit are weighed and fed in put grinder and rotated for about 48 hours. It is then fed to sand grinder for 10 cycles to get ultrafine stable particles.

### 3) Moulding Process:

This process is highly automated. Condom shaped glass moulds are mounted on dual line chains in the automatic moulding machine. Each mould takes fifteen minutes for one full circulation.

When driven by the chains the glass moulds automatically pass through the following sections:

Mould washing

Mould Drying

Control of mould temperature

First dipping in compounded Rubber Latex

Drying

Control of Mould Temperature

Second Dipping in Compounded Rubber Latex and drying

Beading

Finishing, Drying and Vulcanizing

Dipping in Swelling/Leaching Tank

Dipping in Anti-sticking Tank

Stripping

**Mould Washing:** Glass moulds are dipped in mould washing tank with detergent additions and washed with rotatory disc brushes and a spring of hot water.

The pinholes in the product are detected by washing water. Therefore temperature and quality of washing water shall constantly be controlled by automatic temperature controller and filtration with special micro-filters.

**Moulding Washing brushes:** There are totally six sets of brushes, made up of nylon threads. The brushes are belt driven and they rotate at constant speed.

There are totally three sets of brushes namely body brush, neck brush and root brush. These brushes clean the respective parts of moulds as the moulds pass between them.

**Mould Drying and Control of Mould Temperature:** After being washed, glass moulds undergo surface water evaporation and at the same time they are heated in drying booth. Control of glass moulds temperature is achieved by passing the moulds through the cooling booth, in which the air is controlled by cooling air.

For cooling purpose there is a cooling fan which sucks air from the air rotating at about 900 r.p.m. This fan is installed in a box. Air coming out of this fan passes through air filters.

**First Dipping of moulds in Compounding Latex:** Glass moulds pass through the dipping tank filled with compounded rubber latex while thin film is formed on their surface. The uniformity in thickness of the film is significant for products.

The important factors for this are the constant running of glass moulds at a fixed speed of the chain of the automatic moulding machine, as well as the control of the physical conditions, i.e. the temperature, density viscosity, and so forth, of the compounded rubber latex and of the temperature and humidity in the dipping chamber. In order to control the temperature of compounded rubber latex, the dipping tank has double-wall-construction having water jacket system to control the temperature of the compounded rubber latex automatically.



**Dipping Tank.** The dipping tank is rectangular in shape and is jacketted to make the temperature control essential. This is done by passing chilled water or hot water through the jacket. The tank is made out of stainless steel. It consists of four partitions. The depth of the tank is more in the middle than at the ends. This tank consists of two hollow cylindrical tubes.

**Drying:** After passing through the dipping tank, glass moulds rotate and reverse to run into the drying booth. The booth is equipped with steam heater pipe and is blown with hot air by the blower. It is so designed that the hot air is directly applied to products. Its temperature control is automatically attained. The revolution of the blower is freely variable for controlling air rate and pressure. The ammonia water on the compounded rubber, latex film on mould surface evaporates to form rubber film.

#### **Second Mould, Temperature Control, Latex Dipping and Drying:**

After the first dipping and drying, glass moulds run into lower mould temperature control booth from the upper drying booth, enter the dipping tank to get compounded rubber latex film on their surface and continue to run into the drying booth. After drying, the rubber film of the required thickness is formed on their surface to ensure from any defects on the first dip, film must be covered by second dip formation.

**Beading:** The rubber film formed on the mould surface is beaded with its lower end taken up by specially designed rollers.

There are totally three sets of beading rollers which are made of sponge. These three sets are of different sizes and are driven by motors.

**Finish Drying and Vulcanizing:** Vulcanizing of products formed on moulds is carried out through heating and drying booths.

**Dipping in Swelling/Leaching and Anti-sticking Tanks:** It is necessary to reduce the adhesiveness of rubber film to glass moulds for facilitating its stripping from glass moulds after complete drying. For this purpose it is dipped in the swelling, leaching, and anti-sticking tanks. The former, containing a small quantity of ammonia is so controlled that it is constantly supplied at a fixed rate. Chemicals are added to the anti-sticking agent tank constantly by a feeding pump.

**Stripping:** The force of slurry water, jetted from the special nozzle supplied by the slurry pump, is utilised to separate the products from the glass moulds.

The separated products are conveyed to the next process together with powder slurry flowing through the pipe. Empty glass moulds on the other hand proceed to the initial stage for moulding starting with washing process. The processes are all repeatedly performed by automatic moulding machine by OKAMOTO independently. So the products of the same quality are efficiently produced.

#### 4. Vulcanization Process:

Vulcanization is the reaction between rubber and sulphur. Sulphur enters into the reaction with majority of unvulcanized rubbers to produce vulcanizates. The sulphur is used at the rate of 1.5 phr (per hundred rubber). This reaction consists of the formation of a molecular network by a chemical tying together of independent chain molecules. Vulcanization is thus an inter-molecular reaction which increases the retractive force and reduces the amount of permanent deformation, remaining after removal of the deforming force. In simple language, vulcanization increases the elasticity of rubber and reduces its plasticity. Vulcanization usually produces network junctures by the polymer chains. These cross links may be chains of sulphur atoms, single sulphur atoms or carbon bonds.

Vulcanization system consists of sulphur, accelerator, activators etc. by a sequence of reaction gives rise to sulphorating agents. The latter yields a rubber bond intermediate. This rubber bond intermediate initially yields polysulphide cross links and finally a vulcanized network consisting of mainly monosulphide cross links.

**Accelerators:** The function of an accelerator is to increase the rate of vulcanization. Accelerator can cut the vulcanization time. Reduction in time required for vulcanization is generally accomplished by changes in amount and or types of accelerators used.

This reduction in time is of great importance as this results in very high production rate and reduction in capital investment.

The vulcanization process is divided into following parts:

- a) Dehydrating
- b) Predrying
- c) Vulcanizing
- d) Depowdering
- e) Quenching
- f) Discharge.

**Dehydrating and Predrying:**

The products separated from glass moulds in the automatic moulding machine are fed to the dehydrating device which consists of rotating mesh barrel, together with slurry water flow. The slurry water is removed there and further drying by the hot air blown there in at a time. The products are discharged their form.

**Drying/Vulcanizing/Depowdering/Quenching/Discharge:**

The products discharged from the dehydrating devices are conveyed to the automatic vulcanizing and depowdering machine by blowing device.

The vulcanizer consists of two automatically rotating mesh barrel units capable of blowing hot and cold air respectively to control the vulcanizing temperature and time automatically.

The products fed from the dehydrating device are heat dried and vulcanized simultaneously for a certain period alternately using the vulcanizing units.

### 5) Half-Product Laboratory:

After the completion of vulcanization the condoms are subjected to Half-product Lab. The random sample of the condoms (length, thickness, width, weight of the condoms) will be checked in this laboratory.

### 6) Inspection Process:

The whole products from previous process are subjected to inspection and verification for judgement to confirm acceptable/suitable product quality through the following sequence.

a) Whole quantity of products are inspected for existence of pinhole through automatic electronic pinhole testing machine driven by chain conveyer beginning via the following sentence.

Setting - covering on test mould.

Collector for dropped - out product.

Wetting

Detecting/Electrical Testing

Washing/Rinsing

Drying

Rolling up

Classifying/Selecting

Sub-dividing.

b) Sampling inspection for existence of pinhole by continuous JIS type tester and/or manual JIS type tester.

c) Sampling inspection for appearance of re-unrolled products by vibrating visual tester.

Based on the above functional sections procedures to inspect whole quantity of products for existence of pinhole through automatic electrical pinhole testing machine shall be as follows:

**Setting Covering on Test Mould:**

Produced condoms are manually set/covered on test moulds and visually checked by workers.

**Collector for Dropped out Product:**

The function of the collector is to collect any dropped out products which are not properly set/covered on test mould by air section.

**Wetting:**

Condoms mounted on test moulds are led to dip into the wetting bath of which temperature and level are automatically controlled and into this bath, a fixed quantity of chemicals are continuously charged to aid easy penetration of water through existing pinhole if any. Here Dedinol-DT is used as an wetting agent.

### Detecting/Electrical Testings:

In order to detect existence of pinhole, each condom placed on test moulds. Which constitutes one electrode first depend in wetting bath for increment of better conductivity and passes through an aqueous electrolyte bath.

The liquid level and temperature in the electrolyte bath is constantly controlled, when passing through the bath, electricity is activated simultaneously between the test mould and wals of the bath. Condoms having its resistance lower than the desired values will be rejected at the classifying section. The techniques of detecting defective condoms for rejection is based on the corresponding pinswitch located under each holder of test moulds whereby activation on the pins is punched through the switch alot and remain projected vertically above the alot for detection between the classifying unit.

To maintain correct measurement of condoms electrical resistance fixed quantity of chemicals are continuously fed to the bath to increase efficiency and improve electrical conductivity of the water in the bath.

Sodium bicarbonate or Sodiumchloride is used as an electrolyte.

Sub-dividing: Acceptable condoms are automatically accounted and divided to designated quantity each devident of quantity will be hereafter called "One Inspection Lot"

#### 7 & 8) Packing and Lubricating Process:

Condoms after acceptance and rolling up in inspection section proceed to packing process. The condoms are lubricated for preserving quality from ageing. The lubricant used is silicon oil.

The packing and lubricating processes are done in same machine. The rolled up condom is squeezed between two laminates of aluminium foil bearing the brand name of the condom. Then they are sealed at periphery. This is a continuous process. The condoms are fed manually and lubrication and wrapping is carried out automatically.

#### Special Packing:

The wrapped condoms are then put into polythene packets and then walletted in specified numbers. The wallets are filled in cartons.

The condoms are packed in the following manner:

#### Super Deluxe

4 pieces in one pouch in one wallet

25 wallet one carton

50 carton in one corrugated box

Total- 5,000 pieces.

#### Deluxe Nirodh:

5 pieces in one pouch in one wallet

20 wallet in one carton

50 carton in one corrugated box

Total- 5,000 pieces.



Nirodh:

3 pieces in one wallet

50 wallet in one carton

40 carton in one corrugated box

Total-6,000 pieces.

Free supply Nirodh:

50 pieces in one pouch

10 pouch in one carton

12 carton in one corrugated box

Total-6,000 pieces.