COMPUTERIZATION OF SPIN PLAN AND DETERMINATION OF LABOUR NORM AT RING FRAME CONSIDERING THE NET LOSS RECOVERY THROUGH PIECING UP THE BROKEN ENDS OF YARN

MD. RAMZAN ALI

DEPARTMENT OF INDUSTRIAL AND PRODUCTION ENGINEERING
BANGLADESH UNIVERSITY OF ENGINEERING & TECHNOLOGY
DHAKA-1000
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A thesis submitted to the Department of Industrial and Production Engineering (IPE), Bangladesh University of Engineering & Technology, Dhaka in partial fulfilment of the requirements for the degree of Master of Engineering in Industrial and Production Engineering.

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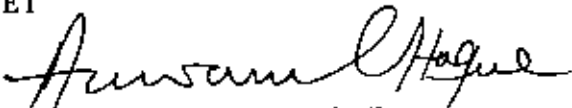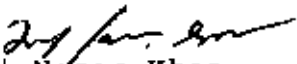**DHAKA-1000**
BANGLADESH

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Accepted as satisfactory in partial fulfilment of requirements for the degree of Master of Engineering in Industrial and Production Engineering.

Approved to the style and content by :

1. Dr. Ahsan Ali Khan   (Chairman)
    Associate Professor
    Department of IPE
    BUET

2. Dr. A. F. M. Anwarul Haque   (Member)
    Professor
    Department of IPE
    BUET

3. Dr. Ali Nesar Khan   (Member)
    Counsellor & Head
    Department of Testing, Quality Control & Research
    Textile Industries Development Centre(TIDC)
    Nayar Hat, Savar, Dhaka.

DEPARTMENT OF INDUSTRIAL AND PRODUCTION ENGINEERING
BANGLADESH UNIVERSITY OF ENGINEERING & TECHNOLOGY
DHAKA-1000
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CERTIFICATE

This is to certify that this work has been done by me and it was not submitted to elsewhere for the award of any degree or diploma or for publication.

_____
Supervisor

_____
Author

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ACKNOWLEDGEMENT

ABSTRACT

Bangladesh is one of the lest developed countries and its textile sector has been declared as "thrust sector" for industrial development. Creation of necessary backward linkage by establishing sophisticated spinning mill is the precondition to achieve the economic goals through developing the Textile Sector.

End down or end breakage is one of the major problems that reduces production and increases labour cost of spinning mills. End breakage is an unavoidable phenomena during spinning and accordingly a number of manpower is engaged to eliminate end breakage by piecing up the broken ends. The number of side(s) to be allocated per tenter (labour) at any end breakage rate has been introduced in spin plan (determination of optimal number of machines and accessories in all sections of spinning mill).

Spin plan is an essential but laborious and time consuming task. To overcome the constraints a computerized method has been developed for spin plan which requires least time to provide almost all required features.

A table has been prepared under the title "Ring Production Table (RPT)" containing some essential techno-managerial indexes and instantaneous vivid features of ring production data and also shows among others (interalia) the optimal labour norm against the ring frames, revenue generation per day etc.

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1.1 GENERAL INTRODUCTION

Industrial development plays an important role on the economic development of developing countries like Bangladesh and Textile Industry is considered as prime mover of industrial development. Bangladesh has a historical background of Textile Industry and at present it is an important industrial sector as 60% of the export earnings comes from this sector. This has been possible as the export oriented Ready Made Garments (RMG) industry has made an spectacular growth over the last few years.

Clothe is one of the five basic needs of human beings. It is also the symbol of civilization, the key item to flourish the beauty of human beings and used as safe-guard during movement in unfavourable weather.

The contribution of Textile Sector to National export earnings is shown in Table # 1.1. This table illustrates the importance of textile sector in economic development of Bangladesh.

High quality fabrics are required for best quality garments,

TABLE # 1.1 :   CONTRIBUTION OF TEXTILE SECTOR TO NATIONAL
EXPORT EARNINGS OF BANGLADESH

(Figure in crore Taka)

SERIAL NO.	YEAR	EXPORT EARNING		
		TOTAL	CONTRIBUTION OF TEXTILES	
			TOTAL	%
1	1978-79	928.22	0.16	0.02
2	1985-86	2431.40	390.22	16.05
3	1990-91	6056.09	3138.21	51.02
4	1991-92	7590.85	4572.21	60.23
5	1992-93	9257.54	5726.60	61.86

Source :   ITET Grand Convention Bulletin, 1995, derived
from the Data Bank of TSMU (Textile Strategic
Management   Unit),   Ministry   of   Textiles,
Bangladesh.

consequently high quality fabrics must be originated from high quality yarns which are manufactured in spinning mill.

End breakage in spinning mills is an unavoidable occurrence that deteriorates yarn quality and reduces production. No spinning technology free from end breakage has yet been developed in the world.

Broken ends are pieced up manually. The number of labours required per machine depends on end breaks per hour and piecing up capacity of labour. Conventionally, the number of labours required per machine is determined by past experience which sometimes found inaccurate. The number of machines required in different sections (Blow Room, Carding, Drawing, Combing, Simplex, Ring and Finishing), total production per shift, total labour cost etc. are calculated manually which is much laborious and time consuming. Recently, Computer Aided Data Recording System, known as "Ring Data" has been developed to monitor instantaneous information such as spindle speed, twist per inch (TPI), count, end breaks, total production and efficiency of ring section. Though Ring Data is much effective to monitor ring section, it requires considerable amount of investment and it does not provide any information regarding optimal number of labours required per machine against present end breakage rate and net loss recovered by piecing up of broken ends of yarn in ring section.

1.2 PRESENT SITUATION OF SPINNING MILLS IN BANGLADESH

Textile goods of Bengal, especially the "muslin" of Dhaka (Dacca) was world famous until the beginning of eighteenth century. Industrial revolution in Europe and the political defeat of Bengal crashed the textile supremacy of Bengal within half a decade. At present Ready Made Garments (RMG) industries contribute 60% of total export earnings of Bangladesh. But the real foreign exchange earnings from export of garments from Bangladesh is only 20-30% of the total value of exports due to the dependence on imported fabrics and accessories. The requirement of fabrics for the export-oriented garments industries is about 1800 million metres for which only 3% locally produced fabrics are used. Moreover Bangladesh needs more than 1300 million metres of fabric for domestic use for her 112 million people.

The ready-made garments industries are now growing rapidly due to cheap labour and favourable situation created by quota system. Under MFN (Most Favoured Nation), Bangladesh currently enjoys benefits from such a quota system. With the emergence of World Trade Organisation (WTO) the MFN that currently governs textile and clothing trade and quota system will be phased out by the year 2005. Withdrawn of quota system would throw the garments export from Bangladesh to open competition and reduce

the CMT (Cutting, Making & Trimming) business of our RMG industries. In that case, demand for locally produced quality fabrics will increase.

Considering the above facts, Textile Sector has been declared as "Thrust Sector" and it could be easily said in general that textile is a potential industrial sector. But we have little idea about the potentialities of different sub-sectors of textiles and the development of different sub-sectors (Spinning, Weaving, Dying and Finishing) are not balanced.

The projected demand of fabrics vis-a-vis yarn for domestic need and export through RMG by the terminal year 1994-95 of FFYP (Fifth Five Year Plan) and onwards up to 1992-2000 is shown in Table # 1.2.

The growth of spinning mills and RMG industries as shown in Table # 1.3 indicates the importance of textile sector in economic development of Bangladesh.

It would appear from the Table # 1.2 that the demand gaps of yarn and fabrics during 1993-94 are 230.00 million kg and 1930 million metre respectively, which are expected to increase to 417.30 million kg and 3,710.00 million metres respectively by 1999-2000.

TABLE # 1.2 : DEMAND PROJECTION OF FABRICS VIS-A-VIS YARN FOR LOCAL CONSUMPTION AND EXPORT AND DEMAND GAP OF YARN AND FABRICS

YEAR	FABRIC (MILLION METRES)					YARN (MILLION KG)		
	DOMESTIC NEED	RMG	TOTAL	PRODU-CTION	DEMAND GAP	REQUIR EMENT	EXIST ING PRODU CTION	DEMAND GAP
1992-93	1320	1000	2320	860	1460	258	91.33	166
1993-94	1380	1350	2730	800	1930	303	73.00	230
1994-95	1450	1820	3270	840	2430	363	113.7	249
1995-96	1520	2000	3520	880	2640	391	113.7	277
1996-97	1600	2200	3800	930	2870	422	113.7	308
1997-98	1680	2420	4100	970	3130	456	113.7	342
1998-99	1760	2660	4420	1020	3400	491	113.7	377
1999-2000	1850	2930	4780	1070	3710	531	113.7	417

Note : 1. Growth rate of local demand has been assumed to increase by 5% and that of export demand has been assumed to decline 10% due to impact of implementation of WTO rules in phases.

2. Production level of yarn and fabrics declined during 1993-94 from 1992-93 level due to pilling up of stock of public sector mills, lack of working capital finance, closure of power looms and hand looms, laying off of 10 public sector mills for privatization.

TABLE # 1.3 : GROWTH OF SPINNING MILLS AND RMG INDUSTRIES IN BANGLADESH

SL. NO.	NAME OF SUBSECTOR	YEAR					
		1947	1970	1972	1982	1992	1994
1.	Spinning : a) No. of units	9	45	51	59	113	118
	b) No. of spindles(000)	110	750	830	1094	1883	2099
2.	Ready Made Garments(RMG)	-	-	-	74	1481	1706

The demand gaps of different textile products show that there is a tremendous scope for creation of new capacity to attain self-reliance in phases. Even to meet the present gap of yarn and fabrics, Bangladesh requires about 100 spinning mills each with 25,000 spindles, 243 weaving mills each with 300 shuttles or 120 shuttle less looms, and 243 dyeing & finishing units each with processing capacity of 10 million meters per year. The projected demand gaps show that the number of mills required to be set up to meet the gaps of textile products by 1999-2000 will be 156 for yarn, 371 for grey fabrics and 371 for dyeing and finishing. Implementation of such a big number of projects within such a short period will be difficult if special efforts are not taken.

Since there exists huge demand of yarn against it's supply, the import of yarn will always prevail over the market until and unless the local production will be able to compete them in terms of cost and quality. The known ways of minimizing the cost are to reduce the wastage through rational utilization of raw material and increase the labour productivity by improving the services and performance of workers. A cost effective labour norm in the ring frame can considerably reduce the labour cost as well as product cost (yarn cost). Improper breakage elimination or failure in piecing up of broken ends at ring frame yields wastage, deteriorates quality of yarn and reduces the productivity. As such, it ultimately brings

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financial loss to spinning mills, it is of great importance to calculate the net loss recovery by end breakage elimination.

1.3 AIMS AND OBJECTIVES

On the basis of the discussions made above, the aims and objectives of the present work were set up as follows :

1. Study of process-technology in ring frame.
2. Study of causes of end breakage in ring frame and its impact on production.
3. Computerization of spin plan which includes requirements of different machines in different sections for a particular production target.
4. Preparation of "Ring Production Table (RPT)" to determine some techno-managerial indexes and instantaneous ring production features (yarn production rate, waste rate, production per shift, required number of labours per machine, total labour cost, net loss recovered by piecing up of broken ends etc.) without any computation work.

1.4 ORGANIZATION OF THESIS

This thesis has been organized within five chapters. The importance of spinning mills, the present status of spinning mills of Bangladesh and the objectives of this thesis have been

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described in chapter-I. A brief description of ring spinning technology has been highlighted in chapter-II under the title "Study of Ring Spinning Technology". Conventional method of spin plan and the computerized method of the same have been described in chapter-III. The "Ring Production Table (RPT)" has been prepared in chapter-IV. Chapter-V contains the concluding remarks on this thesis and some recommendations for future works to increase production of ring section by reducing end breakage rate and wastes.

STUDY OF RING SPINNING TECHNOLOGY

2.1 INTRODUCTION

Spinning is the process or processes used in production of spun yarns or filaments. This term may apply to drafting and twisting of natural or man made fibres, to the extrusion of filaments by spider or silk worms or to the production of filaments from glass, metals or fibre forming polymers.

Continuous research in numerous directions applying modern science and technology has created a number of methods for processing fibres (natural or man made) and production of yarns. Some of these methods are in primary stage of commercialization, and some are suitable for special type of yarn and rest fewer methods are applied commercially world wide for production of spun yarn in large scale. An attempt has been taken to describe spinning method used world wide for large scale production of spun yarn, the Ring Spinning Method.

2.2 DESCRIPTION OF MACHINES FOR RING SPINNING

Production of staple yarn by ring spinning method requires different processing sections equipped with different machineries. Table # 2.1 shows the objectives of different sections of a ring spinning mill and Figure # 2.1a, 2.1b, 2.1c, and 2.1d represent the flow chart for production of different types of staple yarns. The related machineries are described in the following sections.

2.2.1 BLOW ROOM

In blow room, mixed cottons are fed as input to get lap of some desired qualities. A number of operations are occurred on fibres in this section as described below:

Cotton is passed from bales onto apron. Apron moves cotton to blending apron. Blending apron has sharp spikes that raise cotton until part of it is knocked off by roll. Cotton falls on conveyor belt and is carried to next process. Lint cotton falls on apron and passes in between feeder rolls to beater cylinder. The rapidly whirling beater blades take off small tufts of cotton, knock out trash, and loosen up the mass. The two screen rolls are made of screen material, and air is sucked out of them by fan. This draws the cotton from beater, and condenses it on the surface of the screen rolls from which it is taken

TABLE # 2.1 : TABULAR PRESENTATION OF OBJECTIVES OF INDIVIDUAL SECTION OF RING SPINNING

SECTION	INPUT	OBJECTIVES	OUTPUT
Mixing of Raw Cotton	Bale of Raw Cotton	1. To mix different staple fibres properly. 2. To minimise Cost. 3. To produce better quality of yarn at last stage (Ring).	Mixed Raw Cotton
Blow Room	Mixed Raw Cotton	1. To open the fibres. 2. To remove the trash. 3. To mix the fibres. 4. To make uniform Lap-Sheet.	Lap
Carding	Lap	1. To remove fine trash. 2. To remove short fibres and foreign materials. 3. To remove naps present in the lap. 4. To produce regular sliver.	Sliver
Draw Frame (Breaker)	Sliver	1. To parallel the fibres. 2. To blend and mix the fibres. 3. To reduce weight per unit length. 4. To make uniform sliver.	Regular Sliver
For Combed Yarn only Lap Former Combing Drawing	Regular Sliver	1. To remove short fibres. 2. To remove fine trash and dirt. 3. To parallel and straight the fibres. 4. To make uniform sliver.	Uniform sliver
Drawing Finisher	Regular sliver	1. To parallelism the fibres. 2. To make uniform sliver.	Uniform sliver
Simplex	Uniform sliver	1. Draft the material. 2. Insert a small amount of twist. 3. To make bobbin with roving of conical shape.	Roving
Ring	Roving	1. Drafting (attenuation). 2. Insertion of twist for strengthen the Yarn. 3. To wind the yarn on to the ring tube/bobbin.	Yarn.
Cheese winding	Yarn	1. To transfer the yarn from ring cop to a large package.	Yarn on wooden cone/ cone
Twisting/ Doubling	Yarn on cone	1. To insert twist. 2. To fold the yarn.	Folded yarn
Cone Winding	Yarn in Ring Cops	1. To transfer the yarn from ring cop/ tube to a large package (Weight: 2-2 and 1/2 lbs). 2. To remove the faults present in the yarn. 3. To get better quality of yarn.	Yarn on cone
Reeling	Yarn on Cone	1. To clean the slubs. 2. To make hanks (1680 yds) each.	Hanks
Bundling	Hanks	1. To make bundle.	Bundle of 10 lbs.
Bailing	Bundle	1. To make a bale for marketing.	Bale of 400 lbs.

RAW COTTON

Type-1, Type-2, ... Type-n

Mixing of Raw Cotton ── Mixed Cotton

Blow Room ── Lap

Carding ── Sliver

Draw Frame Breaker ── Sliver

Carded / Combed

Lap Former ── Lap

Comber ── Sliver

Drawing ── Sliver

Draw Frame Finisher ── Uniform Sliver

Simplex ── Roving

Ring ── Yarn

Cheese Winding ── Yarn on Cone

Twisting ── Folded Yarn

Cone Winding ── Yarn on Cone

Reeling ── Hank

Packing ── Packet

Bundling ── Bundle

Baling Press ── Bale

FIGURE # 2.1a: FLOW CHART OF A RING SPINNING MILL

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                ┌─────────────────────────────┐
                │         COTTON YARN          │
                └─────────────────────────────┘
                   │                      │
          ┌────────────────┐      ┌────────────────┐
          │     Carded     │      │     Combed     │
          └────────────────┘      └────────────────┘
                  │                       │
          ┌────────────────┐      ┌────────────────┐
          │   Blow Room     │      │   Blow Room    │
          └────────────────┘      └────────────────┘
                  │                       │
          ┌────────────────┐      ┌────────────────┐
          │    Carding      │      │    Carding     │
          └────────────────┘      └────────────────┘
                  │                       │
          ┌────────────────┐      ┌────────────────┐
          │    Drawing      │      │  Pre-drawing   │
          │ (1st Passage)   │      └────────────────┘
          └────────────────┘              │
                  │              ┌────────────────┐
          ┌────────────────┐     │   Lap Former   │
          │    Drawing      │     └────────────────┘
          │ (2nd Passage)   │             │
          └────────────────┘     ┌────────────────┐
                  │              │    Comber      │
                  │              └────────────────┘
                  │                      │
                  │              ┌────────────────┐
                  │              │   Drawing-I    │
                  │              └────────────────┘
                  │                      │
          ┌────────────────┐     ┌────────────────┐
          │    Simplex      │     │   Drawing-II   │
          └────────────────┘     └────────────────┘
                  │                      │
          ┌────────────────┐     ┌────────────────┐
          │   Ring Frame    │     │    Simplex     │
          └────────────────┘     └────────────────┘
                  │                      │
          ┌────────────────┐     ┌────────────────┐
          │  Cone Winding   │     │   Ring Frame   │
          └────────────────┘     └────────────────┘
                  │                      │
          ┌────────────────┐     ┌────────────────┐
          │    Reeling      │     │  Cone Winding  │
          └────────────────┘     └────────────────┘
                  │                      │
          ┌────────────────┐     ┌────────────────┐
          │   Bundling      │     │    Reeling     │
          └────────────────┘     └────────────────┘
                  │                      │
          ┌────────────────┐     ┌────────────────┐
          │    Baling       │     │   Bundling     │
          └────────────────┘     └────────────────┘
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                                ┌────────────────┐
                                │    Baling      │
                                └────────────────┘
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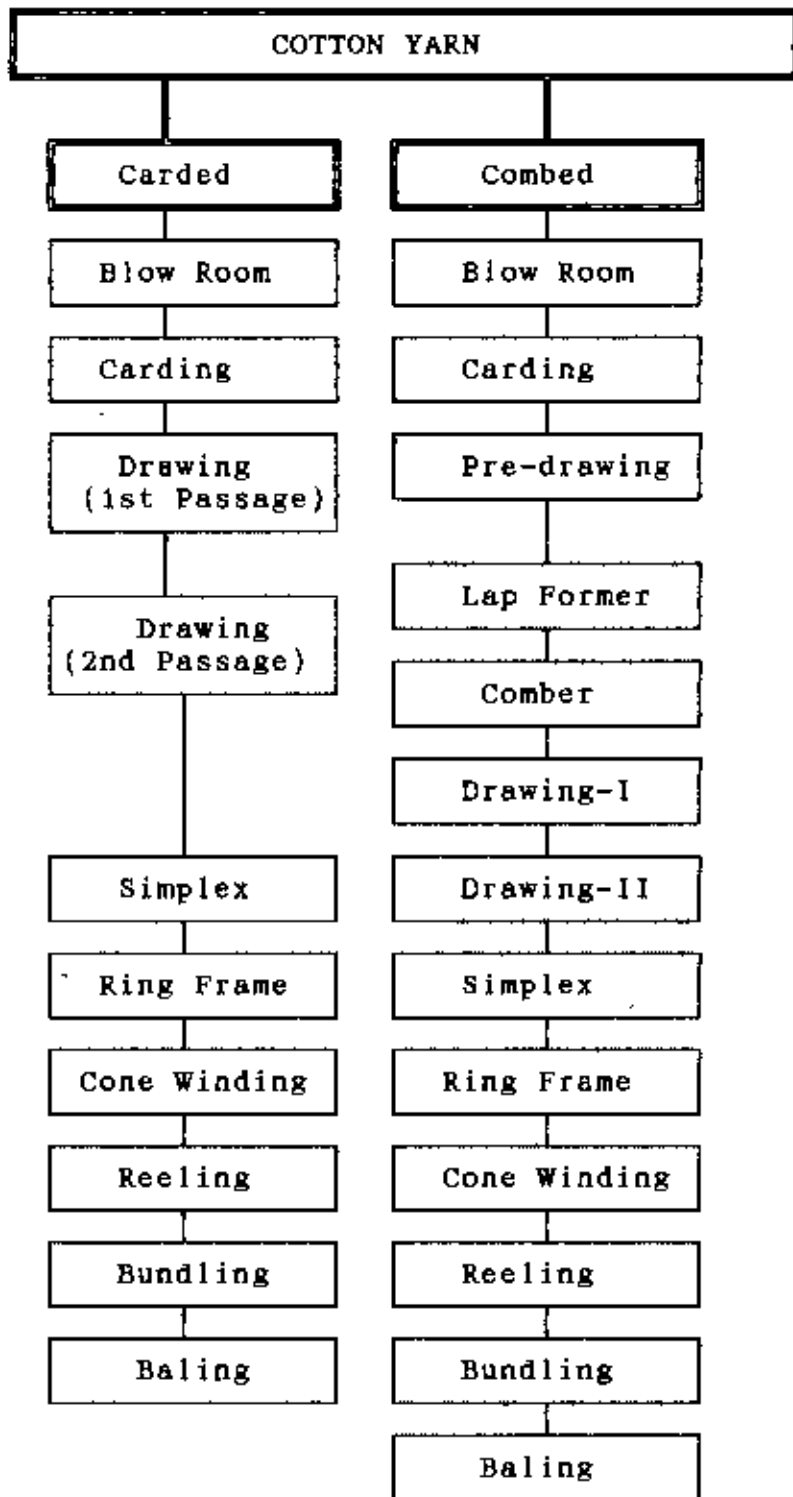
FIGURE # 2.1b :   F L O W   C H A R T   F O R
PRODUCTION OF COTTON
YARN

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                    ┌─────────────────────┐
                    │      POLYESTER      │
                    └─────────────────────┘
                              │
                    ┌─────────────────────┐
                    │      Blow Room      │
                    └─────────────────────┘
                              │
                    ┌─────────────────────┐
                    │       Carding       │
                    └─────────────────────┘
                              │
                    ┌─────────────────────┐
                    │      Drawing-I      │
                    └─────────────────────┘
                              │
                    ┌─────────────────────┐
                    │     Drawing-II      │
                    └─────────────────────┘
                              │
                    ┌─────────────────────┐
                    │     Drawing-III     │
                    └─────────────────────┘
                              │
                    ┌─────────────────────┐
                    │       Simplex       │
                    └─────────────────────┘
                              │
                    ┌─────────────────────┐
                    │     Ring Frame      │
                    └─────────────────────┘
                              │
                    ┌─────────────────────┐
                    │    Cone Winding     │
                    └─────────────────────┘
                              │
                    ┌─────────────────────┐
                    │    Cone Packet      │
                    └─────────────────────┘
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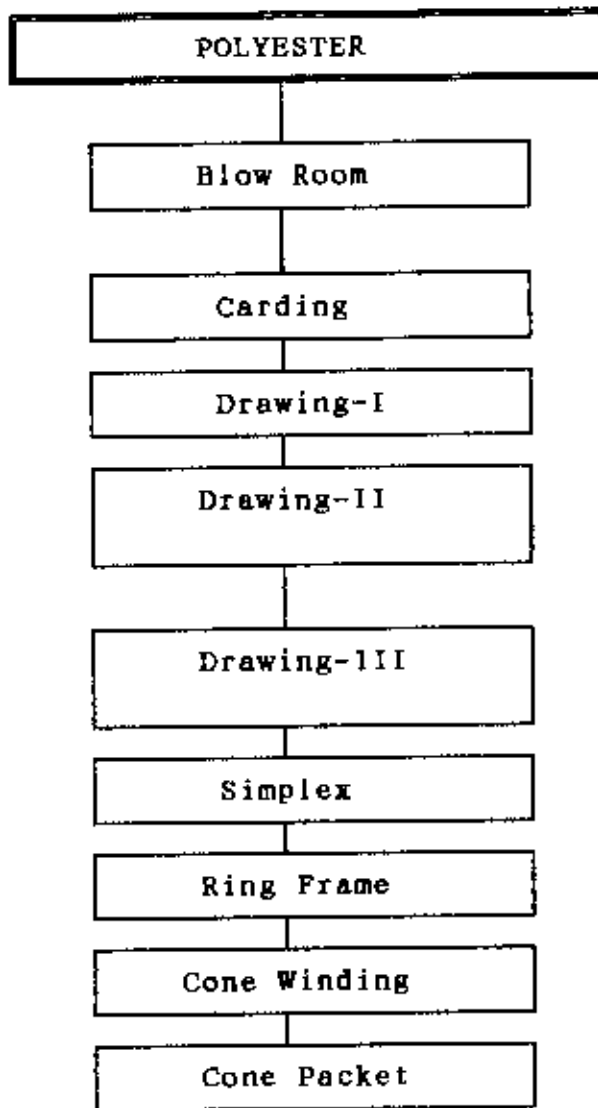
FIGURE # 2.1c : FLOW CHART FOR PRODUCTION
OF POLYESTER YARN

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┌─────────────────────────────────────────────┐
│              POLY-COTTON  YARN                │
└─────────────────────────────────────────────┘
        │                           │
  ┌───────────────┐           ┌───────────────┐
  │   POLYESTER   │           │    COTTON     │
  └───────────────┘           └───────────────┘
        │                           │
  ┌───────────────┐           ┌───────────────┐
  │   Blow Room   │           │   Blow Room   │
  └───────────────┘           └───────────────┘
        │                           │
  ┌───────────────┐           ┌───────────────┐
  │    Carding    │           │    Carding    │
  └───────────────┘           └───────────────┘
        │                           │
  ┌───────────────┐           ┌───────────────┐
  │   Drawing-I   │           │  Pre-Drawing  │
  └───────────────┘           └───────────────┘
        │                           │
        │                     ┌───────────────┐
        │                     │  Lap   ormer  │
        │                     └───────────────┘
        │                           │
        │                     ┌───────────────┐
        │                     │    Comber     │
        │                     └───────────────┘
        │                           │
  ┌─────────────────────────────────────┐
  │             Drawing-II              │
  └─────────────────────────────────────┘
                   │
  ┌─────────────────────────────────────┐
  │            Drawing-III              │
  └─────────────────────────────────────┘
                   │
  ┌─────────────────────────────────────┐
  │              Simplex                │
  └─────────────────────────────────────┘
                   │
  ┌─────────────────────────────────────┐
  │               Ring                  │
  └─────────────────────────────────────┘
                   │
  ┌─────────────────────────────────────┐
  │           Cone Winding              │
  └─────────────────────────────────────┘
                   │
  ┌─────────────────────────────────────┐
  │           Cone Packet               │
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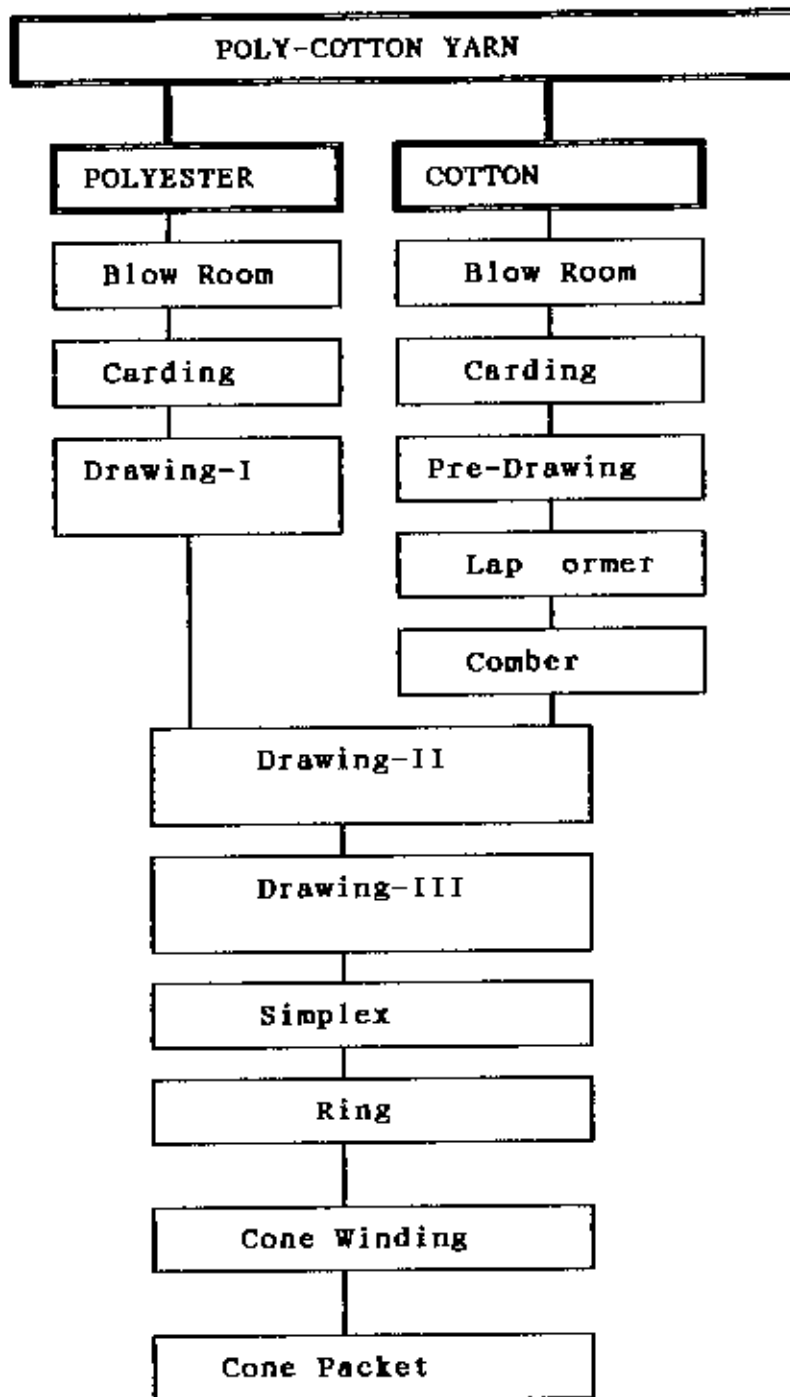
FIGURE # 2.1d : FLOW CHART FOR PRODUCTION
              OF POLY-COTTON YARN

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and passed on by the small rolls. Air suction through cotton takes out dirt and trash. Conveyor belt passes cotton to another type of beater. From beater, the cotton passes to a conveyor and is carried to picker. Cotton in a loose mass enters picker, which is a series of beaters and screen rolls. At the final output of beater and screen system, cotton has again been formed into a sheet or lap. At this point, the "evener" operates to feed more or less cotton to make lap perfectly uniform as it is either wound up into a lap roll on winding rolls and then taken to the carding process, or conveyed as a lap by a chute feeder directly to the card.

2.2.2   CARDING

Carding (Figure # 2.2) is called the key or heart of spinning. Here the fibres are opened mostly to a single hair state. The short broken immature fibres, naps, remaining dust and trashes after blowing process are removed here to the maximum extent. Fibres are also straightened, paralleled, individualized and blended to some extent here and take the shape of rope (sliver). If these functions are not done, it will not be possible to arrange the fibres in proper order during spinning to produce a clean and regular yarn. The above functions are only done in carding machine.

The scutcher lap rests on the driven lap roll and the sheet of
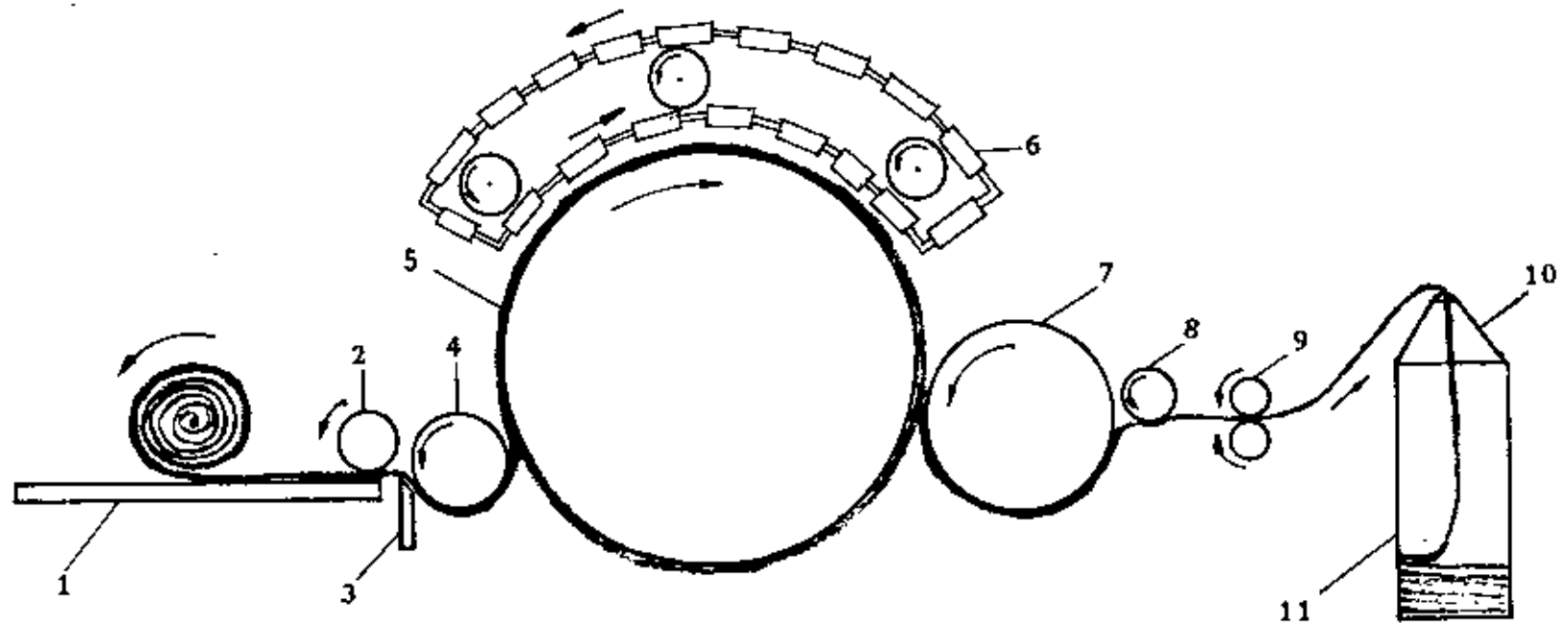
1 — Lap Table
2 — Lap Roller
3 — Mote Knife
4 — Taker-in / Licker-in
5 — Cylinder
6 — Top Flat
7 — Doffer
8 — Cross Roll / Fly Comb
9 — Calender Roller
10 — Trumpet
11 — Cane

FIGURE # 2.2 : MECHANISM OF CARDING

fibres moves forward to pass between the feed roll and the feed plate. The wire covered licker-in detaches tufts from the sheet held by the feed roll and feed plate. The trash is ejected with the help of mote knives as the fibre tufts are carried by the teeth of licker-in towards the cylinder. The cylinder is covered with flexible wire clothing on the older card and metallic wire clothing on the newer high production card. The faster running cylinder strips the fibres off the licker-in, carrying them towards the revolving flats.

The flats are also covered with flexible, semi-rigid, or rigid metallic wire; and since the points of the flats are facing the points of the cylinder, carding action takes place between the two surfaces. The fibres in the small tufts are separated (openings), and the faster moving cylinder carries the fibres forward. The flats accumulate fibres and trash particles and these so called strips are combed off the flats as they leave the cylinder.

The smaller doffer is again covered with flexible wire (on older card) and with rigid metallic wire (on the high production card). It revolves much slower and since the points of the clothing are opposed to those of the cylinder, the fibres are transferred to the doffer.

The web from the doffer is taken off by the oscillating doffer

comb on the low production card or by different roller type doffing arrangements on high production card. The web is then drown through a trumpet by the calender rolls, and the resulting sliver passes through the coiler head and is deposited in to a can.

2.2.3   DRAWING   •

The combination of several slivers from cards or comber is performed by draw frame (Figure # 2.3). It is the process of straightening and paralleling the fibres in the direction of the strand. It also performs the function of blending by combining several slivers, called doubling, and reducing the mass of fibres in the strand without breaking the continuity. This reduction is achieved by processing slivers through several pairs of rollers running at different surface speeds. It is customary to employ two drawing operations after carding and two after combing.

More than three pair of cans that were filled at cards feed each drawing from card delivery. The spoons are connected so that if any one of the six slivers from a can should break, the machine automatically stops. This prevents making uneven yarn later. Each of four sets of rolls runs successively faster than preceding set. The last set runs approximately six times as fast as the first set; consequently, sliver coming out is the

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1 - Drafting Rollers

8 Slivers
in

V_1

V_2

V_3

1 Sliver
out

$V_3 > V_2 > V_1$
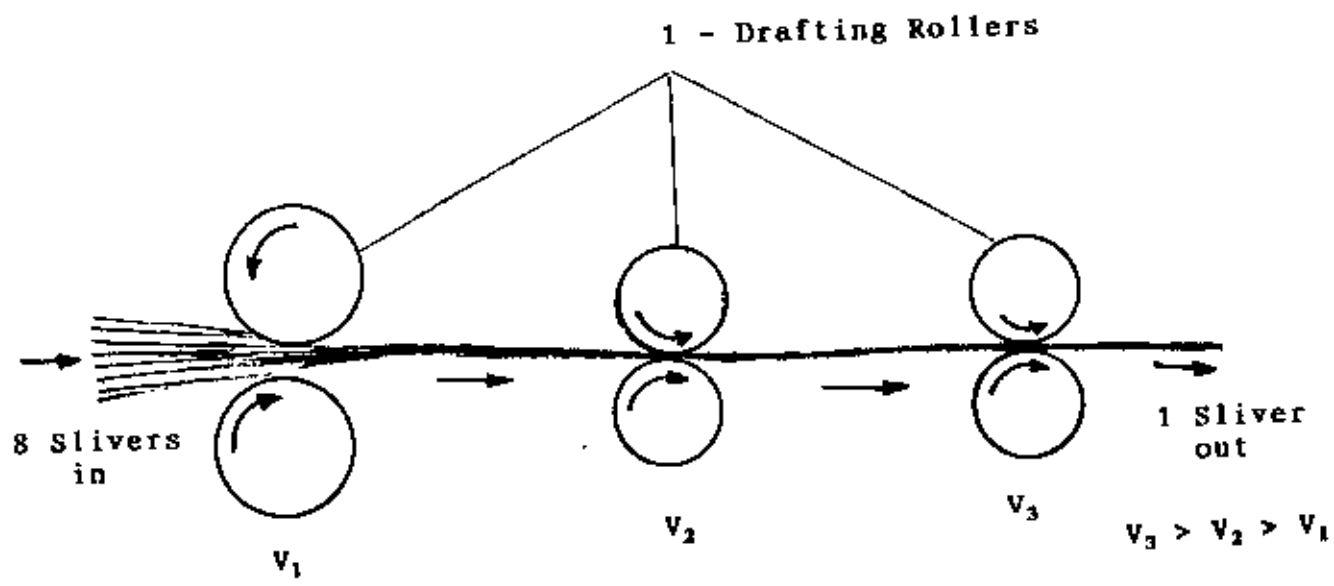
a. Drawing by 3-over-3 drafting system

1 - Drafting Rollers

8 Slivers
in

V_1

V_2

V_3

1 Sliver
out

$V_3 > V_2 > V_1$
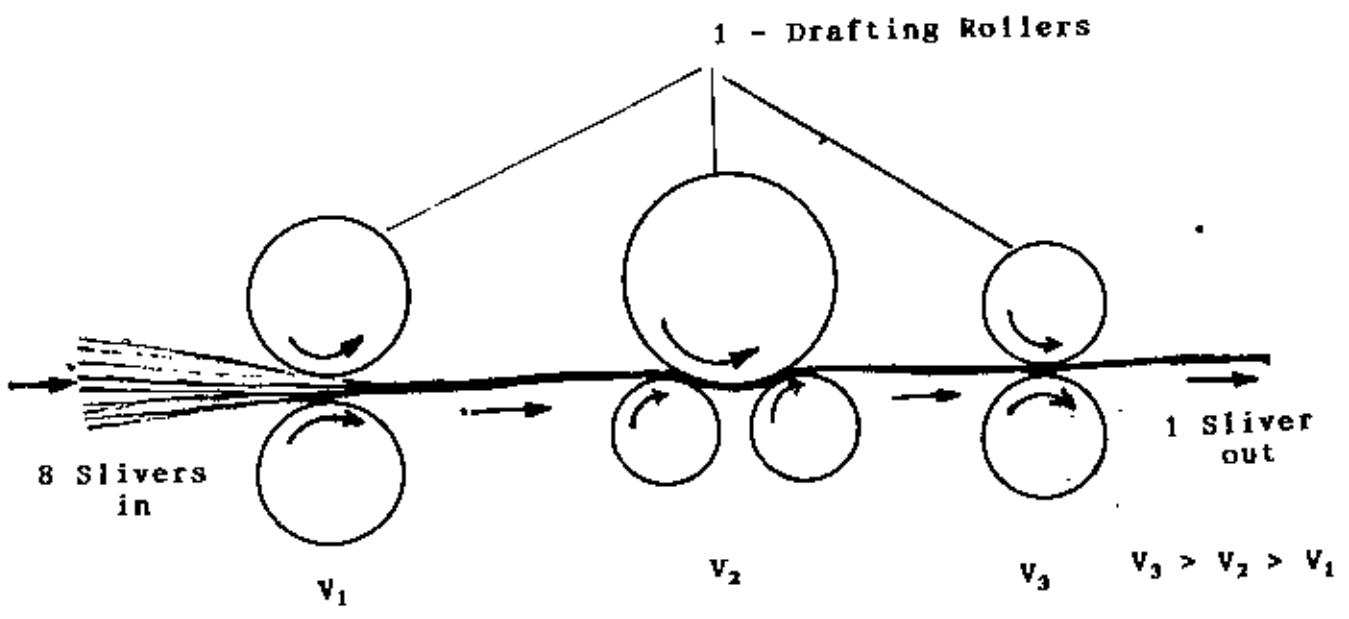
b. Drawing by 3-over-4 drafting system

FIGURE # 2.3 : DRAFTING MECHANISM OF DRAW FRAME

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same size as each one of six going in, but is attenuated to six times the length per minute. The sliver is neatly coiled again in roving can by coiler head. The sliver is now much more uniform and fibres are much more nearly parallel. The sliver is now ready for roving frames. In actual practice, drawing is usually repeated.

The fibres in card sliver are oriented in all directions. They are invariably crimped and some are also bent back on themselves. For processing at subsequent stages, the fibres must be straightened and made to lie parallel to their neighbours and to the axis of the sliver. Successive passages through the draw frame do this very effectively.

The practice of feeding several slivers side by side through the machine and recombining them at the front allows of a very thorough blending of fibres in the individual slivers, and thus makes the final sliver more uniform than card sliver in fibre constitution along its length.

This same doubling improves the regularity of the final sliver by averaging out weight variations existing in slivers fed to the drawing.

2.2.4   COMBING

The introduction of the drawing process enabled spinners to produce finer yarns because of the parallelism of the fibres and also because of the greater regularity resulting from the doubling that occurred at the draw frame. Yet there were still limitations to the finest count to be spun because the cottons in their carded form contain trashy material, naps, and other fibre entanglements, which limited the fineness attainable, and moreover, were regarded as yarn defects. To overcome this detriment, means were sought to get rid of the cotton yarn of these defects by improvements in the processing called combing. In combing operation, fine toothed combs continue straightening the fibres until they are arranged with such a high degree of parallelism that the short fibres, called noil, are combed out and comparatively separated from the longer fibres.

2.2.5   SPEED FRAME/SIMPLEX

The objectives of speed frame (Figure # 2.4) are to draft, twist and successive doubling to reduce variation in weight per unit length. Sufficient twist is given to enable the material to pass from the creel to the drafting system without stretching.

Sliver cans from draw frames are fed between three sets of drafting rolls. Each following set of rolls runs faster than

24
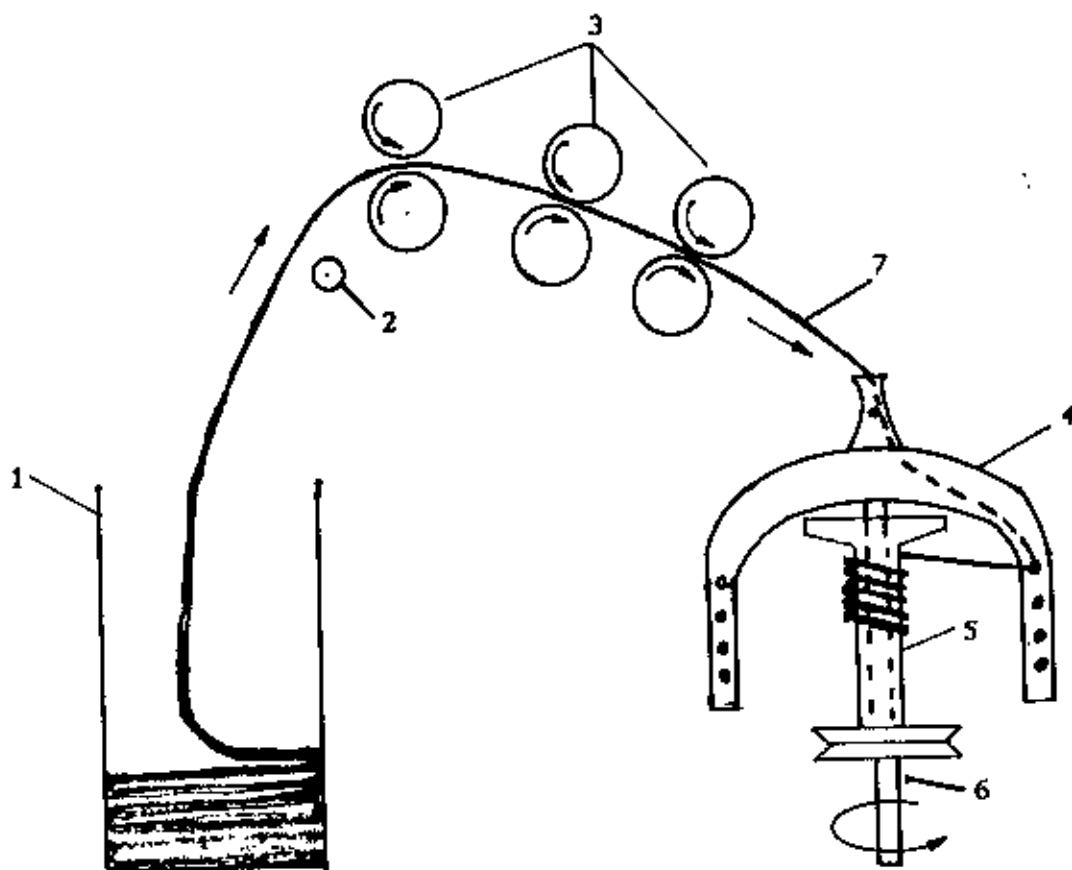
1 – Sliver cane
2 – Photo cell
3 – Drafting rollers
4 – Flyer
5 – Bobbin
6 – Spindle
7 – Roving

FIGURE # 2.4 : MECHANISM OF SPEED FRAME/SIMPLEX

preceding set. This pulls sliver and thins it down, making fibres nearly parallel. The spindle turns flyer and is driven at a constant speed. The front rolls (nearest flyer) are set at a speed that gives strand coming out of the rolls a predetermined number of turns of twist per inch as it moves along between rolls and flyer. The bobbin is driven by a source separate from gear that drives spindle and flyer. The bobbin is regulated to turn automatically at a speed sufficiently faster than flyer, which causes roving to wind on bobbin at same rate it is delivered by front roll.

The mechanism of driving the bobbin is so arranged that at the end of each layer the traverse changes direction and so lays the next layer on top of the proceeding layer. Each layer is shortened in traverse so that the bobbins have tapered ends, which provide stability.

2.2.6   RING FRAME

The ring spinning frame completes the manufacture of yarn by drawing out the roving, inserting twist and winding the yarn on bobbins - all in one operation. Ring frame is faster process used for yarn manufacturing.

The roving on bobbins is placed in the ring frame (Figure # 2.5) where it passes through several sets of rollers running at successively higher speed and is finally drawn out and then

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1 – Creel
2 – Roving Bobbin
3 – Roving Guide
4 – Drafting Rollers
5 – Yarn Guide
6 – Yarn
7 – Ring
8 – Traveller
9 – Ring Bobbin
10 – Spindle
11 – Bolster
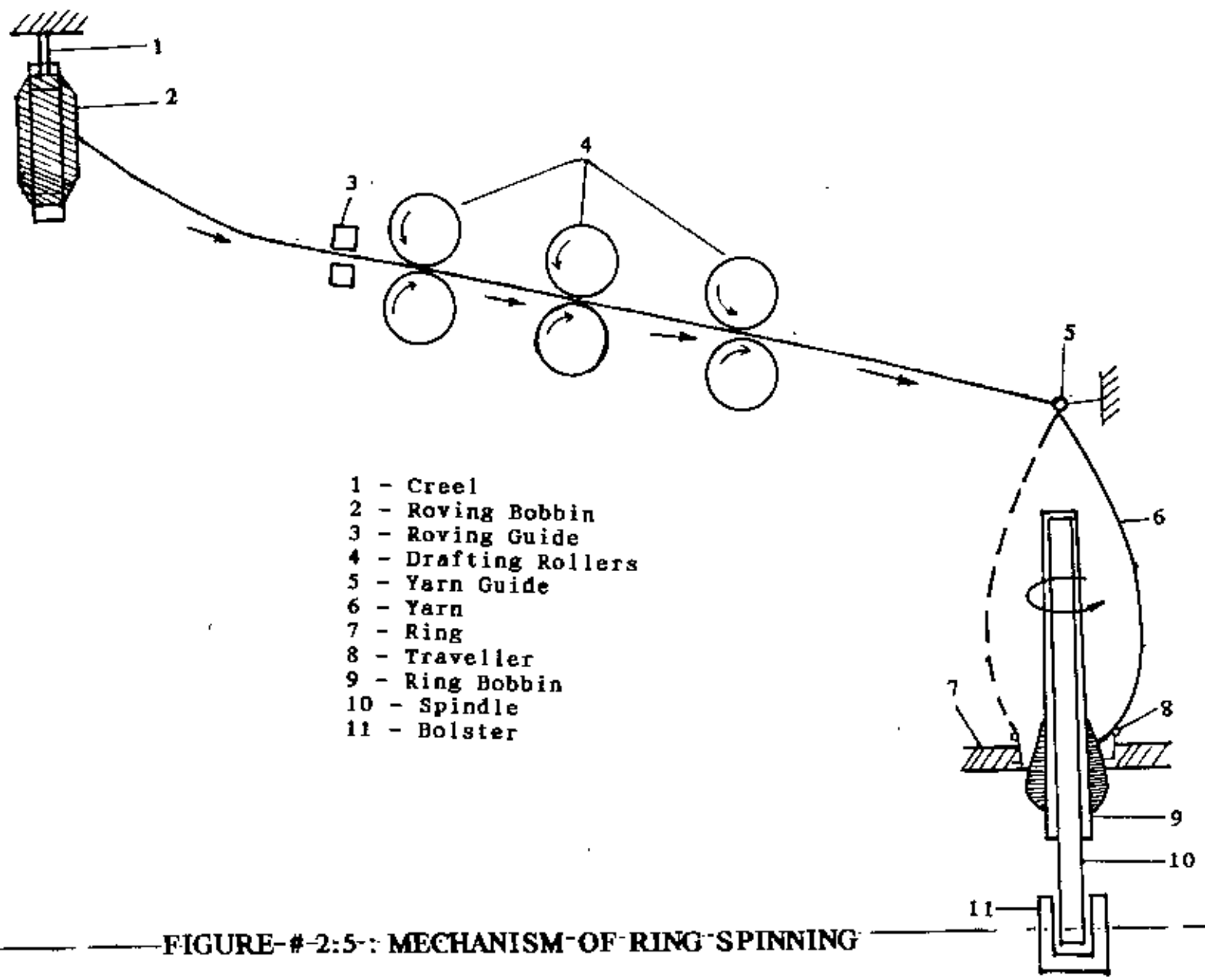
FIGURE #-2:5-: MECHANISM-OF-RING-SPINNING

simultaneously inserts the required amount of twist and winds the spun yarn onto bobbin. The principle for spinning is the same as that used for roving except that the operation is more refined and a ring and traveller are used instead of the flyer.

From bobbin roving is fed between sets of drafting rolls to draw strand down to its final desired size. The spindle turns bobbin at a constant speed. The front set of rolls is adjusted to deliver yarn at a speed sufficient to insert desired amount of twist as strand moves along. The traveller glides freely around the ring. The tension caused by drag of traveller causes yarn to wind on bobbin at same rate of speed as it is delivered by front rollers.

The operations connected with the function of a ring frame are mainly :

CREELING : The main component parts of different creelings are creel and roving guide.
Creel : First of all roving bobbins are mounted on the creel of the ring frame. The function of the creel is to hold the roving bobbins over the roller beam within a convenient height (about 6 feet) i.e within reach of tenter so that he can easily handle the roving. The creel must permit free running of the roving bobbin with slight tension on it. Many types of creel are available. Among them "Umbrella creel" is probably the best

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type.

Roving Guide : The guides are mounted at right angle to a flat bar called traverse bar. The object of the guides is to help the feed of the roving correctly at the bite of the back rolls and the traverse motion moves the strand almost over the entire length of the bite and thus prevents the drafting rolls from being grooved at a particular place.

DRAFTING ZONE : The drafting zone mainly consists of bottom rolls, top rolls, roller stands, top arm, apron etc.

Bottom rolls : The bottom rolls are similar to that of a fly frame, only that they are slightly smaller in diameter. The rolls are made of high class steel and are case hardened. The flutes are cut with highest possible accuracy. The depth of the flutes must be very accurate and uniform.

Roller stands : Roller stands carry the bottom rolls. The rolls are recessed in bearings of the Roll-stands, which are apart every four, six, or eight spindles. The roll bearings are housed on the roll stands.

THREAD GUIDE : The component part next to the drafting zone is the tread guide, whose function is to guide the strand delivered by the front rolls down to the tiny little element in the shape of capital letter "C" termed as traveller mounted loosely on the ring.

Thread guides in use are of various designs, the main object of which is to ensure security of the thread in the loop and to prevent from coming out of it during operation and at the same time to offer an easy access to the piecer in getting the thread through the loop while piecing up the ends. The end of the thread guide needle projecting down wards is called snail.

RING : The ring are made of low carbon steel, that is, soft steel in the form of a bar which is moulded into a ring shape either by bending and welding or by piercing and rolling or by pressing by means of dies and then the stock is given the desired ring size approximately by specially designed lathes and tools which turn out the projection as ring flange. The ring has very hard surface coating and soft core. This soft core is necessary to avoid brittleness. Finally the rings are given high polishing and finishing to become ready for the traveller and to let it work smoothly without much strain due to undue frictional resistance.

SPINDLE : Spindle is an assembly of spindle blade, bolster or insert and bolster case. The insert is housed in the bolster case and the spindle blade is recessed in the insert. The most important of the three is the bolster or insert. It pays a very important part for efficient running of the spindle at high speed ranging from 9000 rpm to 25000 rpm without any perceptible vibration. It also holds the bobbin some what

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loosely but tight enough to prevent from any slippage so that the bobbin can be lifted out of the spindle with little exertion. With the help of ring traveller the spindle inserts twist in the yarn, being delivered by the front rollers. It also carry out another important function of winding the twisted thread on the bobbin with help of ring and traveller.

2.3 CAUSES OF YARN BREAKS IN RING SPINNING

The counting of end breaks is probably the best known and most widely used method of measuring spinning performance once physical testing of yarn to meet a specification is completed.

The counting of end breaks may be divided into:

(a) Breakages classified according to cause, nature and position, to establish a possible trend and rectify the fault.

(b) All breakages irrespective of cause during a given period expressed as breaks per hour or 100 hours per quoted number of spindles.

Faults due to poor or insufficient blending, too much re-worked waste, insufficient cleaning and opening of cotton, inadequate control of blow room and card processes will be apparent by consistent high end breaks and miss-shaped bobbins. This will

vary as material passes through in batches but unfortunately nothing can be done about faults once the material has reached the ring frame.

Causes of end breakage at the ring frame fall into two categories

        (a) Technological

        (b) Machine defect

(a) Technological Causes :- Most of the technological causes of end breaks are as follows -

    1.   Incorrect Twist: The use of a low Twist Multiplier (TM) may cause excessive end breakage. Recommended ranges of TM for warp and weft yarn are 4.0 - 4.5 and 3.0 - 4.0 respectively.

    2.   Slubbing through: This is caused because of excessive high roving twist, bad piecing at previous processes and improper configuration of drafting zone.

    3.   Stretched Roving: Results from faulty winding at the speed frame, or too low twist and stretching of roving in the creel.

4. Incorrect Roller Settings: This may be caused as a result of large variation in length of staple material (mixing raw material of widely different staple length) or faulty roller re-settings.

5. Incorrect Break Draft: This is caused possibly due to variation in bulk of material in break draft zone, and thus changes in total draft.

6. Travellers Flying Off : Excessive speed, incorrect geometry or weight of travellers can bring about travellers fly-off.

7. Traveller Flutter: This happens in operating with the travellers those are very light or of faulty sizes.

8. Excessive Yarn Tension: Heavy travellers, high spindle speed, faulty geometry of travellers etc. may produce excessive high tension of yarn at the zone of balloon.

9. Bobbin Jumping: It results from incorrect taper of tube, loosely fitted damaged tubes on spindles.

10. Incorrect Bobbin Diameter: The relation between the

tube, bobbin diameter, and ring diameter is important. The tangential lead angle should be approximately 30°. Large variation from this figure will trouble at the beginning of the set.

11. Bobbin Rubbing by the inner side Ring: This is caused due to count variation, slack winding and wrong replacement of travellers.

12. Incorrect Atmospheric Conditions: Any deviation in the range of temperature and humidity recommenced for ring section may cause end breakages.

13. Low Yarn Tension: Very light travellers, mixed travellers or slack tape etc. result low yarn tension and let it to hit the separators causing ends down.

14. Careless Working Methods: The end breakages at the ring frame will reflect the quality of material put into the ring frame creel. If operatives in blow room, on cards, draw frame or speed frames are careless and produce defective material, the end breakages at the ring frame will be increased and efficiency and quality be deteriorated. Each process takes the material from the previous process and

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converts it into what the next process needs. Thus any defect once produced can not be eradicated at the finishing stage. Therefore care and attention should be paid at stage or section of defect's origin. Material irregularities that are produced at the earlier stage may also cause to ends-down at the ring frame.

(b) **Machine Defects** : Machine defects which may be the causes of end breakage in ring frame are as follows –

1.   Stretched Roving : This happens due to sticking bobbin holders, fly in the bearing or around the creel pug.

2.   Slubs: It is resulted from the faulty back guides which collect fly and periodically allow it to be carried through in a lump. Dirty or fly-covered rollers have the same effect, and all these cause end breakage.

3.   Grooved (Worn) Rollers: Roller grooving due to inadequate roller changing schedule, defective traverse mechanism or intermittent roller movement may cause roller lapping resulting ends-down of yarn.

4. Roller Lapping: Defective roller covering, incorrect front roller off-set, ineffective roller clearers, worn out rollers, improper roller weighting, blocked pneuma fill clearers etc. may cause roller lapping which bring about end-downs.

5. Worn Rings : Worn out rings which is generally caused as a result of using burnt travellers and improper cleaning may also be responsible for end breakages.

6. Dirty Rings : Accumulation of fly, wax, etc. on the underside of the flange restricting traveller movement may also cause the breakage of end in the ring frame.

7. Worn out Travellers : Worn out travellers frequently fly off causing ends-down.

8. Incorrect lappet setting causes irregular spinning tension that allows the balloon to catch tube or bobbin, which ultimately results in end breakage.

9. Improper setting of rings in the ring rail (such as inclined rings) will cause irregular tension and traveller fluttering and thus end breakage.

10. Incorrect spindle setting (not in the centre of the ring) will cause tension variation and the bobbin may touch the ring.

11. Fly accumulation inside or out beneath the spindle wharve will cause spindle speed variation, irregular twist and slack winding resulting end breakage.

12. Dry Spindle : Inadequate lubrication increases the viscosity causing spindle drag, spindle wearing and increase power consumption. All such spindle defects are in favour of end breakages.

13. Damaged Bobbin : Tubes or bobbins which are damaged can give rise to spindle height and wobble the bobbins which should be taken off and discarded to reduce the ends down.

14. Spindle Tape Slipping : The spindle tape slipping may occur due to contamination with flyer, oil or loss of tension. Spindle tape slippage may cause end breakages.

In general, only two causes of yarn breakage in ring spinning, either (i) the strength of yarn is too low to enable it to withstand the normal tension; or (ii) the tension is too great

for the normal strength of the yarn, whatever the phenomena
responsible to create these two causes.

2.4 INFLUENCE OF END BREAKAGES IN RING SECTION

Yarn manufacturing mills are influenced by end breakage in ring
frame in the following contents -

i) **Production** :- Yarn production of spindles with broken ends
is zero, therefore increase of end breakage decreases
total ring production.

ii) **Waste** :- The fibres delivered by the front rollers of ring
frame are sucked by the suction tube and collected as
pneuma fill waste. In most cases, broken ends create
roller lapping, and roller lapping produces waste which is
commonly known as "bonda".

iii) **Labour Cost** :- A considerable number of labours (known as
tenter) is required to eliminate yarn breakage in ring
frame. High yarn breakage rate naturally calls for
increased number of workers for breakage elimination, and
consequently labour cost is increased.

iv) **Yarn Quality** :- With each end breakage a knot is added at
piecing up of broken ends, thus defects are increased in
terms of irregularity in linear density and visual

aspects. Again the usable wastes produced in ring section as a result of end breakages are mixed with raw cotton in blow room. Excessive waste utilization with raw cotton deteriorates yarn quality.

v) Fibre Processing Cost :- Wastes produced in ring section contain all the necessary costs involved in blow room to simplex. Though the useable wastes are mixed with raw cotton in blow room, it absorbs all the processing cost for the second time. Not only this, wastes disturb smooth and normal processing tempo of fibres in all sections and reduce overall efficiency of every section. Therefore end breakages increase fibre processing cost through increasing labour cost and wastes recycling.

vi) Yarn Implementation Rate :- Waste means loss of production, thus increasing waste reduces the yarn implementation rate.

2.5 IMPORTANCE OF CONTROL AND ELIMINATION OF YARN BREAKAGE

The productivity of a ring frame depends primarily upon it's spindle speed, linear density of yarn, twist multiplier and efficiency, which in turn would be decided by end breakage rate and side allocation to tenters. The high end breakage rate increases the workload of a tenter and his cycle time also. As

a result higher proportion of spindles remains unattended after every patrol cycle. This may lead to a situation when a large number of spindles will become idle and then the ring frame will have to be stopped. If the end breakage rate is lower than the manageable rate, then either the front roller speed can be increased or more sides can be allotted to a tenter. Thus reduction in end breakage rate through quick breakage elimination or controlling the process can give higher machine and/or labour productivity.

Yarn breakage rate can be controlled by removing the causes of yarn breakage as described in section 2.3. But it is observed that in presence of all possible highest measures, end breakage is an unavoidable phenomena during spinning by ring frame. A number of tenters should be employed to eliminate yarn breakage and the allocated number of sides per labour depends upon the yarn breakage rate and piecing up capacity of the tenters.

The piecing up cost of broken ends in ring frame is significant and it should be reflected either in spin plan or in ring production table (Chapter-IV). Another important and interesting matter is to determine the net loss recovery through piecing up of broken ends. This will justify the employment of workers (tenters) in the ring section and will help management in working out labour norm in the ring section. As a matter of fact, labour cost of tenters will then be

treated as an index to decide whether the ring frame should keep either on production or idle.

CHAPTER-III

SPIN PLAN

3.1 INTRODUCTION

As described earlier, manufacturing of yarn from fibres requires a number of processing sections such as blow room, carding, drawing, combing, simplex, ring and finishing sections in successive order. The production capacity of each section must have close relation with target production of yarn of different counts. The number of machines required in each section for different counts are determined so that optimal utilization of man power and machine is established. Determination of exact number of machines and accessories required in different sections to meet target production of yarn is known as SPIN PLAN. It is essential to develop a SPIN PLAN before starting the production of an yarn of specific characteristics. In all the spinning mills in Bangladesh, the necessary outputs of spin plan are calculated with the help of simple arithmetical operations by calculator. It is a time consuming and laborious job. With the change of an input or expected output value the whole calculation may need to be redone. Actually it takes much valuable time of top technical personnel. In order to get rid of such trouble an attempt has been taken to develop an improved variant of spin plan

calculation by using personal computer. This computerized method of calculation will readily provide all essential outputs of spin plan soon after the entry of input data. Once the programme is prepared, a simple computer operator can also determine the spin plan provided input data are supplied to him.

3.2 PARAMETERS OF SPIN PLAN

Preparation of spin plan involves a number of parameters. These parameters are of two types; namely, machine parameters and machine output parameters.

Machine Parameters : Machines used in processing of fibres to manufacture yarn have limited production capacity. The production capacity of machines varies from manufacturer to manufacturer. The parameters those directly related to production capacity of different machines involved in different sections are shown in Table # 3.1.

Machine output parameters : The production capacity of each machine also depends on quality and condition of the output of every machine. The output parameters of different machines in different sections are shown in Table # 3.2.

TABLE # 3.1 : MACHINE PARAMETERS RELATED TO PRODUCTION CAPACITY OF INDIVIDUAL MACHINE OF DIFFERENT SECTION

SECTION	MACHINE PARAMETERS RELATED TO PRODUCTION CAPACITY	UNIT	SIGNIFICANT VALUE
Blow Room	1. Lap roller diameter 2. Lap roller speed 3. Machine efficiency	inch rpm %	10 10-12 80
Carding	1. Doffer diameter 2. Doffer speed 3. Web draft 4. Machine efficiency	inch rpm - %	27-30 45 1.1-1.5 85
Drawing	1. Front roller diameter 2. Front roller speed 3. No. of delivery 4. no. of passage 5. Machine efficiency	inch rpm - - %	1.125 2000-2800 2 2 75
Lap former	1. Delivery roller diameter 2. Delivery roller speed 3. Machine efficiency	inch rpm %	18 90-140 75
Combing	1. No. of nips 2. Feed length 3. No. of laps feed 4. No. of delivery 5. Machine efficiency	per min inch - - %	280 0.25 8 2 75
Simplex	1. Spindle speed 2. No. of spindles 3. Machine efficiency	rpm - %	1400 124 75
Ring	1. Spindle speed 2. No. of spindles 3. Machine efficiency	rpm - %	20000 432 93-95

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TABLE # 3.2 :   MACHINE   OUTPUT   PARAMETERS   RELATED   TO
PRODUCTION CAPACITY OF INDIVIDUAL MACHINE
OF DIFFERENT SECTION.

SECTION	INPUT	OUTPUT PARAMETERS		SIGNIFICANT VALUE
		NAME	UNIT	
Blow Room	Textile fibres	1. Lap	ounce/ yards	12-16
		2. Waste	%	2-6
Carding	Lap	1. Sliver	hank	0.14-0.2
		2. Web draft	-	1.1-1.5
		3. Waste	%	2-6
Drawing	Card Sliver	1. Sliver	hank	0.14-0.2
		2. Waste	%	1-2
Lap Former	Sliver	1. Lap	grain/ yards	800
		2. Waste	%	1
Combing	Lap	1. Sliver	hank	0.14-0.2
		2. Noil	%	12-20
Simplex	Sliver	1. Roving	hank	1.6-2.2
		2. Twist factor	-	0.75-1.3
		3. TPI	TPI	0.94-1.92
		4. Waste	%	1
Ring	Roving	1. Yarn	Count	12-82
		2. Twist factor	-	3.0-4.5
		3. TPI	TPI	-
		4. Waste	%	2-3

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3.3 MACHINE ALLOTMENT

The number of machines required in different sections to meet the target production of yarn of different counts can be determined by two methods :

    (a)   Conventional Method

    (b)   Computerized Method

(a) CONVENTIONAL METHOD : In this method, the number of machines required is determined by manual calculation. The procedures followed in this method are :

    i)   At first, the required or target production of yarn is calculated or collected from production manager of the mill.

    ii) The production capacity of a single machine is determined considering all the parameters of spin plan.

    ii) The number of machines required in different sections are calculated dividing the target or required production by the production capacity of a single machine in respective section.

Illustration of conventional method for Spin Plan is attached in ANNEXURE-A. This is a laborious and time consuming method and it requires highly experienced top technical personnel.

(b) COMPUTERIZED METHOD : In this method, a computer program has been developed to eliminate the manual calculation required in conventional method of Spin Plan. This method requires the parameters of spin plan as input variables in the program and the number of machines required for each section is displayed as output of the program, and thus eliminates the manual calculation of conventional method of Spin Plan.

Illustration of computerized method for Spin Plan is attached in ANNEXURE-B. In this method, all computational works are done by personal computer, so it is a very much faster method and Spin Plan can be done by any computer literate person.

3.4 REQUIREMENT OF ACCESSORIES

A number of accessories (product containers) such as lap rod, can, bobbin, cone, trolley etc. (Table # 3.3) are required in each section to transfer material from one section to successive section. Inadequate accessories may keep the machines idle; on the other hand, excessive accessories may create bottle neck in production system and create waste of accessories. Thus determination of exact number of accessories is essential for smooth operation of each section and continuous production.

The number of accessories required increases with increasing the number of machines in respective section. A typical method

TABLE # 3.3 :   REQUIREMENT OF   ACCESSORIES   OF   RING
SPINNING MILLS

NAME OF ACCESSORIES	SECTION WHERE REQUIRED
Lap Rod	Blow Room, Carding
Can	Carding, Drawing, Combing, Simplex
Roving Bobbin	Simplex, Ring
Ring Cop	Ring, Finishing
Cone	Finishing
Trolley	Ring, Finishing

model for determination of required number of accessories has been illustrated below.

The following mathematical formulae may be used to calculate the number of accessories required in spinning mill :

1. SLIVER CAN : Sliver cans are required in the following sections -

a. Carding to drawing-I (Can Size : A1 X A2)
Total number of sliver cans required = Number of cards X 2 + Number of draw frames X Number of feeds/draw frame(32) X 2.

b. Drawing to lap former (Can Size : B1 X B2)
Total number of cans required = Number of draw frames X Number of delivery /draw frame X 2 + Number of lap former X Number of feeds/lap former(48) X 1.10.

c. Comber to drawing-I (Can Size : C1 X C2)
Total cans required = Number of comber X Number of delivery/comber(2) X 2 + Number of draw frame X Number of feed/draw frame(32) X 2.

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d. Drawing-I to drawing-II (Can Size : D1 X D2)

Total cans required = Number of draw frames for drawing-I X Number of delivery/draw frame X 2 + Number of draw frames for drawing-II X Number of delivery/draw frame(32) X 2.

e. Drawing-II to simplex (Can Size : E1 X E2)

Total cans required = Number of draw frame for drawing -II X Number of delivery/draw frame X 2 + Number of simplex X Number of feed/simplex X 1.10.

2.   ROVING BOBBIN : Roving bobbins are required in simplex and ring frame.

Total number of roving bobbins required = Number of simplex X Number of spindles/simplex(124) X 2 X 1.10 + Number of ring frames X Number of spindles/ring frame X 1.10.

3.   RING BOBBIN : Ring bobbins are required in ring frame and cone winder.

Total ring bobbins required = Number of ring frames X Number of spindles/ ring frame X 3.5.

4.   CONE : Cones are required in cone winder and reeling machine.

Total number of cones required = Number of cone winder

machines X Number of cone spindles/machine(120) X 2 +
(Number of reeling machines X No. of cone feed/machine(20).
X 2) X 3.

CHAPTER-IV

PREPARATION OF RING PRODUCTION TABLE (RPT)

4.1 INTRODUCTION

Manufacturing of yarn from staple fibres by ring spinning method is performed by Ring Frame. Thus the production capacity of yarn manufacturing mill is limited by the production capacity of ring section. A laborious calculation is required to determine the production capacity of ring section. A computer program has been developed to prepare a Ring Production Table (RPT) so that ring production can be determined without or least calculation.

4.2 INPUT PARAMETERS OF RING PRODUCTION TABLE (RPT)

The following parameters have been considered as input variables of the ring production table (RPT) :

END BREAKAGE: It is the major of the difficulties those reduce ring production. Broken end spindles have zero production and create waste at most cases. A number of labours required to piece up the broken ends during ring spinning. End breaks

increase labour cost and waste, and decrease production. The ring production table has been prepared considering end breaks rate starting from 0 per hour per 100 spindles to 30 per hour per 100 spindles.

COUNT: Production of lower count of yarn is higher than that of finer count if the spindle speed, end breaks rate and other parameters remain same in both cases.

NUMBER OF SPINDLES PER MACHINE: Total production of ring frame is the sum of the production of individual spindle. Therefore the production of a ring frame having more number of spindles is higher than that of a ring frame having fewer number of spindles.

NUMBER OF MACHINES: A number of ring frames are employed for production of yarn of different counts. Increasing the number of ring frames increases the production of ring section.

MACHINE EFFICIENCY: Increasing machine efficiency, the production of ring section increases.

TWIST MULTIPLIER (TM) : It is the ratio of twist per inch (TPI) to square root of yarn count. Increasing TM increases TPI and decreases ring production.

TWIST PER INCH (TPI) : Strength of yarn depends on TPI. Increasing TPI decreases ring production.

WASTE MULTIPLIER : Broken ends create roller lapping and roller lapping is one of the major causes of waste production in ring section. Increasing end breakage increases ring waste. Waste multiplier has been introduced here as the ratio of waste produced to the yarn production decrease due to end breakage.

YARN PRICE: Yarn price depends on the yarn count and types of yarn i.e. carded, combed, polyester or poly-cotton yarn.

WASTE PRICE : Waste price depends on type of waste. Usable waste is of higher price than unusable waste.

LABOUR PERFORMANCE : The number of labours required per machine for a definite end breaks rate depends on the performance of individual labour. Actually there are two groups of workers found to be employed in the ring section. The members of the primary group is known as "Tenter" or "Sider" who watch and patrol around the ring frame, piece up the broken ends, clean the drafting zones and report to the supervisor/shift-incharge about break downs and other relevant matters. The members of second group are commonly known as doffers who pick up the full ring cops at doffing time, insert empty bobbins on spindles and end up the suspended yarn being delivered by the drafting zone

with the empty bobbins. In fact at running time, the workers of second category do not have any contribution to the production. But the tenters have concrete tasks at this time. Their all activities as described above are to ensure the continuity of the process. And it is obvious that any discontinuation of production of yarn at running condition of ring frame is connected with end breakage. So, for reinstallation of process continuity end breakage elimination is a must. Actually tenters' all activities are assessed only through judging the piecing up capacity as piecing up of broken ends reinstall process continuity. Therefore, the performance of individual tenter is determined by counting piecing up (elimination of yarn breakage) capacity of that tenter. The average performance of labours is determined by dividing the summation of total number of pieced up ends by total number of labours engaged for piecing up. Increasing labour performance decreases number of labours required per machine, thus decreases labour cost in ring section.

LABOUR COST : Labour cost depends on the performance and availability of labour.

SPINNING POWER : Spinning power is the power required to over come ring-traveller and yarn-traveller friction, to rotate the yarn between package and thread-guide against the resistance of air, and to over come the extra spindle-bearing friction caused

by the winding tension. It is, of course, influenced considerably by the count of the yarn being spun and the spindle speed.

POWER COST : It is the unit price of electricity consumed.

4.3 PREPARATION OF A RING PRODUCTION TABLE (RPT)

As mentioned in section 4.2, production capacity of ring frame depends on a number of parameters. The variation range of these parameters other than spindle speed are closer more or less, and have little effect on production capacity of a ring frame for a specified variety of counts. The parameter that has major effect on production in ring section is spindle speed. With increasing spindle speed production should increase linearly as the formula indicates below -

$$
\text{Production/machine/shift} = \frac{\text{Spindle speed X Number of spindles per machine X 8 X 60 X Efficiency(\%)}}{\text{Count X 36 X TPI X 840 X 100}} \text{lbs}
$$

But in actual practice, with increasing the spindle speed the end breaks rate increases and machine efficiency decreases. Increase in end breaks and decrease in machine efficiency

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reduce production rate simultaneously. A computer aided table has been prepared to determine the ring production against possible spindle speeds under the title "Ring Production Table (RPT)" and attached in ANNEXURE-C.

4.4 OUTPUT ELEMENTS OF RING PRODUCTION TABLE (RPT)

Computer programs have been developed to input parameters those have important influence on production of ring section and other information those help determine the profit/loss of any specified operation period of a spinning mill. The output elements of the RPT are discussed as follows :

NUMBER OF SIDES PER LABOUR : The ring frame has two rows of spindles on both sides. The number of sides allocated per labour depends on end breaks rate, number of spindles per side of the ring frame and piecing up capacity of that labour.

TOTAL NUMBER OF LABOURS : It depends on the total number of ring frames and number of sides allocated per labour.

TOTAL LABOUR COST : It is the product of total number of labours required and unit labour cost.

YARN PRODUCTION RATE : It is a function of spindle speed, count, TPI, number of spindles per machine, machine efficiency

and total number of ring frames on production. It has been expressed as pound per shift per 100 rpm of spindles. The production trend of ring section of running shift may be compared to any past shift with this figure and production per shift can be interpreted with respect to any spindle speed not available in the RPT.

WASTE RATE : It is a function of end breaks rate and other parameters related to yarn production rate. It reveals the waste generation rate as like as yarn production rate.

YARN PRODUCTION : Yarn production per shift, per day and yarn production recovered per shift by piecing up of broken ends are produced in these columns against different possible spindle speeds.

PRICE OF YARN PRODUCED : It is the product of yarn produced and yarn price per pound.

WASTE DUE TO END BREAKAGE : End breakage causes roller lapping and increase pneuma fill waste. It is assumed that increasing end breaks increases waste. Waste produced and price of waste have been presented in these columns.

NET LOSS RECOVERED PER SHIFT BY PIECING UP : Yarn production by broken ends is zero, not only this, broken ends create waste of

cotton. End breakages may be eliminated by employing tenters to piece up the same. Employment of tenters is justified by the net loss recovered per shift by pieced up ends against the labour cost of the tenters employed to piece up the broken ends. It is obvious that, if the net loss recovered by the broken ends pieced up by the tenters is found higher than the piecing up labour costs, the tenter employment would be found financially viable.

The net loss recovered per shift by pieced up broken ends may be expressed as follows :

$$C = c_1 - c_2 - c_3 - c_4$$

where

C =   Net loss recovered per shift by pieced up ends.

c_1 =   Price of yarn recovered by pieced up ends.

c_2 =   Piecing up labour cost to eliminate end breakages. As the major responsibility of a tenter is to piece up the broken ends, the labour cost has been considered in RPT as the piecing up cost.

c_3 =   Price of waste produced by broken ends.

c_4 =   Cost of spinning power required by the pieced up ends.

4.5 INTERPRETATION OF RING PRODUCTION TABLE (RPT)

The contents of the output elements of RPT are the calculated values against possible spindle speeds which are valid only for the values of the input elements as mentioned in the top of the table. Any variation of the input elements will vary the output elements. The values of the output elements may be interpreted with respect to any variation in input elements. The methods to interpret the values of the output elements are as follows :

Let, I indicates the interpreted value.

T indicates the value in the table.

$$\frac{\text{(No. of sides per labour)I}}{\text{(No. of sides per labour)T}} = \frac{\text{(End breaks rate)I}}{\text{(End breaks rate)T}} \times \frac{\text{(Labour performance)T}}{\text{(Labour performance)I}}$$

$$\text{(Total no. of labours)I} = \frac{2 \times \text{(No. of machines)I}}{\text{(No. of sides per labour)I}}$$

$$\text{(Total labour cost)I} = \text{(Total no. of labours)I} \times \text{(Unit labour cost)I}$$

$$\frac{\text{(Yarn production rate)I}}{\text{(Yarn production rate)T}} = \frac{\text{(No. of machines)I}}{\text{(No. of machines)T}}$$

$$\frac{\text{(Waste rate)I}}{\text{(Waste rate)T}} = \frac{\text{(End breaks rate)I}}{\text{(End breaks rate)T}}$$

$$\frac{\text{(Yarn production)I}}{\text{(Yarn production)T}} = \frac{\text{(No. of m/c)I}}{\text{(No. of m/c)T}} \times \frac{\text{(TPI)T}}{\text{(TPI)I}} \times \frac{\text{(Eff.)I}}{\text{(Eff.)T}} \times \frac{\text{(rpm)I}}{\text{(rpm)T}}$$

$$\frac{\text{(Yarn recovered by piece up)I}}{\text{(Yarn recovered by piece up)T}} = \frac{\text{(End breaks rate)I}}{\text{(End breaks rate)T}} \times \frac{\text{(No. of m/c)I}}{\text{(No. of m/c)T}} \times \frac{\text{(TPI)T}}{\text{(TPI)I}} \times \frac{\text{(Eff.)I}}{\text{(Eff.)T}} \times \frac{\text{(rpm)I}}{\text{(rpm)I}}$$

$$\frac{\text{(Waste due to end breaks)I}}{\text{(Yarn recovered by piece up)I}} = \frac{\text{(Waste multiplier)I}}{\text{(Waste multiplier)T}}$$

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4.6 APPLICATIONS OF RING PRODUCTION TABLE (RPT)

The Ring Production Table (RPT) may be used as a techno-managerial indexes to determine the following important information on ring section of spinning mills :

1. The optimal number of sides of ring frames to be allocated per tenter.

2. Total number of tenters required and total labour cost in ring section.

3. Yarn production rate of ring section (pound per shift per 100 revolution per minute).

4. Waste production rate of ring section (pound per shift per 100 revolution per minute).

5. Total yarn production at specified spindle speed.

6. Yarn production recovered by piecing up of broken ends of yarn.

7. Total waste produced due to end breaks if the broken ends are not pieced up.

8. Revenue generation per day and per shift.

9. Net loss recovered through piecing up the broken ends of yarn in ring frame.

CHAPTER-V

CONCLUSION AND RECOMMENDATIONS FOR FUTURE WORKS

5.1 CONCLUSION

1.   An enthusiastic endeavour has been taken to illustrate the ring spinning process used in purpose of manufacturing high quality yarn. Causes of end breakage in ring frame have been studied and its impact on production has been described. Moreover, a computer aided method has been developed to determine the number of machines required to attain certain production target, determine labour cost and instantaneous production rate of ring section.

2.   The computer aided method developed for spin plan is very helpful to any body who wishes to prepare a spin plan at the cost of least labour and minimum time with respect to those required in conventional method of spin plan.

3.   End breakage is the primary problem that reduces production of ring section of spinning mill. Broken ends are pieced up manually, and a number of labours is required to piece up the broken ends of ring frame. Therefore, the labour

cost of ring section is significant.

The number of sides to be allocated per tenter at any end breakage rate may. be determined by any of the following methods :

    I.   Computerized method of spin plan.

    II.   Interpretation of RPT.

Unfortunately, it is observed that most of the spinning mills are running their ring section without optimizing the labour cost in ring sections. They only count the cost of labours in ring section, but do not count the price of yarn recovered by piece up. A considerable number of spindles of ring section are kept unproductive because of high end breakage though labour cost is low in Bangladesh. The study reveals that, in context of present labour cost, every spinning mill in Bangladesh may keep all the spindles of ring section productive economically by piecing up of broken ends upto end breaks rate 40 per hour per 100 spindles.

4.   The Ring Production Table (RPT) is the vivid feature of production of ring section. Any body can forecast the production of ring section with the help of this table. The total number of labours required, total labour cost, price of yarn produced, price of yarn recovered by piecing up and other techno-managerial indexes are available in this table which are

very helpful to justify every day's revenue generation against cost (if calculated earlier), and thus the management of the mill can assess profit/loss of the mill day by day wise.

5.2 RECOMMENDATIONS FOR FUTURE WORKS

The study reveals the following phenomena which have significant role on increasing waste and decreasing production of ring section of spinning mill.

1. Increasing end breakage rate increases waste (bonda and pneuma fill). No relationship yet been established between end breakage rate and waste created due to end breakage. Waste created due to end breakage may be expressed in terms of yarn production of the spindles with broken ends. This study may create effective awareness among workers and management against end breakage and waste.

2. Excessive roller lapping sometimes creates end breakage to spindles on both sides of that roller, thus a lapping roller may be the cause of end breakage of all the spindles on that side of the ring frame. A study may be performed for the purpose of creating a device which can prevent any lapping roller to be the cause of end breakage to adjacent spindles.

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CONVENTIONAL METHOD FOR SPIN PLAN

CONVECTIONAL METHOD FOR SPIN PLAN

YARN TYPE   :

COUNT   :

REQUIRED PRODUCTION   :

SPINDLE SPEED (rpm)   :

Let

P_R = Required production of yarn in ring section.

P_s = Required production of roving in Simplex section.

P_{D-II} = Required production of sliver in Draw-II section.

P_{Com} = Required production of Combing section.

P_L = Required production of Lap Former.

P_{D-I} = Required production of pre-drawing section.

P_{Card} = Required production of carding section.

P_B = Required production of Blow Room section.

p_r = Production capacity of individual ring frame.

p_s = Production capacity of individual speed frame.

p_{d-II} = Production capacity of individual draw frame.

p_{com} = Production capacity of individual comber.

p_l = Production capacity of individual lap former.

p_{d-I} = Production capacity of individual pre-draw frame.

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P_{card} = Production capacity of individual card.

p_b = Production capacity of individual scutcher.

N_R = Total numbers of ring frame required = $\dfrac{P_R}{p_r}$.

N_S = Total numbers of speed frame required = $\dfrac{P_S}{p_s}$.

N_{D-II} = Total numbers of draw frame required = $\dfrac{P_{D-II}}{p_{d-II}}$.

N_{Com} = Total numbers of comber required = $\dfrac{P_{Com}}{p_{com}}$.

N_L = Total numbers of lap former required = $\dfrac{P_L}{p_l}$.

N_{D-I} = Total numbers of draw frame required = $\dfrac{P_{D-I}}{p_{d-I}}$.

N_{Card} = Total numbers of card required = $\dfrac{P_{Card}}{p_{card}}$.

N_B = Total numbers of scutcher required = $\dfrac{P_B}{p_b}$.

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$$P_r = \frac{\text{Spindle rpm x 8 x 60 x Eff.(\%) x No. of Spindles /Machine.}}{\text{TPI x 36 x 840 x Count x 100}} \quad \text{lbs/shift.}$$

$$P_s = \frac{\text{Spindle rpm x 8 x 60 x Eff.(\%) x No. of Spindles /Machine.}}{\text{TPI x 36 x 840 x Hank x 100}} \quad \text{lbs/shift.}$$

$$P_{d\text{-}j} = \frac{(22/7) \text{ x F.R. dia. x F.R. rpm x 8 x 60 x Eff.(\%) x No. of delivery per Machine.}}{36 \text{ x 840 x Hank x 100}} \quad \text{lbs/shift.}$$

$$P_{card} = \frac{(22/7) \text{ x Doffer rpm x Doffer dia.(inch) x 8 x 60 x Web Draft x Eff.(\%).}}{36 \text{ x 840 x Hank x 100}} \quad \text{lbs/shift.}$$

$$P_{con} = \frac{\text{Nips/minute x Feed/Nip x 8 x 60 x No. of Laps Feed/Machine x (100 - \% Noil) x Lap Weight(in grains) x Eff.(\%).}}{36 \text{ x 7000 x 100 x 100}} \quad \text{lbs/shift.}$$

$$P_b = \frac{(22/7) \text{ x Delivery Roller rpm x Delivery Roller Dia.(inch) x 8 x 60 x Lap Weight/Yard(in grains) x Eff.(\%).}}{36 \text{ x 7000 x 100}} \quad \text{lbs/shift.}$$

$$P_l = \frac{(22/7) \text{ x Delivery Roller rpm x Delivery Roller Dia.(inch) x 8 x 60 x Lap Weight/Yard(in grains) x Eff.(\%).}}{36 \text{ x 7000 x 100}} \quad \text{lbs/shift.}$$

$$N_l = \text{Total numbers of ring frame required} = \frac{P_l}{P_r}.$$

COMPUTERIZED METHOD FOR SPIN PLAN

COMPUTERIZED METHOD FOR SPIN PLAN

FOR COMBED YARN
    TO RUN THE PROGRAM AND INPUT DATA : PRESS<ALT+A>
    TO PRINT OUTPUT   : PRESS<ALT+B>
    TO PRINT DETAILS OF OUTPUT   : PRESS<ALT+C>

FOR P-C YARN
    TO RUN THE PROGRAM AND INPUT DATA : PRESS<ALT+D>
    TO PRINT DETAILS OF OUTPUT   : PRESS<ALT+E>

FOR CARDED YARN
    TO RUN THE PROGRAM AND INPUT DATA : PRESS<ALT+F>
    TO PRINT DETAILS OF OUTPUT   : PRESS<ALT+G>

    A   {GOTO}AQ5~

    B   /PPRAP3..AZ79~AG{ESC}{ESC}{ESC}

    C   /PPRF6..P133~AG{ESC}{ESC}{ESC}

    D   {GOTO}V4~

    E   /PPRU4..AK133~AG{ESC}{ESC}{ESC}

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COMPUTERIZED METHOD FOR SPIN PLAN

YARN TYPE	:	Combed
YARN COUNT	:	60
TPI	:	31.305
REQUIRED PRODUCTION (lbs)	:	12000
END BREAKS PER HOUR/100 SPINDLES	:	20
LABOUR PERFORMANCE(piece-up per hour)	:	40

INPUT PARAMETERS

SECTION	MACHINE PARAMETERS		MACHINE OUTPUT PARAMETERS	
	NAME	VALUE	NAME	VALUE
RING	1. Spindle speed(rpm) 2. No. of Spdl/machine 3. Machine eff.(%)	18000 432 93	1. Yarn count 2. T.M. 3. TPI 4. Waste(%)	60 3.5 27.11088 1.5
SIMPLEX	1. Spindle speed(rpm) 2. No. of Spnl/machine 3. Machine eff.(%)	1400 124 75	1. Roving hank 2. T.M. 3. TPI 4. Waste(%)	2.2 0.943 1.399 1
DRAWING	1. F.R. dia.(inch) 2. F.R. speed(rpm) 3. No. of delivery/frame 4. No. of passage/frame 5. Machine eff.(%)	1.125 2700 2 2 75	1. Sliver hank 2. Waste (%)	0.16 1
COMBING	1. No. of nips/minute 2. Feed length(inch) 3. No. of laps feed/machine 4. Lap wt.(lbs/yd in grains) 4. No. of delivery 5. Machine eff.(%)	200 0.25 8 800 1 75	1. Noil(%)	20
LAP FORMER	1. D.R. diameter(inch) 2. D.R. speed(rpm) 3. Machine eff.(%)	18 50 75	1. Lap weight (grain/yd.) 2. Waste(%)	800 1
PRE-DRAWING	1. F.R. dia.(inch) 2. F.R. speed(rpm) 3. No. of delivery/frame 4. No. of passage/frame 5. Machine eff.(%)	1.125 2500 2 1 75	1. Sliver hank 2. Waste (%)	0.16 1
CARDING	1. Doffer diameter(inch) 2. Doffer speed(rpm) 3. Web draft 4. Machine eff.(%)	27 40 1.45 85	1. Sliver hank 2. Waste(%)	0.16 4
BLOW ROOM	1. Lap roller dia.(in.) 2. Lap roller speed(rpm) 3. Machine eff.(%)	10 10 75	1. Lap weight (oz./yd.) 2. Waste(%)	14 5

SUMMERY OF OUTPUTS

ACCESSORIES REQUIRED			MACHINES ALLOCATED :		
SLIVER CAN :					
1. Carding to drawing	=	2734	1. RING FRAME	=	56.68
2. Drawing to lap former	=	90	2. SIMPLEX	=	6.05
3. Comber to drawing-1	=	230	3. DRAW FRAMES	=	9.59
4. Drawing-1 to drawing-2	=	196	4. COMBER	=	11.32
5. Drawin-2 to simplex	=	836	5. LAP FORMER	=	1.54
			6. CARDING	=	12.22
ROVING BOBBIN	=	28585	7. SCHATURE	=	1.92
RING BOBBIN	=	85705			
CONE	=	3360	RAW COTTON REQU=16608.74		
			YARN IMPLEMENTA=		72.25
			SIDES/LABOUR	=	0.93

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DETAILS OF SPIN PLAN OF YARN MANUFACTURING MILLS

YARN TYPE : | COMBED |

PIECE UP/LABOUR/HOUR   :   45

INPUT VARIABLES		OUTPUTS		
RING FRAME		**RING FRAME**		
COUNT	60	PRODUCTION/FRAME/SHIFT (Lb)	=	70.57
T.M	3.500	PRODUCTION/FRAME/DAY (Lb)	=	211.70
TPI	27.111			
NO. OF SPINDLES/FRAME	432	NO. OF R/F REQUIRED	=	56.68
SPINDLE SPEED (rpm)	18000			
EFFICIENCY (%)	93	NO. OF SIDES/LABOUR	=	1.04
REQUIRED PRODUCTION/DAY (Lb)	12000.00			
WASTE (%)	1.5			
END BREAKAGE/HOUR/100 SPINDLES	20			
SIMPLEX		**SIMPLEX**		
REQUIRED PRODUCTION/DAY (Lb)	12180.00	PRODUCTION/FRAME/SHIFT (Lb)	=	671.48
T.M	0.943	PRODUCTION/FRAME/DAY (Lb)	=	2014.43
HANK OF ROVINGS	2.20			
TPI	1.399	NO. OF S/F REQUIRED	=	6.05
SPINDLE SPEED (rpm)	1400			
EFFICIENCY (%)	75			
NO. OF SPINDLES/MACHINE	124			
WASTE (%)	1			
DRAW FRAME		**DRAW FRAME**		
REQUIRED PRODUCTION/DAY (Lb)	12301.80	PRODUCTION/FRAME/SHIFT (Lb)	=	1420.60
HANK OF SLIVERS	0.16	PRODUCTION/FRAME/DAY (Lb)	=	4261.80
F.R. rpm	2700	FRAME REQUIRED/PASSAGE	=	2.89
F.R. DIAMETER (inch)	1.125			
EFFICIENCY (%)	75	TOTAL FRAME REQUIRED	=	5.77
NO. OF DELIVERY/MACHINE	2			
NO. OF PASSAGE	2			
WASTE (%)	1			
COMBER		**COMBER**		
REQUIRED PRODUCTION/DAY (Lb)	12424.82	PRODUCTION/FRAME/SHIFT (Lb)	=	365.71
NIPS/MINUTE	200	PRODUCTION/FRAME/DAY (Lb)	=	1097.14
FEED LENGTH (inch)	0.250			
NO. OF LAPS FEED/MACHINE	8	TOTAL MACHINE REQUIRED	=	11.32
LAP WEIGHT (Lb/YARD IN GRAINS)	800			
NOILS (%)	20			
EFFICIENCY (%)	75			
NO. OF DELIVERY	1			

75

```
:----------------------------------: :----------------------------------:
:               LAP FORMER          : :               LAP FORMER          :
:----------------------------------: :----------------------------------:
:                                   : :                                   :
:REQUIRED PRODUCTION/DAY (Lb)  : 14909.78 :PRODUCTION/FRAME/SHIFT (Lb)  =   3232.65 :
:DELIVERY ROLLER DIA (inch)    :      18 :PRODUCTION/FRAME/DAY (Lb)    =   9697.96 :
:DELIVERY ROLLER  RPM          :      50 :                                   :
:LAP WEIGHT/YARD IN GRAINS     :     800 :TOTAL NO. OF L. FORMER REQUIR=   1.54 :
:EFFICIENCY (%)                :      75 :                                   :
:WASTE (%)                     :       1 :                                   :
:                                   : :                                   :
:----------------------------------: :----------------------------------:
:               DRAWING-I           : :               DRAWING-I           :
:----------------------------------: :----------------------------------:
:                                   : :                                   :
:REQUIRED PRODUCTION/DAY (Lb)  : 15058.88 :PRODUCTION/FRAME/SHIFT (Lb)  =   1315.37 :
:HANK                          :    0.16 :PRODUCTION/FRAME/DAY (Lb)    =   3946.11 :
:F.R. RPM                      :    2500 :FRAME REQUIRED/PASSAGE       =     3.82 :
:F.R. DIA (inch)               :   1.125 :                                   :
:EFFICIENCY (%)                :      75 :TOTAL FRAME REQUIRED         =     3.82 :
:NO. OF DELEVERY/MACHINE       :       2 :                                   :
:NO. OF PASSAGE                :       1 :                                   :
:WASTE (%)                     :       1 :                                   :
:                                   : :                                   :
:----------------------------------: :----------------------------------:
:               CARDING             : :               CARDING             :
:----------------------------------: :----------------------------------:
:                                   : :                                   :
:REQUIRED PRODUCTION/DAY (Lb)  : 15209.47 :PRODUCTION/FRAME/SHIFT (Lb)  =    415.03 :
:DOFFER SPEED (RPM)            :      40 :PRODUCTION/FRAME/DAY (Lb)    =   1245.08 :
:DOFFER DIA (inch)             :      27 :                                   :
:WEB DAFT                      :    1.45 :TOTAL NO. OF CARDS REQUIRED  =    12.22 :
:HANK OF SLIVERS               :    0.16 :                                   :
:EFFICIENCY (%)                :      85 :                                   :
:WASTE (%)                     :       4 :                                   :
:                                   : :                                   :
:----------------------------------: :----------------------------------:
:               BLOW ROOM           : :               BLOW ROOM           :
:----------------------------------: :----------------------------------:
:                                   : :                                   :
:REQUIRED PRODUCTION/DAY (Lb)  : 15817.85 :PRODUCTION/FRAME/SHIFT (Lb)  =   2750.00 :
:LAP WEIGHT/YARD in oz.        :      14 :PRODUCTION/FRAME/DAY (Lb)    =   8250.00 :
:LAP ROLLER DIA (inch)         :      10 :                                   :
:LAP ROLLER RPM                :      10 :REQUIRED NO. OF SCUTURE      =     1.92 :
:EFFICIENCY (%)                :      75 :                                   :
:WASTE (%)                     :       5 :RAW COTTON REQUIRED          =  16608.74 :
:                                   : :                                   :
:==================================================================:
:                                                                   :
:                       SUMMERY OF OUTPUTS                          :
:                                                                   :
:==================================================================:
:ACCESSORIES REQUIRED              :MACHINES ALLOCATED :              :
:SLIVER CAN :                      :                                 :
:1. Carding to drawing    =   2734 :1. RING FRAME        =     56.68 :
:2. Drawing to lap former =     90 :2. SIMPLEX           =      6.05 :
:3. Comber to drawing-1   =    230 :3. DRAW FRAMES       =      9.59 :
:4. Drawing-1 to drawing-2 =   196 :4. COMBER            =     11.32 :
:5. Drawing-2 to simplex  =    836 :5. LAP FORMER        =      1.54 :
:                                  :6. CARDING           =     12.22 :
:ROVING BOBBIN            =  28585 :7. SCHATURE          =      1.92 :
:RING BOBBIN              =  85705 :                                 :
:CONE                     =   3360 :RAW COTTON REQUIRED  =  16608.74 :
:                                  :YARN IMPLEMENTATION RATE (%)= 72.25 :
:                                  :SIDES/LABOUR         =      1.04 :
:==================================================================:
```

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YARN TYPE :   CARDED

PIECE UP/LABOUR/HOUR   :   45

INPUT VARIABLES	OUTPUTS

RING FRAME | ### RING FRAME

END BREAKAGE/Hr/100 SPINDLES :	30	
COUNT :	40	PRODUCTION/FRAME/SHIFT (Lb) = 108.01
T.M :	3.501	PRODUCTION/FRAME/DAY (Lb) = 324.04
TPI :	22.140	
NO. OF SPINDLES/FRAME :	432	NO. OF R/F REQUIRED = 14.00
SPINDLE SPEED (rpm) :	15000	
EFFICIENCY (%) :	93	SIDES/LABOUR = 0.83
REQUIRED PRODUCTION/DAY (Lb) :	4537.95	
WASTE (%) :	2	
END BREAKAGE/HOUR/100 SPINDLES:	25	

SIMPLEX | ### SIMPLEX

REQUIRED PRODUCTION/DAY (Lb) :	4628.74	PRODUCTION/FRAME/SHIFT (Lb) = 687.68
T.M :	0.800	PRODUCTION/FRAME/DAY (Lb) = 2063.04
HANK OF ROVINGS :	1.80	
TPI :	1.073	NO. OF S/F REQUIRED = 2.24
SPINDLE SPEED (rpm) :	900	
EFFICIENCY (%) :	75	
NO. OF SPINDLES/MACHINE :	124	
WASTE (%) :	1	

DRAW FRAME | ### DRAW FRAME

REQUIRED PRODUCTION/DAY (Lb) :	4675.03	PRODUCTION/FRAME/SHIFT (Lb) = 926.02
HANK OF SLIVERS :	0.20	PRODUCTION/FRAME/DAY (Lb) = 2778.06
F.R. rpm :	2200	FRAME REQUIRED/PASSAGE = 1.68
F.R. DIAMETER (inch) :	1.125	
EFFICIENCY (%) :	75	TOTAL FRAME REQUIRED = 5.05
NO. OF DELIVERY/MACHINE :	2	
NO. OF PASSAGE :	3	
WASTE (%) :	1.5	

CARDING | ### CARDING

REQUIRED PRODUCTION/DAY (Lb) :	4745.15	PRODUCTION/FRAME/SHIFT (Lb) = 193.96
DOFFER RPM :	30	PRODUCTION/FRAME/DAY (Lb) = 581.88
DOFFER DIA (inch) :	27	
WEB DAFT :	1.2	TOTAL NO. OF CARDS REQUIRED = 8.15
HANK OF SLIVERS :	0.2	
EFFICIENCY (%) :	80	
WASTE (%) :	1	

BLOW ROOM			BLOW ROOM		
REQUIRED PRODUCTION/DAY (Lb)	:	4792.60	PRODUCTION/FRAME/SHIFT (Lb)	=	2160.71
LAP WEIGHT/YARD in oz.	:	11	PRODUCTION/FRAME/DAY (Lb)	=	6482.14
LAP ROLLER DIA (inch)	:	10			
LAP ROLLER RPM	:	10	REQUIRED NO. OF SCUTURE	=	0.74
EFFICIENCY (%)	:	75			
WASTE (%)	:	1	RAW COTTON REQUIRED	=	4840.53

SUMMERY OF OUTPUTS

ACCESSORIES REQUIRED			MACHINES ALLOCATED :		
SLIVER CAN :					
1. Carding to drawing	=	339	1. RING FRAME	=	14.00
2. Drawing to simplex	=	316	2. SIMPLEX	=	2.24
			3. DRAW FRAMES	=	5.05
ROVING BOBBIN	=	7267	4. CARDING	=	8.15
RING BOBBIN	=	21175	5. SCHATURE	=	0.74
			RAW COTTON REQUIRED	=	4840.53
			YARN IMPLEMENTATION RATE (%)	=	93.75
			SIDES/LABOUR	=	0.83

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DETAILS OF SPIN PLAN OF YARN MANUFACTURING MILLS

YARN TYPE : P-C

| | | POLYESTER [%] = | 30 |
| | | COTTON [%] = | 70 |

PIECE UP/LABOUR/HOUR : 45

CONE WINDER 8 REELING M/C 12
SPINDLES/CONE 120 CONE FEED/REEL 20

INPUT VARIABLES	OUTPUTS	
RING FRAME	**RING FRAME**	
COUNT : 42	PRODUCTION/FRAME/SHIFT [Lb] = 93.16	-
T.M : 3.898	PRODUCTION/FRAME/DAY [Lb] = 279.49	-
TPI : 25.262		
NO. OF SPINDLES/FRAME : 432	NO. OF R/F REQUIRED = 22.40	-
SPINDLE SPEED (rpm) : 15500		
EFFICIENCY (%) : 93	NO. OF SIDES/LABOUR = 0.83	
REQUIRED PRODUCTION/DAY [Lb] : 6260.60		
WASTE (%) : 2		
END BREAKAGE/HOUR/100 SPINDLES : 25		
SIMPLEX	**SIMPLEX**	
REQUIRED PRODUCTION/DAY [Lb] : 6385.81	PRODUCTION/FRAME/SHIFT [Lb] = 1071.16	-
T.M : 1.470	PRODUCTION/FRAME/DAY [Lb] = 3213.48	-
HANK OF ROVINGS : 1.50		
TPI : 1.103	NO. OF S/F REQUIRED = 1.99	-
SPINDLE SPEED (rpm) : 1200		
EFFICIENCY (%) : 75		
NO. OF SPINDLES/MACHINE : 124		
WASTE (%) : 1		
DRAW FRAME	**DRAW FRAME**	
REQUIRED PRODUCTION/DAY [Lb] : 6449.67	PRODUCTION/FRAME/SHIFT [Lb] = 1234.69	-
HANK OF SLIVERS : 0.15	PRODUCTION/FRAME/DAY [Lb] = 3704.08	-
F.R. rpm : 2200	FRAME REQUIRED/PASSAGE = 1.74	-
F.R. DIAMETER (inch) : 1.125		
EFFICIENCY (%) : 75	TOTAL FRAME REQUIRED = 3.48	-
NO. OF DELIVERY/MACHINE : 2		
NO. OF PASSAGE : 2		
WASTE (%) : 1		
COMBER	**COMBER**	
REQUIRED PRODUCTION/DAY [Lb] : 4605.06	PRODUCTION/FRAME/SHIFT [Lb] = 384.00	-
NIPS/MINUTE : 200	PRODUCTION/FRAME/DAY [Lb] = 1152.00	-
FEED LENGTH (inch) : 0.250		
NO. OF LAPS FEED/MACHINE : 8	TOTAL MACHINE REQUIRED = 4.00	-
LAP WEIGHT (Lb/YARD IN GRAINS) : 800		
NOILS (%) : 16		
EFFICIENCY (%) : 75		
NO. OF DELIVERY : 1		

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```
------------------------------------------         ------------------------------------------------
|           LAP FORMER             |               |              LAP FORMER            |          |
------------------------------------               ------------------------------------
|                                  |               |                                    |          |
|REQUIRED PRODUCTION/DAY (Lb)  : 5341.87|          |PRODUCTION/FRAME/SHIFT (Lb)   =  3232.65|    -  |
|DELIVERY ROLLER DIA (inch)    :    18  |          |PRODUCTION/FRAME/DAY (Lb)     =  9697.96|       |
|DELIVERY ROLLER RPM           :    50  |          |                                    |          |
|LAP WEIGHT/YARD IN GRAINS     :   800  |          |TOTAL NO. OF FAME REQUIRED    =     0.55|    -  |
|EFFICIENCY (%)                :    75  |          |                                    |          |
|WASTE (%)                     :     1  |          |                                    |          |
```

DRAWING-I	COTTON	POLYESTER	DRAWING-I	COTTON	POLESTER
REQUIRED PRODUCTION/DAY (Lb)	5395.29	1973.60	PRODUCTION/FRAME/SHIFT (Lb) =	1403.06	801.75
HANK	0.15	0.21	PRODUCTION/FRAME/DAY (Lb) =	4209.18	2405.25
F.R. RPM	2500	2000	FRAME REQUIRED/PASSAGE =	1.28	0.82
F.R. DIA (inch)	1.125	1.125			
EFFICIENCY (%)	75	75	TOTAL FRAME REQUIRED =	0.00	0.82
NO. OF DELEVERY/MACHINE	2	2			
NO. OF PASSAGE	1	1			
WASTE (%)	1	1.5			

CARDING	COTTON	POLYESTER	CARDING	COTTON	POLYESTER
REQUIRED PRODUCTION/DAY (Lb)	5449.25	2003.203	PRODUCTION/FRAME/SHIFT (Lb) =	442.69	179.91
DOFFER RPM	40	30	PRODUCTION/FRAME/DAY (Lb) =	1328.08	539.74
DOFFER DIA (inch)	27	27			
WEB DAFT	1.45	1.1	TOTAL NO. OF CARDS REQUIRED =	4.10	3.71
HANK OF SLIVERS	0.15	0.21			
EFFICIENCY (%)	85	85			
WASTE (%)	4	1			

BLOW ROOM	COTTON	POLYESTER	BLOW ROOM	COTTON	POLYESTER
REQUIRED PRODUCTION/DAY (Lb)	5667.22	2023.2351	PRODUCTION/FRAME/SHIFT (Lb) =	2750.00	2357.14
LAP WEIGHT/YARD IN oz.	14	12	PRODUCTION/FRAME/DAY (Lb) =	8250.00	7071.43
LAP ROLLER DIA (inch)	10	10			
LAP ROLLER RPM	10	10	REQUIRED NO. OF SCUTURE =	0.69	0.29
EFFICIENCY (%)	75	75			
WASTE (%)	5	1	RAW COTTON REQUIRED =	5950.58	2043.47

SUMMERY OF OUTPUTS

```
ACCESSORIES REQUIRED
SLIVER CAN :
1. Carding to drawing       =    68         MACHINES ALLOCATED :
2. Drawing to lap former    =    32
3. Comber to drawing-1      =   127         1. RING FRAME      =  22.40     0.00
4. Drawing-1 to drawing-2   =   230         2. SIMPLEX         =   1.99     0.00
5. Drawing-2 to simplex     =   299         3. DRAW FRAMES     =   3.48     0.82
                                            4. COMBER          =   4.00     0.00
ROVING BOBBIN               = 11187         5. LAP FORMER      =   0.55     0.00
RING BOBBIN                 = 33869         6. CARDING         =   4.10     3.71
CONE                        =  3360         7. SCHATURE        =   0.69     0.29

                                            RAW COTTON/FIBER REQUIRED (Lb) = 5950.58   2043.47
                                            YARN IMPLEMENTATION RATE (%)   =  201.66      -
                                            SIDES/LABOUR                   =    0.83
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RING PRODUCTION TABLE (RPT)

APPLICATIONS

- Number of Sides per Labour(Tenter)

- Total Labour Cost

- Ring Production Rate

- Ring Production per Shift

- Net Loss Recovered Through Piece up

- Revenue Generation per Shift

GUIDES FOR USER

C O U N T	PAGE													
	End Breakage/hour/100 spindles													
	1	11	12	13	14	15	16	17	18	19	20	21	25	29
30	84	85	86	87	88	89	90	91	92	93	94	95	96	97
45	98	99	100	101	102	103	104	105	106	107	108	109	110	111
60	112	113	114	115	116	117	118	119	120	121	122	123	124	125
80	126	127	128	129	130	131	132	133	134	135	136	137	138	139

TO RUN THE PROGRAM AND
         INPUT DATA   : PRESS <Alt+R>

TO PRINT OUTPUT   : PRESS <Alt+P>

TO PRINT THE PROGRAM   : PRESS <Alt+Q>

TO ERASE OUTPUTS   : PRESS <Alt+Z>

RING PRODUCTION FEATURE

INPUT VARIABLES			
END BREAKS/Hour/100 Spindle	30	WASTE MULTIPLIER	1.50
NUMBER OF SPINDLES/MACHINE	432	YARN PRICE (TAKA/Lb)	100.45
NUMBER OF MACHINES	20	WASTE PRICE (TAKA/Lb)	15.25
MACHINE EFFICIENCY (%)	95	LABOUR PERFORMANCE (pitch up/hour)	40
COUNT	80	LABOUR COST (TK./ Labour/Shift)	55.75
TWIST MULTIPLIER (T.M)	3.500	SPINNING POWER (KW/100 SPINDLES)	2.00
TWIST PER INCH (TPI)	31.305	COST OF POWER (TK./KWH)	3.65

OUTPUTS	
NUMBER OF SIDES PER LABOUR =	YARN PRODUCTION RATE (Lb/Shift/100 rpm)=
TOTAL NUMBERS OF LABOURS =	WASTE RATE (Lb/Shift/100 rpm) =
TOTAL LABOUR COST/SHIFT(TK.) =	

SPINDLE SPEED [RPM]	YARN PRODUCTION			PRICE OF YARN PRODUCED			WASTE DUE TO END BREAKAGE		NET LOSS RECOVERED /SHIFT BY PITCH-UP [Taka]
	NET		RECOVERED BY PITCH-	PER DAY	PER SHIFT	RECOVERED PER SHIFT	WEIGHT	PRICE	
	(Lb/Day)	(Lb/Shift)	(Lb/Shift)	(Taka)	(Taka)	(Taka)	(Lb/SHIFT)	(Taka)	
1	2	3	4	5	6	7	8	9	10

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*********
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3.19E+09

R    /CC15..W40"AL3"/DFAN30..AN54"4000"1000"28000"{D}
     {GOTO}F43"1+8+60+$AS$7+$AS$8+$AS$9"{GOTO}F44"{D}
     @IF($AS$11=1,$AS$12,$AS$11+$AS$10"(1/2))+36+840+$AS$10+100"{D}
     {GOTO}BG30"@ABS(F43)/@ABS(F44)"{D}
     D}
     {GOTO}AQ30"@ABS(AN30)+$BG$30"{GOTO}AO30"3+@ABS(AQ30)"{D}
     {GOTO}AS30"@ABS(AQ30)+$AS$6/200"{D}
     D}
     {GOTO}AU30"@ABS(AO30)+$BE$7"{GOTO}AW30"@ABS(AO30)/3"{D}
     {GOTO}AY30"@ABS(AS30)+$BE$7"{D}
     D}
     {GOTO}BA30"@ABS(AS30)+$BE$6"{GOTO}BC30"@ABS(BA30)+$BE$8"{D}
     {GOTO}BE30"@ABS(AY30-BC30-$BG$11)"{D}
     D}
     {GOTO}BE16"+(AQ31-AQ30)/10"{GOTO}BE17"+(BA31-BA30)/10"{D}
     D}
```

```
{D}
{GOTO}AS16~+$BE$9*2*100/($AS$6*$AS$7)~{GOTO}AJ17~+$AS$8*2/AS16~{D}
{D}
{D}
{D}
{GOTO}AJ18~{D}
@ROUND(AJ17,0)~{GOTO}AJ19~{D}
@IF(@ABS(AJ18)<=@ABS(AJ17),(@ABS(AJ18)+1),@ABS(AJ18))~{D}
{GOTO}AS17~1*(AJ18+1)~{GOTO}AS18~1*$AS$17*$BE$10~{D}
{GOTO}ANS5~\=~/C~{R}.ANS5..BE55~{GOTO}AO30~/CAO30..BE30~AO31..AO54~{D}
{D}
/MANS5..BE55~AM36~{GOTO}AS6~
/MAN41..BE56~AM42~{GOTO}AM36~
/MAN47..BE57~AM48~{GOTO}AM42~
/MAN53..BE58~AM54~{GOTO}AM4~
```

Z   /REAL3..BE64~

P   /PPRALI..BF59~AG{ESC}{ESC}{ESC}

Q   /PPRCI..X87~AG{ESC}{ESC}{ESC}

..........................END...

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RING PRODUCTION FEATURE

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======================================================================
                          INPUT VARIABLES
======================================================================
END BREAKS/Hour/100 Spindle  :      1  | WASTE MULTIPLIER              :   1.50
NUMBER OF SPINDLES/MACHINE    :    432  | YARN PRICE (TAKA/Lb)         :  75.00
NUMBER OF MACHINES            :     20  | WASTE PRICE (TAKA/Lb)        :  15.25
MACHINE EFFICIENCY (%)        :     95  | LABOUR PERFORMANCE (pitch up/hour) : 45
COUNT                         :     30  | LABOUR COST (TK./ Labour/Shift)  : 70.00
TWIST MULTIPLIER (T.M)        :  3.500  | SPINNING POWER (KW/100 SPINDLES) :  2.00
TWIST PER INCH (TPI)          : 31.305  | COST OF POWER (TK./KWH)         :  3.65
======================================================================
                             OUTPUTS
======================================================================
NUMBER OF SIDES PER LABOUR  =   20.83  | YARN PRODUCTION RATE (Lb/Shift/100 rpm) =  22.69
TOTAL NUMBERS OF LABOURS    =       3  | WASTE RATE (Lb/Shift/100 rpm)          =   0.17
TOTAL LABOUR COST/SHIFT(Tk.) = 210.00  |
======================================================================
```

SPINDLE SPEED	YARN PRODUCTION			PRICE OF YARN PRODUCED			WASTE DUE TO END BREAKAGE		NET LOSS RECOVERED /SHIFT BY PITCH-UP
	NET		RECOVERED BY PITCH-UP	PER DAY	PER SHIFT	RECOVERED PER SHIFT	WEIGHT	PRICE	
(RPM)	(Lb/Day)	(Lb/Shift)	(Lb/Shift)	(Taka)	(Taka)	(Taka)	(Lb/Shift)	(Taka)	(Taka)
1	2	3	4	5	6	7	8	9	10
4000	2718.49	906.16	4.53	203886.93	67962.31	339.81	6.80	103.64	236.10
5000	3398.12	1132.71	5.66	254858.66	84952.89	424.76	8.50	129.55	295.14
6000	4077.74	1359.25	6.80	305830.39	101943.46	509.72	10.19	155.46	354.18
7000	4757.36	1585.79	7.93	356802.12	118934.04	594.67	11.89	181.37	413.22
8000	5436.98	1812.33	9.06	407773.86	135924.62	679.62	13.59	207.29	472.27
9000	6116.61	2038.87	10.19	458745.59	152915.20	764.58	15.29	233.20	531.31
10000	6796.23	2265.41	11.33	509717.32	169905.77	849.53	16.99	259.11	590.35
11000	7475.85	2491.95	12.46	560689.05	186896.35	934.48	18.69	285.02	649.39
12000	8155.48	2718.49	13.59	611660.78	203886.93	1019.43	20.39	310.93	708.43
13000	8835.10	2945.03	14.73	662632.51	220877.50	1104.39	22.09	336.84	767.48
14000	9514.72	3171.57	15.86	713604.25	237868.08	1189.34	23.79	362.75	826.52
15000	10194.35	3398.12	16.99	764575.98	254858.66	1274.29	25.49	388.66	885.56
16000	10873.97	3624.66	18.12	815547.71	271849.24	1359.25	27.18	414.57	944.60
17000	11553.59	3851.20	19.26	866519.44	288839.81	1444.20	28.88	440.48	1003.65
18000	12233.22	4077.74	20.39	917491.17	305830.39	1529.15	30.58	466.39	1062.69
19000	12912.84	4304.28	21.52	968462.91	322820.97	1614.10	32.28	492.30	1121.73
20000	13592.46	4530.82	22.65	1019434.64	339811.55	1699.06	33.98	518.21	1180.77
21000	14272.08	4757.36	23.79	1070406.37	356802.12	1784.01	35.68	544.12	1239.81
22000	14951.71	4983.90	24.92	1121378.10	373792.70	1868.96	37.38	570.03	1298.86
23000	15631.33	5210.44	26.05	1172349.83	390783.28	1953.92	39.08	595.94	1357.90
24000	16310.95	5436.98	27.18	1223321.57	407773.86	2038.87	40.78	621.86	1416.94
25000	16990.58	5663.53	28.32	1274293.30	424764.43	2123.82	42.48	647.77	1475.98
26000	17670.20	5890.07	29.45	1325265.03	441755.01	2208.78	44.18	673.68	1535.03
27000	18349.82	6116.61	30.58	1376236.76	458745.59	2293.73	45.87	699.59	1594.07
28000	19029.45	6343.15	31.72	1427208.49	475736.16	2378.68	47.57	725.50	1653.11

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RING PRODUCTION FEATURE

INPUT VARIABLES			
END BREAKS/Hour/100 Spindle	11	WASTE MULTIPLIER	1.50
NUMBER OF SPINDLES/MACHINE	432	YARN PRICE (TAKA/Lb)	75.00
NUMBER OF MACHINES	20	WASTE PRICE (TAKA/Lb)	15.25
MACHINE EFFICIENCY (%)	95	LABOUR PERFORMANCE (pitch up/hour)	45
COUNT	30	LABOUR COST (TK./ Labour/Shift)	70.00
TWIST MULTIPLIER (T.M)	3.500	SPINNING POWER (KW/100 SPINDLES)	2.00
TWIST PER INCH (TPI)	31.305	COST OF POWER (TK./KWH)	3.65

OUTPUTS			
NUMBER OF SIDES PER LABOUR =	1.89	YARN PRODUCTION RATE (Lb/Shift/100 rpm) =	22.65
TOTAL NUMBERS OF LABOURS =	22	WASTE RATE (Lb/Shift/100 rpm) =	1.87
TOTAL LABOUR COST/SHIFT(Tk.) = 1540.00			

SPINDLE SPEED (RPM)	YARN PRODUCTION			PRICE OF YARN PRODUCED			WASTE DUE TO END BREAKAGE		NET LOSS RECOVERED /SHIFT BY PITCH-UP
	NET		RECOVERED BY PITCH-	PER DAY	PER SHIFT	RECOVERED PER SHIFT	WEIGHT	PRICE	
	(Lb/Day)	(Lb/Shift)	(Lb/Shift)	(Taka)	(Taka)	(Taka)	(Lb/SHIFT)	(Taka)	(Taka)
1	2	3	4	5	6	7	8	9	10
4000	2718.49	906.16	49.84	203886.93	67962.31	3737.93	74.76	1140.07	2597.06
5000	3398.12	1132.71	62.30	254858.66	84952.89	4672.41	93.45	1425.08	3246.52
6000	4077.74	1359.25	74.76	305830.39	101943.46	5606.89	112.14	1710.10	3895.99
7000	4757.36	1585.79	87.22	356802.12	118934.04	6541.37	130.83	1995.12	4545.45
8000	5436.98	1812.33	99.68	407773.86	135924.62	7475.85	149.52	2280.14	5194.92
9000	6116.61	2038.87	112.14	458745.59	152915.20	8410.34	168.21	2565.15	5844.38
10000	6796.23	2265.41	124.60	509717.32	169905.77	9344.82	186.90	2850.17	6493.85
11000	7475.85	2491.95	137.06	560689.05	186896.35	10279.30	205.59	3135.19	7143.31
12000	8155.48	2718.49	149.52	611660.78	203886.93	11213.78	224.28	3420.20	7792.77
13000	8835.10	2945.03	161.98	662632.51	220877.50	12148.26	242.97	3705.22	8442.24
14000	9514.72	3171.57	174.44	713604.25	237868.08	13082.74	261.65	3990.24	9091.70
15000	10194.35	3398.12	186.90	764575.98	254858.66	14017.23	280.34	4275.25	9741.17
16000	10873.97	3624.66	199.36	815547.71	271849.24	14951.71	299.03	4560.27	10390.63
17000	11553.59	3851.20	211.82	866519.44	288839.81	15886.19	317.72	4845.29	11040.10
18000	12233.22	4077.74	224.28	917491.17	305830.39	16820.67	336.41	5130.30	11689.56
19000	12912.84	4304.28	236.74	968462.91	322820.97	17755.15	355.10	5415.32	12339.03
20000	13592.46	4530.82	249.20	1019434.64	339811.55	18689.64	373.79	5700.34	12988.49
21000	14272.08	4757.36	261.65	1070406.37	356802.12	19624.12	392.48	5985.36	13637.96
22000	14951.71	4983.90	274.11	1121378.10	373792.70	20558.60	411.17	6270.37	14287.42
23000	15631.33	5210.44	286.57	1172349.83	390783.28	21493.08	429.86	6555.39	14936.89
24000	16310.95	5436.98	299.03	1223321.57	407773.86	22427.56	448.55	6840.41	15586.35
25000	16990.58	5663.53	311.49	1274293.30	424764.43	23362.04	467.24	7125.42	16235.82
26000	17670.20	5890.07	323.95	1325265.03	441755.01	24296.53	485.93	7410.44	16885.28
27000	18349.82	6116.61	336.41	1376236.76	458745.59	25231.01	504.62	7695.46	17534.75
28000	19029.45	6343.15	348.87	1427208.49	475736.16	26165.49	523.31	7980.47	18184.21

RING PRODUCTION FEATURE

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============================================================================
                              INPUT VARIABLES
============================================================================
END BREAKS/Hour/100 Spindle  :     12  | WASTE MULTIPLIER                  :      1.50
NUMBER OF SPINDLES/MACHINE   :    432  | YARN PRICE (TAKA/Lb)              :     75.00
NUMBER OF MACHINES           :     20  | WASTE PRICE (TAKA/Lb)             :     15.25
MACHINE EFFICIENCY (%)       :     95  | LABOUR PERFORMANCE (pitch up/hour):      45
COUNT                        :     30  | LABOUR COST (TK./ Labour/Shift)   :     70.00
TWIST MULTIPLIER (T.M)       :  3.500  | SPINNING POWER (KW/100 SPINDLES)  :      2.00
TWIST PER INCH (TPI)         : 31.305  | COST OF POWER (TK./KWH)           :      3.65
============================================================================
                                 OUTPUTS
============================================================================
NUMBER OF SIDES PER LABOUR   =   1.74  | YARN PRODUCTION RATE (Lb/Shift/100 rpm) =  22.65
TOTAL NUMBERS OF LABOURS     =     24  | WASTE RATE (Lb/Shift/100 rpm)           =   2.04
TOTAL LABOUR COST/SHIFT(Tk.) = 1680.00 |
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SPINDLE SPEED	YARN PRODUCTION			PRICE OF YARN PRODUCED			WASTE DUE TO END BREAKAGE		NET LOSS RECOVERED /SHIFT BY PITCH-UP
	NET		RECOVERED BY PITCH	PER DAY	PER SHIFT	RECOVERED PER SHIFT	WEIGHT	PRICE	
(RPM)	(Lb/Day)	(Lb/Shift)	(Lb/Shift)	(Taka)	(Taka)	(Taka)	(Lb/Shift)	(Taka)	(Taka)
1	2	3	4	5	6	7	8	9	10
4000	2718.49	906.16	54.37	203886.93	67962.31	4077.74	81.55	1243.71	2833.15
5000	3398.12	1132.71	67.96	254858.66	84952.89	5097.17	101.94	1554.64	3541.66
6000	4077.74	1359.25	81.55	305830.39	101943.46	6116.61	122.33	1865.57	4250.17
7000	4757.36	1585.79	95.15	356802.12	118934.04	7136.04	142.72	2176.49	4958.67
8000	5436.98	1812.33	108.74	407773.86	135924.62	8155.48	163.11	2487.42	5667.18
9000	6116.61	2038.87	122.33	458745.59	152915.20	9174.91	183.50	2798.35	6375.69
10000	6796.23	2265.41	135.92	509717.32	169905.77	10194.35	203.89	3109.28	7084.19
11000	7475.85	2491.95	149.52	560689.05	186896.35	11213.78	224.28	3420.20	7792.70
12000	8155.48	2718.49	163.11	611660.78	203886.93	12233.22	244.66	3731.13	8501.21
13000	8835.10	2945.03	176.70	662632.51	220877.50	13252.65	265.05	4042.06	9209.72
14000	9514.72	3171.57	190.29	713604.25	237868.08	14272.08	285.44	4352.99	9918.22
15000	10194.35	3398.12	203.89	764575.98	254858.66	15291.51	305.83	4663.91	10626.73
16000	10873.97	3624.66	217.48	815547.71	271849.24	16310.95	326.22	4974.84	11335.24
17000	11553.59	3851.20	231.07	866519.44	288839.81	17330.39	346.61	5285.77	12043.74
18000	12233.22	4077.74	244.66	917491.17	305830.39	18349.82	367.00	5596.70	12752.25
19000	12912.84	4304.28	258.26	968462.91	322820.97	19369.26	387.39	5907.62	13460.76
20000	13592.46	4530.82	271.85	1019434.64	339811.55	20388.69	407.77	6218.55	14169.27
21000	14272.08	4757.36	285.44	1070406.37	356802.12	21408.13	428.16	6529.48	14877.77
22000	14951.71	4983.90	299.03	1121378.10	373792.70	22427.56	448.55	6840.41	15586.28
23000	15631.33	5210.44	312.63	1172349.83	390783.28	23447.00	468.94	7151.33	16294.79
24000	16310.95	5436.98	326.22	1223321.57	407773.86	24466.43	489.33	7462.26	17003.29
25000	16990.58	5663.53	339.81	1274293.30	424764.43	25485.87	509.72	7773.19	17711.80
26000	17670.20	5890.07	353.40	1325265.03	441755.01	26505.30	530.11	8084.12	18420.31
27000	18349.82	6116.61	367.00	1376236.76	458745.59	27524.74	550.49	8395.04	19128.81
28000	19029.45	6343.15	380.59	1427208.49	475736.16	28544.17	570.88	8705.97	19837.32

RING PRODUCTION FEATURE

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=====================================================================================
                                 INPUT VARIABLES
=====================================================================================
END BREAKS/Hour/100 Spindle :     13   | WASTE MULTIPLIER                        :  1.50
NUMBER OF SPINDLES/MACHINE   :    432   | YARN PRICE (TAKA/Lb)                    : 75.00
NUMBER OF MACHINES           :     20   | WASTE PRICE (TAKA/Lb)                   : 15.25
MACHINE EFFICIENCY (%)       :     95   | LABOUR PERFORMANCE (pitch up/hour)      :    45
COUNT                        :     30   | LABOUR COST (TK./ Labour/Shift)         : 70.00
TWIST MULTIPLIER (T.M)       :  3.500   | SPINNING POWER (KW/100 SPINDLES)        :  2.00
TWIST PER INCH (TPI)         : 31.105   | COST OF POWER (TK./KWH)                 :  3.65
=====================================================================================
                                      OUTPUTS
=====================================================================================
NUMBER OF SIDES PER LABOUR    =   1.60   | YARN PRODUCTION RATE (Lb/shift/100 rpm) = 22.65
TOTAL NUMBERS OF LABOURS      =     26   | WASTE RATE (Lb/shift/100 rpm)           =  1.21
TOTAL LABOUR COST/SHIFT(Tk.)  = 1820.00  |
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SPINDLE SPEED (RPM)	YARN PRODUCTION NET (Lb/Day)	YARN PRODUCTION NET (Lb/Shift)	RECOVERED BY PITCH- (Lb/Shift)	PRICE OF YARN PRODUCED PER DAY (Taka)	PRICE OF YARN PRODUCED PER SHIFT (Taka)	RECOVERED PER SHIFT (Taka)	WASTE DUE TO END BREAKAGE WEIGHT (Lb/Shift)	WASTE DUE TO END BREAKAGE PRICE (Taka)	NET LOSS RECOVERED /SHIFT BY PITCH-UP (Taka)
1	2	3	4	5	6	7	8	9	10
4000	2718.49	906.16	58.90	203886.93	67962.31	4417.55	88.35	1347.35	3069.25
5000	3398.12	1132.71	73.63	254858.66	84952.89	5521.94	110.44	1684.19	3836.80
6000	4077.74	1359.25	88.35	305830.39	101943.46	6626.33	132.53	2021.03	4604.35
7000	4757.36	1585.79	103.08	356802.12	118934.04	7730.71	154.61	2357.87	5371.90
8000	5436.98	1812.33	117.80	407773.86	135924.62	8835.10	176.70	2694.71	6139.45
9000	6116.61	2038.87	132.53	458745.59	152915.20	9939.49	198.79	3031.54	6906.99
10000	6796.23	2265.41	147.25	509717.32	169905.77	11043.88	220.88	3368.38	7674.54
11000	7475.85	2491.95	161.98	560689.05	186896.35	12148.26	242.97	3705.22	8442.09
12000	8155.48	2718.49	176.70	611660.78	203886.93	13252.65	265.05	4042.06	9209.64
13000	8835.10	2945.03	191.43	662632.51	220877.50	14357.04	287.14	4378.90	9977.19
14000	9514.72	3171.57	206.15	713604.25	237868.08	15461.43	309.23	4715.73	10744.74
15000	10194.35	3398.12	220.88	764575.98	254858.66	16565.81	331.32	5052.57	11512.29
16000	10873.97	3624.66	235.60	815547.71	271849.24	17670.20	353.40	5389.41	12279.84
17000	11553.59	3851.20	250.33	866519.44	288839.81	18774.59	375.49	5726.25	13047.39
18000	12233.22	4077.74	265.05	917491.17	305830.39	19878.98	397.58	6063.09	13814.94
19000	12912.84	4304.28	279.78	968462.91	322820.97	20983.36	419.67	6399.93	14582.49
20000	13592.46	4530.82	294.50	1019434.64	339811.55	22087.75	441.76	6736.76	15350.04
21000	14272.08	4757.36	309.23	1070406.37	356802.12	23192.14	463.84	7073.60	16117.59
22000	14951.71	4983.90	323.95	1121378.10	373792.70	24296.53	485.93	7410.44	16885.14
23000	15631.33	5210.44	338.68	1172349.83	390783.28	25400.91	508.02	7747.28	17652.69
24000	16310.95	5436.98	353.40	1223321.57	407773.86	26505.30	530.11	8084.12	18420.23
25000	16990.58	5663.53	368.13	1274293.30	424764.43	27609.69	552.19	8420.95	19187.78
26000	17670.20	5890.07	382.85	1325265.03	441755.01	28714.08	574.28	8757.79	19955.33
27000	18349.82	6116.61	397.58	1376236.76	458745.59	29818.46	596.37	9094.63	20722.88
28000	19029.45	6343.15	412.30	1427208.49	475736.16	30922.85	618.46	9431.47	21490.43

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RING PRODUCTION FEATURE

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============================================================================================
                                   INPUT VARIABLES
============================================================================================
END BREAKS/Hour/100 Spindle    :      14   |   WASTE MULTIPLIER                      :    1.50
NUMBER OF SPINDLES/MACHINE      :     432   |   YARN PRICE (TAKA/Lb)                  :   75.00
NUMBER OF MACHINES              :      20   |   WASTE PRICE (TAKA/Lb)                 :   15.25
MACHINE EFFICIENCY (%)          :      95   |   LABOUR PERFORMANCE (pitch up/hour)    :      15
COUNT                           :      30   |   LABOUR COST (Tk./ Labour/Shift)       :   70.00
TWIST MULTIPLIER (T.M)          :   3.500   |   SPINNING POWER (KW/100 SPINDLES)      :    2.00
TWIST PER INCH (TPI)            :  31.305   |   COST OF POWER (TK./KWH)               :    3.65
============================================================================================
                                      OUTPUTS
============================================================================================
NUMBER OF SIDES PER LABOUR   =    1.49      |   YARN PRODUCTION RATE (Lb/Shift/100 rpm) =   22.65
TOTAL NUMBERS OF LABOURS     =      28      |   WASTE RATE (Lb/Shift/100 rpm)           =    2.38
TOTAL LABOUR COST/SHIFT(Tk.) = 1960.80      |
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SPINDLE SPEED (RPM)	YARN PRODUCTION			PRICE OF YARN PRODUCED			WASTE DUE TO END BREAKAGE		NET LOSS RECOVERED /SHIFT BY PITCH-UP
	NET		RECOVERED BY PITCH-	PER DAY	PER SHIFT	RECOVERED PER SHIFT	WEIGHT	PRICE	
	(Lb/Day)	(Lb/Shift)	(Lb/Shift)	(Taka)	(Taka)	(Taka)	(Lb/SHIFT)	(Taka)	(Taka)
1	2	3	4	5	6	7	8	9	10
4000	2718.49	906.16	63.43	203886.93	67962.31	4757.36	95.15	1451.00	3305.34
5000	3398.12	1132.71	79.29	254858.66	84952.89	5946.70	118.93	1813.74	4131.94
6000	4077.74	1359.25	95.15	305830.39	101943.46	7136.04	142.72	2176.49	4958.53
7000	4757.36	1585.79	111.01	356801.12	118934.04	8325.38	166.51	2539.24	5785.12
8000	5436.98	1812.33	126.86	407773.86	135924.62	9514.72	190.29	2901.99	6611.71
9000	6116.61	2038.87	142.72	458745.59	152915.20	10704.06	214.08	3264.74	7438.30
10000	6796.23	2265.41	158.58	509717.32	169905.77	11893.40	237.87	3627.49	8264.89
11000	7475.85	2491.95	174.44	560689.05	186896.35	13082.74	261.65	3990.24	9091.49
12000	8155.48	2718.49	190.29	611660.78	203886.93	14272.08	285.44	4352.99	9918.08
13000	8835.10	2945.03	206.15	662632.51	220877.50	15461.43	309.23	4715.73	10744.67
14000	9514.72	3171.57	222.01	713604.25	237868.08	16650.77	333.02	5078.48	11571.26
15000	10194.35	3398.12	237.87	764575.98	254858.66	17840.11	356.80	5441.23	12397.85
16000	10873.97	3624.66	253.73	815547.71	271849.24	19029.45	380.59	5803.98	13224.44
17000	11553.59	3851.20	269.58	866519.44	288839.81	20218.79	404.38	6166.73	14051.03
18000	12233.22	4077.74	285.44	917491.17	305830.39	21408.13	428.16	6529.48	14877.63
19000	12912.84	4304.28	301.30	968462.91	322820.97	22597.47	451.95	6892.23	15704.22
20000	13592.46	4530.82	317.16	1019434.64	339811.55	23786.81	475.74	7254.98	16530.81
21000	14272.08	4757.36	333.02	1070406.37	356802.12	24976.15	499.52	7617.73	17357.40
22000	14951.71	4983.90	348.87	1121378.10	373792.70	26165.49	523.31	7980.47	18183.99
23000	15631.33	5210.44	364.73	1172349.83	390783.28	27354.83	547.10	8343.22	19010.58
24000	16310.95	5436.98	380.59	1223321.57	407773.86	28544.17	570.88	8705.97	19837.18
25000	16990.58	5663.53	396.45	1274293.30	424764.43	29733.51	594.67	9068.72	20663.77
26000	17670.20	5890.07	412.30	1325265.03	441755.01	30922.85	618.46	9431.47	21490.36
27000	18349.82	6116.61	428.16	1376236.76	458745.59	32112.19	642.24	9794.22	22316.95
28000	19029.45	6343.15	444.02	1427208.49	475736.16	33301.53	666.03	10156.97	23143.54

RING PRODUCTION FEATURE

INPUT VARIABLES				
END BREAKS/Hour/100 Spindle	:	15	WASTE MULTIPLIER	:	1.50
NUMBER OF SPINDLES/MACHINE	:	432	YARN PRICE (TAKA/Lb)	:	75.00
NUMBER OF MACHINES	:	20	WASTE PRICE (TAKA/Lb)	:	15.25
MACHINE EFFICIENCY (%)	:	95	LABOUR PERFORMANCE (pitch up/hour)	:	45
COUNT	:	30	LABOUR COST (TK./ Labour/Shift)	:	70.00
TWIST MULTIPLIER (T.M)	:	3.500	SPINNING POWER (KW/100 SPINDLES)	:	2.00
TWIST PER INCH (TPI)	:	31.305	COST OF POWER (TK./KWH)	:	3.65

OUTPUTS			
NUMBER OF SIDES PER LABOUR	=	1.39	YARN PRODUCTION RATE (Lb/Shift/100 rpm) = 22.65
TOTAL NUMBERS OF LABOURS	=	30	WASTE RATE (Lb/Shift/100 rpm) = 2.55
TOTAL LABOUR COST/SHIFT(Tk.) = 2100.00			

SPINDLE SPEED (RPM)	YARN PRODUCTION			PRICE OF YARN PRODUCED			WASTE DUE TO END BREAKAGE		NET LOSS RECOVERED /SHIFT BY PITCH-UP (Taka)
	NET		RECOVERED BY PITCH-	PER DAY	PER SHIFT	RECOVERED PER SHIFT	WEIGHT	PRICE	
	(Lb/Day)	(Lb/Shift)	(Lb/Shift)	(Taka)	(Taka)	(Taka)	(Lb/SHIFT)	(Taka)	(Taka)
1	2	3	4	5	6	7	8	9	10
4000	2718.49	906.16	67.96	203886.93	67962.31	5097.17	101.94	1554.64	3541.44
5000	3398.12	1132.71	84.95	254858.66	84952.89	6371.47	127.43	1943.30	4427.07
6000	4077.74	1359.25	101.94	305830.39	101943.46	7645.76	152.92	2331.96	5312.71
7000	4757.36	1585.79	118.93	356802.12	118934.04	8920.05	178.40	2720.62	6198.34
8000	5436.98	1812.33	135.92	407773.86	135924.62	10194.35	203.89	3109.28	7083.98
9000	6116.61	2038.87	152.92	458745.59	152915.20	11468.64	229.37	3497.94	7969.61
10000	6796.23	2265.41	169.91	509717.32	169905.77	12742.93	254.86	3886.59	8855.24
11000	7475.85	2491.95	186.90	560689.05	186896.35	14017.23	280.34	4275.25	9740.88
12000	8155.48	2718.49	203.89	611660.78	203886.93	15291.52	305.83	4663.91	10626.51
13000	8835.10	2945.03	220.88	662632.51	220877.50	16565.81	331.32	5052.57	11512.14
14000	9514.72	3171.57	237.87	713604.25	237868.08	17840.11	356.80	5441.23	12397.78
15000	10194.35	3398.12	254.86	764575.98	254858.66	19114.40	382.29	5829.89	13283.41
16000	10873.97	3624.66	271.85	815547.71	271849.24	20388.69	407.77	6218.55	14169.05
17000	11553.59	3851.20	288.84	866519.44	288839.81	21662.99	433.26	6607.21	15054.68
18000	12233.22	4077.74	305.83	917491.17	305830.39	22937.28	458.75	6995.87	15940.31
19000	12912.84	4304.28	322.82	968462.91	322820.97	24211.57	484.23	7384.53	16825.95
20000	13592.46	4530.82	339.81	1019434.64	339811.55	25485.87	509.72	7773.19	17711.58
21000	14272.08	4757.36	356.80	1070406.37	356802.12	26760.16	535.20	8161.85	18597.22
22000	14951.71	4983.90	373.79	1121378.10	373792.70	28034.45	560.69	8550.51	19482.85
23000	15631.33	5210.44	390.78	1172349.83	390783.28	29308.75	586.17	8939.17	20368.48
24000	16310.95	5436.98	407.77	1223321.57	407773.86	30583.04	611.66	9327.83	21254.12
25000	16990.58	5663.53	424.76	1274293.30	424764.43	31857.33	637.15	9716.49	22139.75
26000	17670.20	5890.07	441.76	1325265.03	441755.01	33131.63	662.63	10105.15	23025.38
27000	18349.82	6116.61	458.75	1376236.76	458745.59	34405.92	688.12	10493.81	23911.02
28000	19029.45	6343.15	475.74	1427208.49	475736.16	35680.21	713.60	10882.46	24796.65

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==================================================================================
                                INPUT VARIABLES
==================================================================================
END BREAKS/Hour/100 Spindle  :    16    WASTE MULTIPLIER                     :   1.50
NUMBER OF SPINDLES/MACHINE   :   432    YARN PRICE (TAKA/Lb)                 :  75.00
NUMBER OF MACHINES           :    20    WASTE PRICE (TAKA/Lb)                :  15.25
MACHINE EFFICIENCY (%)       :    95    LABOUR PERFORMANCE (pitch up/hour)   :    45
COUNT                        :    30    LABOUR COST (TK./ Labour/Shift)      :  70.00
TWIST MULTIPLIER (T.M)       : 3.500    SPINNING POWER (KW/100 SPINDLES)     :   2.00
TWIST PER INCH (TPI)         : 31.305   COST OF POWER (TK./KWH)              :   3.65
==================================================================================
                                    OUTPUTS
==================================================================================
NUMBER OF SIDES PER LABOUR   =   1.30   YARN PRODUCTION RATE (Lb/Shift/100 rpm) =  22.65
TOTAL NUMBERS OF LABOURS     =    32    WASTE RATE (Lb/Shift/100 rpm)           =   2.72
TOTAL LABOUR COST/SHIFT(TK.) = 2240.00
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SPINDLE SPEED (RPM)	YARN PRODUCTION			PRICE OF YARN PRODUCED			WASTE DUE TO END BREAKAGE		NET LOSS RECOVERED /SHIFT BY PITCH-UP (Taka)
	NET		RECOVERED BY PITCH- (Lb/Shift)	PER DAY (Taka)	PER SHIFT (Taka)	RECOVERED PER SHIFT (Taka)	WEIGHT (Lb/SHIFT)	PRICE (Taka)	
	[Lb/Day]	[Lb/Shift]							
1	2	3	4	5	6	7	8	9	10
4000	2718.49	906.16	72.49	203886.93	67962.31	5436.98	108.74	1658.28	3777.54
5000	3398.12	1132.71	90.62	254858.66	84952.89	6796.23	135.92	2072.85	4722.21
6000	4077.74	1359.25	108.74	305830.39	101943.46	8155.48	163.11	2487.42	5666.89
7000	4757.36	1585.79	126.86	356802.12	118934.04	9514.73	190.29	2901.99	6611.56
8000	5436.98	1812.33	144.99	407773.86	135924.62	10873.97	217.48	3316.56	7556.24
9000	6116.61	2038.87	163.11	458745.59	152915.20	12233.22	244.66	3731.13	8500.92
10000	6796.23	2265.41	181.23	509717.32	169905.77	13592.46	271.85	4145.70	9445.59
11000	7475.85	2491.95	199.36	560689.05	186896.35	14951.71	299.03	4560.27	10390.27
12000	8155.48	2718.49	217.48	611660.78	203886.93	16310.95	326.22	4974.84	11334.95
13000	8835.10	2945.03	235.60	662632.51	220877.50	17670.20	353.40	5389.41	12279.62
14000	9514.72	3171.57	253.73	713604.25	237868.08	19029.45	380.59	5803.98	13224.30
15000	10194.35	3398.12	271.85	764575.98	254858.66	20388.69	407.77	6218.55	14168.97
16000	10873.97	3624.66	289.97	815547.71	271849.24	21747.94	434.96	6633.12	15113.65
17000	11553.59	3851.20	308.10	866519.44	288839.81	23107.19	462.14	7047.69	16058.33
18000	12233.22	4077.74	326.22	917491.17	305830.39	24466.43	489.33	7462.26	17003.00
19000	12912.84	4304.28	344.34	968462.91	322820.97	25825.68	516.51	7876.83	17947.68
20000	13592.46	4530.82	362.47	1019434.64	339811.55	27184.92	543.70	8291.40	18892.35
21000	14272.08	4757.36	380.59	1070406.37	356802.12	28544.17	570.88	8705.97	19837.03
22000	14951.71	4983.90	398.71	1121378.10	373792.70	29903.42	598.07	9120.54	20781.71
23000	15631.33	5210.44	416.84	1172349.83	390783.28	31262.66	625.25	9535.11	21726.38
24000	16310.95	5436.98	434.96	1223321.57	407773.86	32621.91	652.44	9949.68	22671.06
25000	16990.58	5663.53	453.08	1274293.30	424764.43	33981.15	679.62	10364.25	23615.73
26000	17670.20	5890.07	471.21	1325265.03	441755.01	35340.40	706.81	10778.82	24560.41
27000	18349.82	6116.61	489.33	1376236.76	458745.59	36699.65	733.99	11193.39	25505.09
28000	19029.45	6343.15	507.45	1427208.49	475736.16	38058.89	761.18	11607.96	26449.76

RING PRODUCTION FEATURE

INPUT VARIABLES

END BREAKS/Hour/100 Spindle	17	WASTE MULTIPLIER	1.50
NUMBER OF SPINDLES/MACHINE	432	YARN PRICE (TAKA/Lb)	75.00
NUMBER OF MACHINES	20	WASTE PRICE (TAKA/Lb)	15.25
MACHINE EFFICIENCY (%)	95	LABOUR PERFORMANCE (pitch up/hour)	45
COUNT	30	LABOUR COST (TK./ Labour/Shift)	70.00
TWIST MULTIPLIER (T.M)	3.500	SPINNING POWER (KW/100 SPINDLES)	2.00
TWIST PER INCH (TPI)	31.305	COST OF POWER (TK./KWH)	3.65

OUTPUTS

NUMBER OF SIDES PER LABOUR =	1.23	YARN PRODUCTION RATE (Lb/Shift/100 rpm) =	22.65
TOTAL NUMBERS OF LABOURS =	34	WASTE RATE (Lb/Shift/100 rpm) =	2.89
TOTAL LABOUR COST/SHIFT(Tk.) = 2380.00			

SPINDLE SPEED (RPM)	YARN PRODUCTION NET (Lb/Day)	YARN PRODUCTION NET (Lb/Shift)	RECOVERED BY PITCH- (Lb/Shift)	PRICE OF YARN PRODUCED PER DAY (Taka)	PRICE OF YARN PRODUCED PER SHIFT (Taka)	RECOVERED PER SHIFT (Taka)	WASTE DUE TO END BREAKAGE WEIGHT (Lb/SHIFT)	WASTE DUE TO END BREAKAGE PRICE (Taka)	NET LOSS RECOVERED /SHIFT BY PITCH-UP (Taka)
1	2	3	4	5	6	7	8	9	10
4000	2718.49	906.16	77.02	203886.93	67962.31	5776.80	115.54	1761.92	4013.63
5000	3398.12	1132.71	96.28	254858.66	84952.89	7221.00	144.42	2202.40	5017.35
6000	4077.74	1359.25	115.54	305830.39	101943.46	8665.19	173.30	2642.88	6021.07
7000	4757.36	1585.79	134.79	356802.12	118934.04	10109.39	202.19	3083.37	7024.79
8000	5436.98	1812.33	154.05	407773.86	135924.62	11553.59	231.07	3523.85	8028.51
9000	6116.61	2038.87	173.30	458745.59	152915.20	12997.79	259.96	3964.33	9032.22
10000	6796.23	2265.41	192.56	509717.32	169905.77	14441.99	288.84	4404.81	10035.94
11000	7475.85	2491.95	211.82	560689.05	186896.35	15886.19	317.72	4845.29	11039.66
12000	8155.48	2718.49	231.07	611660.78	203886.93	17330.39	346.61	5285.77	12043.38
13000	8835.10	2945.03	250.33	662632.51	220877.50	18774.59	375.49	5726.25	13047.10
14000	9514.72	3171.57	269.58	713604.25	237868.08	20218.79	404.38	6166.73	14050.82
15000	10194.35	3398.12	288.84	764575.98	254858.66	21662.99	433.26	6607.21	15054.53
16000	10873.97	3624.66	308.10	815547.71	271849.24	23107.19	462.14	7047.69	16058.25
17000	11553.59	3851.20	327.35	866519.44	288839.81	24551.38	491.03	7488.17	17061.97
18000	12233.22	4077.74	346.61	917491.17	305830.39	25995.58	519.91	7928.65	18065.69
19000	12912.84	4304.28	365.86	968462.91	322820.97	27439.78	548.80	8369.13	19069.41
20000	13592.46	4530.82	385.12	1019434.64	339811.55	28883.98	577.68	8809.61	20073.13
21000	14272.08	4757.36	404.38	1070406.37	356802.12	30328.18	606.56	9250.10	21076.84
22000	14951.71	4983.90	423.63	1121378.10	373792.70	31772.38	635.45	9690.58	22080.56
23000	15631.33	5210.44	442.89	1172349.83	390783.28	33216.58	664.33	10131.06	23084.28
24000	16310.95	5436.98	462.14	1223321.57	407773.86	34660.78	693.22	10571.54	24088.00
25000	16990.58	5663.53	481.40	1274293.30	424764.43	36104.98	722.10	11012.02	25091.72
26000	17670.20	5890.07	500.66	1325265.03	441755.01	37549.18	750.98	11452.50	26095.44
27000	18349.82	6116.61	519.91	1376236.76	458745.59	38993.37	779.87	11892.98	27099.15
28000	19029.45	6343.15	539.17	1427208.49	475736.16	40437.57	808.75	12333.46	28102.87

RING PRODUCTION FEATURE

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                              INPUT VARIABLES
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END BREAKS/Hour/100 Spindle :    18    | WASTE MULTIPLIER              :   1.50
NUMBER OF SPINDLES/MACHINE   :   432    | YARN PRICE (TAKA/Lb)         :  75.00
NUMBER OF MACHINES           :    20    | WASTE PRICE (TAKA/Lb)        :  15.25
MACHINE EFFICIENCY (%)       :    95    | LABOUR PERFORMANCE (pitch up/hour) : 45
COUNT                        :    30    | LABOUR COST (TK./ Labour/Shift) : 70.00
TWIST MULTIPLIER (T.M)       : 3.500    | SPINNING POWER (KW/100 SPINDLES)  : 2.00
TWIST PER INCH (TPI)         : 31.305   | COST OF POWER (TK./KWH)      :   3.65
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                                 OUTPUTS
================================================================================
NUMBER OF SIDES PER LABOUR   =   1.16   | YARN PRODUCTION RATE (Lb/Shift/100 rpm) = 22.65
TOTAL NUMBERS OF LABOURS     =    36    | WASTE RATE (Lb/Shift/100 rpm)           =  3.06
TOTAL LABOUR COST/SHIFT(Tk.) = 2520.00  |
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SPINDLE SPEED (RPM)	YARN PRODUCTION			PRICE OF YARN PRODUCED			WASTE DUE TO END BREAKAGE		NET LOSS RECOVERED /SHIFT BY PITCH-UP (Taka)
	NET		RECOVERED BY PITCH-	PER DAY	PER SHIFT	RECOVERED PER SHIFT	WEIGHT	PRICE	
	(Lb/Day)	(Lb/Shift)	(Lb/Shift)	(Taka)	(Taka)	(Taka)	(Lb/SHIFT)	(Taka)	(Taka)
1	2	3	4	5	6	7	8	9	10
4000	2718.49	906.16	81.55	203886.93	67962.31	6116.61	122.33	1865.57	4249.73
5000	3398.12	1132.71	101.94	254858.66	84952.89	7645.76	152.92	2331.96	5312.49
6000	4077.74	1359.25	122.33	305830.39	101943.46	9174.91	183.50	2798.35	6375.25
7000	4757.36	1585.79	142.72	356802.12	118934.04	10704.06	214.08	3264.74	7438.01
8000	5436.98	1812.33	163.11	407773.86	135924.62	12233.22	244.66	3731.13	8500.77
9000	6116.61	2038.87	183.50	458745.59	152915.20	13762.37	275.25	4197.52	9563.53
10000	6796.23	2265.41	203.89	509717.32	169905.77	15291.52	305.83	4663.91	10626.29
11000	7475.85	2491.95	224.28	560689.05	186896.35	16820.67	336.41	5130.30	11689.05
12000	8155.48	2718.49	244.66	611660.78	203886.93	18349.82	367.00	5596.70	12751.81
13000	8835.10	2945.03	265.05	662632.51	220877.50	19878.98	397.58	6063.09	13814.57
14000	9514.72	3171.57	285.44	713604.25	237868.08	21408.13	428.16	6529.48	14877.33
15000	10194.35	3398.12	305.83	764575.98	254858.66	22937.28	458.75	6995.87	15940.10
16000	10873.97	3624.66	326.22	815547.71	271849.24	24466.43	489.33	7462.26	17002.86
17000	11553.59	3851.20	346.61	866519.44	288839.81	25995.58	519.91	7928.65	18065.62
18000	12233.22	4077.74	367.00	917491.17	305830.39	27524.74	550.49	8395.04	19128.38
19000	12912.84	4304.28	387.39	968462.91	322820.97	29053.89	581.08	8861.44	20191.14
20000	13592.46	4530.82	407.77	1019434.64	339811.55	30583.04	611.66	9327.83	21253.90
21000	14272.08	4757.36	428.16	1070406.37	356802.12	32112.19	642.24	9794.22	22316.66
22000	14951.71	4983.90	448.55	1121378.10	373792.70	33641.34	672.83	10260.61	23379.42
23000	15631.33	5210.44	468.94	1172349.83	390783.28	35170.49	703.41	10727.00	24442.18
24000	16310.95	5436.98	489.33	1223321.57	407773.86	36699.65	733.99	11193.39	25504.94
25000	16990.58	5663.53	509.72	1274293.30	424764.43	38228.80	764.58	11659.78	26567.70
26000	17670.20	5890.07	530.11	1325265.03	441755.01	39757.95	795.16	12126.18	27630.46
27000	18349.82	6116.61	550.49	1376236.76	458745.59	41287.10	825.74	12592.57	28693.22
28000	19029.45	6343.15	570.88	1427208.49	475736.16	42816.25	856.33	13058.96	29755.98

RING PRODUCTION FEATURE

INPUT VARIABLES			
END BREAKS/Hour/100 Spindle	19	WASTE MULTIPLIER	1.50
NUMBER OF SPINDLES/MACHINE	432	YARN PRICE (TAKA/Lb)	75.00
NUMBER OF MACHINES	20	WASTE PRICE (TAKA/Lb)	15.25
MACHINE EFFICIENCY (%)	95	LABOUR PERFORMANCE (pitch up/hour)	45
COUNT	30	LABOUR COST (TK./ Labour/Shift)	70.00
TWIST MULTIPLIER (T.M)	3.500	SPINNING POWER (KW/100 SPINDLES)	2.08
TWIST PER INCH (TPI)	31.305	COST OF POWER (TK./KWH)	3.65

OUTPUTS			
NUMBER OF SIDES PER LABOUR	= 1.10	YARN PRODUCTION RATE (Lb/Shift/100 rpm)	= 22.65
TOTAL NUMBERS OF LABOURS	= 37	WASTE RATE (Lb/Shift/100 rpm)	= 3.23
TOTAL LABOUR COST/SHIFT(Tk.)	= 2590.00		

SPINDLE SPEED (RPM)	YARN PRODUCTION			PRICE OF YARN PRODUCED			WASTE DUE TO END BREAKAGE		NET LOSS RECOVERED /SHIFT BY PITCH-UP
	NET		RECOVERED BY PITCH-	PER DAY	PER SHIFT	RECOVERED PER SHIFT	WEIGHT	PRICE	
	(Lb/Day)	(Lb/Shift)	(Lb/Shift)	(Taka)	(Taka)	(Taka)	(Lb/SHIFT)	(Taka)	(Taka)
1	2	3	4	5	6	7	8	9	10
4000	2718.49	906.16	86.09	203886.93	67962.31	6456.42	129.13	1969.21	4485.82
5000	3398.12	1132.71	107.61	254858.66	84952.89	8070.52	161.41	2461.51	5607.63
6000	4077.74	1359.25	129.13	305830.39	101943.46	9684.63	193.69	2953.81	6729.43
7000	4757.36	1585.79	150.65	356802.12	118934.04	11298.73	225.97	3446.11	7851.23
8000	5436.98	1812.33	172.17	407773.86	135924.62	12912.84	258.26	3938.42	8973.04
9000	6116.61	2038.87	193.69	458745.59	152915.20	14526.94	290.54	4430.72	10094.84
10000	6796.23	2265.41	215.21	509717.32	169905.77	16141.05	322.82	4923.02	11216.64
11000	7475.85	2491.95	236.74	560689.05	186896.35	17755.15	355.10	5415.32	12338.44
12000	8155.48	2718.49	258.26	611660.78	203886.93	19369.26	387.39	5907.62	13460.25
13000	8835.10	2945.03	279.78	662632.51	220877.50	20983.36	419.67	6399.93	14582.05
14000	9514.72	3171.57	301.30	713604.25	237868.08	22597.47	451.95	6892.23	15703.85
15000	10194.35	3398.12	322.82	764575.98	254858.66	24211.57	484.23	7384.53	16825.66
16000	10873.97	3624.66	344.34	815547.71	271849.24	25825.68	516.51	7876.83	17947.46
17000	11553.59	3851.20	365.86	866519.44	288839.81	27439.78	548.80	8369.13	19069.26
18000	12233.22	4077.74	387.39	917491.17	305830.39	29053.89	581.08	8861.44	20191.06
19000	12912.84	4304.28	408.91	968462.91	322820.97	30667.99	613.36	9353.74	21312.87
20000	13592.46	4530.82	430.43	1019434.64	339811.55	32282.10	645.64	9846.04	22434.67
21000	14272.08	4757.36	451.95	1070406.37	356802.12	33896.20	677.92	10338.34	23556.47
22000	14951.71	4983.90	473.47	1121378.10	373792.70	35510.31	710.21	10830.64	24678.28
23000	15631.33	5210.44	494.99	1172349.83	390783.28	37124.41	742.49	11322.95	25800.08
24000	16310.95	5436.98	516.51	1223321.57	407773.86	38738.52	774.77	11815.25	26921.88
25000	16990.58	5663.53	538.03	1274293.30	424764.43	40352.62	807.05	12307.55	28043.68
26000	17670.20	5890.07	559.56	1325265.03	441755.01	41966.73	839.33	12799.85	29165.49
27000	18349.82	6116.61	581.08	1376236.76	458745.59	43580.83	871.62	13292.15	30287.29
28000	19029.45	6343.15	602.60	1427208.49	475736.16	45194.94	903.90	13784.46	31409.09

RING PRODUCTION FEATURE

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                               INPUT VARIABLES
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END BREAKS/Hour/100 Spindle    :      20   | WASTE MULTIPLIER                        :   1.50
NUMBER OF SPINDLES/MACHINE      :     432   | YARN PRICE (TAKA/Lb)                    :  75.00
NUMBER OF MACHINES              :      20   | WASTE PRICE (TAKA/Lb)                   :  15.25
MACHINE EFFICIENCY (%)          :      95   | LABOUR PERFORMANCE (pitch up/hour)      :     45
COUNT                           :      30   | LABOUR COST (TK./ Labour/Shift)         :  70.00
TWIST MULTIPLIER (T.M)          :   3.500   | SPINNING POWER (KW/100 SPINDLES)        :   2.00
TWIST PER INCH (TPI)            :  31.305   | COST OF POWER (TK./KWH)                 :   3.65
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                                  OUTPUTS
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NUMBER OF SIDES PER LABOUR   =    1.04    | YARN PRODUCTION RATE (Lb/Shift/100 rpm)  =   22.65
TOTAL NUMBERS OF LABOURS     =      39    | WASTE RATE (Lb/Shift/100 rpm)            =    3.40
TOTAL LABOUR COST/SHIFT(TK.) = 2730.00    |
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SPINDLE SPEED	YARN PRODUCTION			PRICE OF YARN PRODUCED			WASTE DUE TO END BREAKAGE		NET LOSS RECOVERED /SHIFT BY PITCH-UP
	NET		RECOVERED BY PITCH-	PER DAY	PER SHIFT	RECOVERED PER SHIFT	WEIGHT	PRICE	
(RPM)	(Lb/Day)	(Lb/Shift)	(Lb/Shift)	(Taka)	(Taka)	(Taka)	(Lb/SHIFT)	(Taka)	(Taka)
1	2	3	4	5	6	7	8	9	10
4000	2718.49	906.16	90.62	203886.93	67962.31	6796.23	135.92	2072.85	4721.92
5000	3398.12	1132.71	113.27	254858.66	84952.89	8495.29	169.91	2591.06	5902.77
6000	4077.74	1359.25	135.92	305830.39	101943.46	10194.35	203.89	3109.28	7083.61
7000	4757.36	1585.79	158.58	356802.12	118934.04	11893.40	237.87	3627.49	8264.46
8000	5436.98	1812.33	181.23	407773.86	135924.62	13592.46	271.85	4145.70	9445.30
9000	6116.61	2038.87	203.89	458745.59	152915.20	15291.52	305.83	4663.91	10626.15
10000	6796.23	2265.41	226.54	509717.32	169905.77	16990.58	339.81	5182.13	11806.99
11000	7475.85	2491.95	249.20	560689.05	186896.35	18689.64	373.79	5700.34	12987.84
12000	8155.48	2718.49	271.85	611660.78	203886.93	20388.69	407.77	6218.55	14168.68
13000	8835.10	2945.03	294.50	662632.51	220877.50	22087.75	441.76	6736.76	15349.53
14000	9514.72	3171.57	317.16	713604.25	237868.08	23786.81	475.74	7254.98	16530.37
15000	10194.35	3398.12	339.81	764575.98	254858.66	25485.87	509.72	7773.19	17711.22
16000	10873.97	3624.66	362.47	815547.71	271849.24	27184.92	543.70	8291.40	18892.06
17000	11553.59	3851.20	385.12	866519.44	288839.81	28883.98	577.68	8809.61	20072.91
18000	12233.22	4077.74	407.77	917491.17	305830.39	30583.04	611.66	9327.83	21253.75
19000	12912.84	4304.28	430.43	968462.91	322820.97	32282.10	645.64	9846.04	22434.60
20000	13592.46	4530.82	453.08	1019434.64	339811.55	33981.15	679.62	10364.25	23615.44
21000	14272.09	4757.36	475.74	1070406.37	356802.12	35680.21	713.60	10882.46	24796.29
22000	14951.71	4983.90	498.39	1121378.10	373792.70	37379.27	747.59	11400.68	25977.13
23000	15631.33	5210.44	521.04	1172349.83	390783.28	39078.33	781.57	11918.89	27157.98
24000	16310.95	5436.98	543.70	1223321.57	407773.86	40777.39	815.55	12437.10	28338.82
25000	16990.59	5663.53	566.35	1274293.30	424764.43	42476.44	849.53	12955.32	29519.67
26000	17670.20	5890.07	589.01	1325265.03	441755.01	44175.50	883.51	13473.53	30700.51
27000	18349.82	6116.61	611.66	1376236.76	458745.59	45874.56	917.49	13991.74	31881.36
28000	19029.45	6343.15	634.31	1427208.49	475736.16	47573.61	951.47	14509.95	33062.20

RING PRODUCTION FEATURE

INPUT VARIABLES

END BREAKS/Hour/100 Spindle	21	WASTE MULTIPLIER	1.50
NUMBER OF SPINDLES/MACHINE	432	YARN PRICE (TAKA/Lb)	75.80
NUMBER OF MACHINES	20	WASTE PRICE (TAKA/Lb)	15.25
MACHINE EFFICIENCY (%)	95	LABOUR PERFORMANCE (pitch up/hour)	45
COUNT	30	LABOUR COST (TK./ Labour/Shift)	70.00
TWIST MULTIPLIER (T.M)	3.500	SPINNING POWER (KW/100 SPINDLES)	2.00
TWIST PER INCH (TPI)	31.305	COST OF POWER (TK./KWH)	3.65

OUTPUTS

NUMBER OF SIDES PER LABOUR	= 0.99	YARN PRODUCTION RATE (Lb/Shift/100 rpm) =	22.65
TOTAL NUMBERS OF LABOURS	= 41	WASTE RATE (Lb/Shift/100 rpm) =	3.57
TOTAL LABOUR COST/SHIFT(Tk.) = 2870.00			

SPINDLE SPEED (RPM)	YARN PRODUCTION			PRICE OF YARN PRODUCED			WASTE DUE TO END BREAKAGE		NET LOSS RECOVERED /SHIFT BY PITCH-UP
	NET		RECOVERED BY PITCH-	PER DAY	PER SHIFT	RECOVERED PER SHIFT	WEIGHT	PRICE	
	(Lb/Day)	(Lb/Shift)	(Lb/Shift)	(Taka)	(Taka)	(Taka)	(Lb/Shift)	(Taka)	(Taka)
1	2	3	4	5	6	7	8	9	10
4000	2718.49	906.16	95.15	203886.93	67962.31	7136.04	142.72	2176.49	4958.02
5000	3398.12	1132.71	118.93	254858.66	84952.89	8920.05	178.40	2720.62	6197.90
6000	4077.74	1359.25	142.72	305830.39	101943.46	10704.06	214.08	3264.74	7437.39
7000	4757.36	1585.79	166.51	356802.12	118934.04	12488.07	249.76	3808.86	8677.68
8000	5436.98	1812.33	190.29	407773.86	135924.62	14272.08	285.44	4352.99	9917.57
9000	6116.61	2038.87	214.08	458745.59	152915.20	16056.10	321.12	4897.11	11157.45
10000	6796.23	2265.41	237.87	509717.32	169905.77	17840.11	356.80	5441.23	12397.34
11000	7475.85	2491.95	261.65	560689.05	186896.35	19624.12	392.48	5985.36	13637.23
12000	8155.48	2718.49	285.44	611660.78	203886.93	21408.13	428.16	6529.48	14877.12
13000	8835.10	2945.03	309.23	662632.51	220877.50	23192.14	463.84	7073.60	16117.00
14000	9514.72	3171.57	333.02	713604.25	237868.08	24976.15	499.52	7617.73	17356.89
15000	10194.35	3398.12	356.80	764575.98	254858.66	26760.16	535.20	8161.85	18596.78
16000	10873.97	3624.66	380.59	815547.71	271849.24	28544.17	570.88	8705.97	19836.67
17000	11553.59	3851.20	404.38	866519.44	288839.81	30328.18	606.56	9250.10	21076.55
18000	12233.22	4077.74	428.16	917491.17	305830.39	32112.19	642.24	9794.22	22316.44
19000	12912.84	4304.28	451.95	968462.91	322820.97	33896.20	677.92	10338.34	23556.33
20000	13592.46	4530.82	475.74	1019434.64	339811.55	35680.21	713.60	10882.46	24796.21
21000	14272.08	4757.36	499.52	1070406.37	356802.12	37464.22	749.28	11426.59	26036.10
22000	14951.71	4983.90	523.31	1121378.10	373792.70	39248.23	784.96	11970.71	27275.99
23000	15631.33	5210.44	547.10	1172349.83	390783.28	41032.24	820.64	12514.83	28515.88
24000	16310.95	5436.98	570.88	1223321.57	407773.86	42816.25	856.33	13058.96	29755.76
25000	16990.58	5663.53	594.67	1274293.30	424764.43	44600.27	892.01	13603.08	30995.65
26000	17670.20	5890.07	618.46	1325265.03	441755.01	46384.28	927.69	14147.20	32235.54
27000	18349.82	6116.61	642.24	1376236.76	458745.59	48168.29	963.37	14691.33	33475.43
28000	19029.45	6343.15	666.03	1427208.49	475736.16	49952.30	999.05	15235.45	34715.31

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RING PRODUCTION FEATURE

INPUT VARIABLES

END BREAKS/Hour/100 Spindle	25	WASTE MULTIPLIER	1.50
NUMBER OF SPINDLES/MACHINE	432	YARN PRICE (TAKA/Lb)	75.00
NUMBER OF MACHINES	20	WASTE PRICE (TAKA/Lb)	15.25
MACHINE EFFICIENCY (%)	95	LABOUR PERFORMANCE (pitch up/hour)	45
COUNT	30	LABOUR COST (TK./ Labour/Shift)	70.00
TWIST MULTIPLIER (T.M)	3.500	SPINNING POWER (KW/100 SPINDLES)	2.00
TWIST PER INCH (TPI)	31.305	COST OF POWER (TK./KWH)	3.65

OUTPUTS

NUMBER OF SIDES PER LABOUR	= 0.83	YARN PRODUCTION RATE (Lb/Shift/100 rpm) =	22.65
TOTAL NUMBERS OF LABOURS	= 49	WASTE RATE (Lb/Shift/100 rpm) =	4.25
TOTAL LABOUR COST/SHIFT(Tk.) = 3430.00			

SPINDLE SPEED (RPM)	YARN PRODUCTION			PRICE OF YARN PRODUCED			WASTE DUE TO END BREAKAGE		NET LOSS RECOVERED /SHIFT BY PITCH-UP (Taka)
	NET		RECOVERED BY PITCH- (Lb/Shift)	PER DAY (Taka)	PER SHIFT (Taka)	RECOVERED PER SHIFT (Taka)	WEIGHT (Lb/SHIFT)	PRICE (Taka)	
	(Lb/Day)	(Lb/Shift)							
1	2	3	4	5	6	7	8	9	10
4000	2718.49	906.16	113.27	203886.93	67962.31	8495.29	169.91	2591.06	5902.40
5000	3398.12	1132.71	141.59	254858.66	84952.89	10619.11	212.38	3238.83	7378.46
6000	4077.74	1359.25	169.91	305830.39	101943.46	12742.93	254.86	3886.59	8854.51
7000	4757.36	1585.79	198.22	356802.12	118934.04	14866.76	297.34	4534.36	10330.57
8000	5436.98	1812.33	226.54	407773.86	135924.62	16990.58	339.81	5182.13	11806.63
9000	6116.61	2038.87	254.86	458745.59	152915.20	19114.40	382.29	5829.89	13282.68
10000	6796.23	2265.41	283.18	509717.32	169905.77	21238.22	424.76	6477.66	14758.74
11000	7475.85	2491.95	311.49	560689.05	186896.35	23362.04	467.24	7125.42	16234.80
12000	8155.48	2718.49	339.81	611660.78	203886.93	25485.87	509.72	7773.19	17710.85
13000	8835.10	2945.03	368.13	662632.51	220877.50	27609.69	552.19	8420.95	19186.91
14000	9514.72	3171.57	396.45	713604.25	237868.08	29733.51	594.67	9068.72	20662.96
15000	10194.35	3398.12	424.76	764575.98	254858.66	31857.33	637.15	9716.49	22139.02
16000	10873.97	3624.66	453.08	815547.71	271849.24	33981.15	679.62	10364.25	23615.08
17000	11553.59	3851.20	481.40	866519.44	288839.81	36104.98	722.10	11012.02	25091.13
18000	12233.22	4077.74	509.72	917491.17	305830.39	38228.80	764.58	11659.78	26567.19
19000	12912.84	4304.28	538.03	968462.91	322820.97	40352.62	807.05	12307.55	28043.25
20000	13592.46	4530.82	566.35	1019434.64	339811.55	42476.44	849.53	12955.32	29519.30
21000	14272.08	4757.36	594.67	1070406.37	356802.12	44600.27	892.01	13603.08	30995.36
22000	14951.71	4983.90	622.99	1121378.10	373792.70	46724.09	934.48	14250.85	32471.42
23000	15631.33	5210.44	651.31	1172349.83	390783.28	48847.91	976.96	14898.61	33947.47
24000	16310.95	5436.98	679.62	1223321.57	407773.86	50971.73	1019.43	15546.38	35423.53
25000	16990.58	5663.53	707.94	1274293.30	424764.43	53095.55	1061.91	16194.14	36899.59
26000	17670.20	5890.07	736.26	1325265.03	441755.01	55219.38	1104.39	16841.91	38375.64
27000	18349.82	6116.61	764.58	1376236.76	458745.59	57343.20	1146.86	17489.68	39851.70
28000	19029.45	6343.15	792.89	1427208.49	475736.16	59467.02	1189.34	18137.44	41327.75

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RING PRODUCTION FEATURE

INPUT VARIABLES

END BREAKS/Hour/100 Spindle	29	WASTE MULTIPLIER	1.50
NUMBER OF SPINDLES/MACHINE	432	YARN PRICE (TAKA/Lb)	75.00
NUMBER OF MACHINES	20	WASTE PRICE (TAKA/Lb)	15.25
MACHINE EFFICIENCY (%)	95	LABOUR PERFORMANCE (pitch up/hour)	45
COUNT	30	LABOUR COST (Tk./ Labour/Shift)	70.00
TWIST MULTIPLIER (T.M)	3.500	SPINNING POWER (KW/100 SPINDLES)	2.00
TWIST PER INCH (TPI)	31.305	COST OF POWER (Tk./KWH)	3.65

OUTPUTS

NUMBER OF SIDES PER LABOUR	= 0.72	YARN PRODUCTION RATE (Lb/Shift/100 rpm)	= 22.65
TOTAL NUMBERS OF LABOURS	= 57	WASTE RATE (Lb/Shift/100 rpm)	= 4.93
TOTAL LABOUR COST/SHIFT(Tk.)	= 3990.00		

SPINDLE SPEED (RPM)	YARN PRODUCTION			PRICE OF YARN PRODUCED			WASTE DUE TO END BREAKAGE		NET LOSS RECOVERED /SHIFT BY PITCH-UP (Taka)
	NET		RECOVERED BY PITCH-	PER DAY	PER SHIFT	RECOVERED PER SHIFT	WEIGHT	PRICE	
	(Lb/Day)	(Lb/Shift)	(Lb/Shift)	(Taka)	(Taka)	(Taka)	(Lb/SHIFT)	(Taka)	
1	2	3	4	5	6	7	8	9	10
4000	2718.49	906.16	131.39	203886.93	67962.31	9854.53	197.09	3005.63	6846.78
5000	3398.12	1132.71	164.24	254858.66	84952.89	12318.17	246.36	3757.04	8559.01
6000	4077.74	1359.25	197.09	305830.39	101943.46	14781.80	295.64	4508.45	10271.24
7000	4757.36	1585.79	229.94	356802.12	118934.04	17245.44	344.91	5259.86	11983.46
8000	5436.98	1812.33	262.79	407773.86	135924.62	19709.07	394.18	6011.27	13695.69
9000	6116.61	2038.87	295.64	458745.59	152915.20	22172.70	443.45	6762.67	15407.91
10000	6796.23	2265.41	328.48	509717.32	169905.77	24636.34	492.73	7514.08	17120.14
11000	7475.85	2491.95	361.33	560689.05	186896.35	27099.97	542.00	8265.49	18832.36
12000	8155.48	2718.49	394.18	611660.78	203886.93	29563.60	591.27	9016.90	20544.59
13000	8835.10	2945.03	427.03	662632.51	220877.50	32027.24	640.54	9768.31	22256.81
14000	9514.72	3171.57	459.88	713604.25	237868.08	34490.87	689.82	10519.71	23969.04
15000	10194.35	3398.12	492.73	764575.98	254858.66	36954.51	739.09	11271.12	25681.26
16000	10873.97	3624.66	525.58	815547.71	271849.24	39418.14	788.36	12022.53	27393.49
17000	11553.59	3851.20	558.42	866519.44	288839.81	41881.77	837.64	12773.94	29105.72
18000	12233.22	4077.74	591.27	917491.17	305830.39	44345.41	886.91	13525.35	30817.94
19000	12912.84	4304.28	624.12	968462.91	322820.97	46809.04	936.18	14276.76	32530.17
20000	13592.46	4530.82	656.97	1019434.64	339811.55	49272.67	985.45	15028.17	34242.39
21000	14272.08	4757.36	689.82	1070406.37	356802.12	51736.31	1034.73	15779.57	35954.62
22000	14951.71	4983.90	722.67	1121378.10	373792.70	54199.94	1084.00	16530.98	37666.84
23000	15631.33	5210.44	755.51	1172349.83	390783.28	56663.58	1133.27	17282.39	39379.07
24000	16310.95	5436.98	788.36	1223321.57	407773.86	59127.21	1182.54	18033.80	41091.29
25000	16990.58	5663.53	821.21	1274293.30	424764.43	61590.84	1231.82	18785.21	42803.52
26000	17670.20	5890.07	854.06	1325265.03	441755.01	64054.48	1281.09	19536.62	44515.74
27000	18349.82	6116.61	886.91	1376236.76	458745.59	66518.11	1330.36	20288.02	46227.97
28000	19029.45	6343.15	919.76	1427208.49	475736.16	68981.74	1379.63	21039.43	47940.19

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RING PRODUCTION FEATURE

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=========================================================================================
                                    INPUT VARIABLES
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END BREAKS/Hour/100 Spindle  :      1      | WASTE MULTIPLIER                      :    1.50
NUMBER OF SPINDLES/MACHINE    :    432      | YARN PRICE (TAKA/Lb)                 :  100.00
NUMBER OF MACHINES            :     20      | WASTE PRICE (TAKA/Lb)                :   15.25
MACHINE EFFICIENCY (%)        :     95      | LABOUR PERFORMANCE (pitch up/hour)   :     45
COUNT                         :     45      | LABOUR COST (TK./ Labour/Shift)      :   70.09
TWIST MULTIPLIER (T.M)        :  3.500      | SPINNING POWER (KW/100 SPINDLES)     :    2.00
TWIST PER INCH (TPI)          : 11.305      | COST OF POWER (TK./KWH)              :    3.65
=========================================================================================
                                       OUTPUTS
=========================================================================================
NUMBER OF SIDES PER LABOUR  =   20.83   | YARN PRODUCTION RATE (Lb/Shift/100 rpm)  =  12.33
TOTAL NUMBERS OF LABOURS    =      3    | WASTE RATE (Lb/Shift/100 rpm)            =   0.09
TOTAL LABOUR COST/SHIFT(Tk.) = 210.00   |
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SPINDLE SPEED	YARN PRODUCTION			PRICE OF YARN PRODUCED			WASTE DUE TO END BREAKAGE		NET LOSS RECOVERED /SHIFT BY PITCH-UP
	NET		RECOVERED BY PITCH-	PER DAY	PER SHIFT	RECOVERED PER SHIFT	WEIGHT	PRICE	
(RPM)	(Lb/Day)	(Lb/Shift)	(Lb/Shift)	(Taka)	(Taka)	(Taka)	(Lb/SHIFT)	(Taka)	(Taka)
1	2	3	4	5	6	7	8	9	10
4000	1479.76	493.25	2.47	147975.98	49325.33	246.63	3.70	56.42	190.14
5000	1849.70	616.57	3.08	184969.98	61656.66	308.28	4.62	70.52	237.69
6000	2219.64	739.88	3.70	221963.97	73987.99	369.94	5.55	84.62	285.24
7000	2589.58	863.19	4.32	258957.97	86319.32	431.60	6.47	98.73	332.80
8000	2959.52	986.51	4.93	295951.96	98650.65	493.25	7.40	112.83	380.35
9000	3329.46	1109.82	5.55	332945.96	110981.99	554.91	8.32	126.94	427.90
10000	3699.40	1233.13	6.17	369939.95	123313.32	616.57	9.25	141.04	475.45
11000	4069.34	1356.45	6.78	406933.95	135644.65	678.22	10.17	155.14	523.01
12000	4439.28	1479.76	7.40	443927.94	147975.98	739.88	11.10	169.25	570.56
13000	4809.22	1603.07	8.02	480921.94	160307.31	801.54	12.02	183.35	618.11
14000	5179.16	1726.39	8.63	517915.94	172638.65	863.19	12.95	197.46	665.66
15000	5549.10	1849.70	9.25	554909.93	184969.98	924.85	13.87	211.56	713.22
16000	5919.04	1973.01	9.87	591903.93	197301.31	986.51	14.80	225.66	760.77
17000	6288.98	2096.33	10.48	628897.92	209632.64	1048.16	15.72	239.77	808.32
18000	6658.92	2219.64	11.10	665891.92	221963.97	1109.82	16.65	253.87	855.88
19000	7028.86	2342.95	11.71	702885.91	234295.30	1171.48	17.57	267.98	903.43
20000	7398.80	2466.27	12.33	739879.91	246626.64	1233.13	18.50	282.08	950.98
21000	7768.74	2589.58	12.95	776873.90	258957.97	1294.79	19.42	296.18	998.53
22000	8138.68	2712.89	13.56	813867.90	271289.30	1356.45	20.35	310.29	1046.09
23000	8508.62	2836.21	14.18	850861.89	283620.63	1418.10	21.27	324.39	1093.64
24000	8878.56	2959.52	14.80	887855.89	295951.96	1479.76	22.20	338.50	1141.19
25000	9248.50	3082.83	15.41	924849.88	308283.29	1541.42	23.12	352.60	1188.74
26000	9618.44	3206.15	16.03	961843.88	320614.63	1603.07	24.05	366.70	1236.30
27000	9988.38	3329.46	16.65	999837.88	332945.96	1664.73	24.97	380.81	1283.85
28000	10358.32	3452.77	17.26	1035831.87	345277.29	1726.39	25.90	394.91	1331.40

RING PRODUCTION FEATURE

INPUT VARIABLES					
END BREAKS/Hour/100 Spindle	:	11	WASTE MULTIPLIER	:	1.50
NUMBER OF SPINDLES/MACHINE	:	432	YARN PRICE (TAKA/Lb)	:	100.00
NUMBER OF MACHINES	:	20	WASTE PRICE (TAKA/Lb)	:	15.25
MACHINE EFFICIENCY (%)	:	95	LABOUR PERFORMANCE (pitch up/hour)	:	45
COUNT	:	45	LABOUR COST (TK./ Labour/Shift)	:	70.00
TWIST MULTIPLIER (T.M)	:	3.500	SPINNING POWER (KW/100 SPINDLES)	:	2.00
TWIST PER INCH (TPI)	:	31.305	COST OF POWER (TK./KWH)	:	3.65

OUTPUTS				
NUMBER OF SIDES PER LABOUR	=	1.89	YARN PRODUCTION RATE (Lb/Shift/100 rpm) =	12.33
TOTAL NUMBERS OF LABOURS	=	22	WASTE RATE (Lb/Shift/100 rpm) =	1.02
TOTAL LABOUR COST/SHIFT(Tk.)	=	1540.00		

SPINDLE SPEED (RPM)	YARN PRODUCTION			PRICE OF YARN PRODUCED			WASTE DUE TO END BREAKAGE		NET LOSS RECOVERED /SHIFT BY PITCH-UP (Taka)
	NET		RECOVERED BY PITCH-	PER DAY	PER SHIFT	RECOVERED PER SHIFT	WEIGHT	PRICE	
	(Lb/Day)	(Lb/Shift)	(Lb/Shift)	(Taka)	(Taka)	(Taka)	(Lb/SHIFT)	(Taka)	
1	2	3	4	5	6	7	8	9	10
4000	1479.76	493.25	27.13	147975.98	49325.33	2712.89	40.69	620.57	2091.52
5000	1849.70	616.57	33.91	184969.98	61656.66	3391.12	50.87	775.72	2614.60
6000	2219.64	739.88	40.69	221963.97	73987.99	4069.34	61.04	930.86	3137.68
7000	2589.58	863.19	47.48	258957.97	86319.32	4747.56	71.21	1086.00	3660.75
8000	2959.52	986.51	54.26	295951.96	98650.65	5425.79	81.39	1241.15	4183.83
9000	3329.46	1109.82	61.04	332945.96	110981.99	6104.01	91.56	1396.29	4706.91
10000	3699.40	1233.13	67.82	369939.95	123313.32	6782.23	101.73	1551.44	5229.99
11000	4069.34	1356.45	74.60	406933.95	135644.65	7460.46	111.91	1706.58	5753.07
12000	4439.28	1479.76	81.39	443927.94	147975.98	8138.68	122.08	1861.72	6276.15
13000	4809.22	1603.07	88.17	480921.94	160307.31	8816.90	132.25	2016.87	6799.23
14000	5179.16	1726.39	94.95	517915.94	172638.65	9495.13	142.43	2172.01	7322.31
15000	5549.10	1849.70	101.73	554909.93	184969.98	10173.35	152.60	2327.15	7845.39
16000	5919.04	1973.01	108.52	591903.93	197301.31	10851.57	162.77	2482.30	8368.47
17000	6288.98	2096.33	115.30	628897.92	209632.64	11529.80	172.95	2637.44	8891.55
18000	6658.92	2219.64	122.08	665891.92	221963.97	12208.02	183.12	2792.58	9414.63
19000	7028.86	2342.95	128.86	702885.91	234295.30	12886.24	193.29	2947.73	9937.71
20000	7398.80	2466.27	135.64	739879.91	246626.64	13564.46	203.47	3102.87	10460.79
21000	7768.74	2589.58	142.43	776873.90	258957.97	14242.69	213.64	3258.01	10983.87
22000	8138.68	2712.89	149.21	813867.90	271289.30	14920.91	223.81	3413.16	11506.95
23000	8508.62	2836.21	155.99	850861.89	283620.63	15599.13	233.99	3568.30	12030.03
24000	8878.56	2959.52	162.77	887855.89	295951.96	16277.36	244.16	3723.45	12553.11
25000	9248.50	3082.83	169.56	924849.88	308283.29	16955.58	254.33	3878.59	13076.19
26000	9618.44	3206.15	176.34	961843.88	320614.63	17633.80	264.51	4033.73	13599.27
27000	9988.38	3329.46	183.12	998837.88	332945.96	18312.03	274.68	4188.88	14122.35
28000	10358.32	3452.77	189.90	1035831.87	345277.29	18990.25	284.85	4344.02	14645.43

RING PRODUCTION FEATURE

INPUT VARIABLES			
END BREAKS/Hour/100 Spindle	12	WASTE MULTIPLIER	1.50
NUMBER OF SPINDLES/MACHINE	432	YARN PRICE [TAKA/Lb]	100.00
NUMBER OF MACHINES	20	WASTE PRICE [TAKA/Lb]	15.25
MACHINE EFFICIENCY (%)	95	LABOUR PERFORMANCE (pitch up/hour)	45
COUNT	45	LABOUR COST (TK./ Labour/Shift)	70.00
TWIST MULTIPLIER (T.M)	3.500	SPINNING POWER (KW/100 SPINDLES)	2.00
TWIST PER INCH (TPI)	31.305	COST OF POWER [TK./KWH]	3.65

OUTPUTS			
NUMBER OF SIDES PER LABOUR	= 1.74	YARN PRODUCTION RATE (Lb/Shift/100 rpm)	= 12.33
TOTAL NUMBERS OF LABOURS	= 24	WASTE RATE (Lb/Shift/100 rpm)	= 1.11
TOTAL LABOUR COST/SHIFT(Tk.)	= 1680.00		

SPINDLE SPEED (RPM)	YARN PRODUCTION			PRICE OF YARN PRODUCED			WASTE DUE TO END BREAKAGE		NET LOSS RECOVERED /SHIFT BY PITCH-UP (Taka)
	NET		RECOVERED BY PITCH-	PER DAY	PER SHIFT	RECOVERED PER SHIFT	WEIGHT	PRICE	
	[Lb/Day]	[Lb/Shift]	[Lb/Shift]	(Taka)	(Taka)	(Taka)	(Lb/Shift)	(Taka)	
1	2	3	4	5	6	7	8	9	10
4000	1479.76	493.25	29.60	147975.98	49325.33	2959.52	44.39	676.99	2281.65
5000	1849.70	616.57	36.99	184969.98	61656.66	3699.40	55.49	846.24	2852.29
6000	2219.64	739.88	44.39	221963.97	73987.99	4439.28	66.59	1015.49	3422.92
7000	2589.58	863.19	51.79	258957.97	86319.32	5179.16	77.69	1184.73	3993.55
8000	2959.52	986.51	59.19	295951.96	98650.65	5919.04	88.79	1353.98	4564.18
9000	3329.46	1109.82	66.59	332945.96	110981.99	6658.92	99.88	1523.23	5134.82
10000	3699.40	1233.13	73.99	369939.95	123313.32	7398.80	110.98	1692.48	5705.45
11000	4069.34	1356.45	81.39	406933.95	135644.65	8138.68	122.08	1861.72	6276.08
12000	4439.28	1479.76	88.79	443927.94	147975.98	8878.56	133.18	2030.97	6846.71
13000	4809.22	1603.07	96.18	480921.94	160307.31	9618.44	144.28	2200.22	7417.34
14000	5179.16	1726.39	103.58	517915.94	172638.65	10358.32	155.37	2369.47	7987.98
15000	5549.10	1849.70	110.98	554909.93	184969.98	11098.20	166.47	2538.71	8558.61
16000	5919.04	1973.01	118.38	591903.93	197301.31	11838.08	177.57	2707.96	9129.24
17000	6288.98	2096.33	125.78	628897.92	209632.64	12577.96	188.67	2877.21	9699.87
18000	6658.92	2219.64	133.18	665891.92	221963.97	13317.84	199.77	3046.46	10270.51
19000	7028.86	2342.95	140.58	702885.91	234295.30	14057.72	210.87	3215.70	10841.14
20000	7398.80	2466.27	147.98	739879.91	246626.64	14797.60	221.96	3384.95	11411.77
21000	7768.74	2589.58	155.37	776873.90	258957.97	15537.48	233.06	3554.20	11982.40
22000	8138.68	2712.89	162.77	813867.90	271289.30	16277.36	244.16	3723.45	12553.04
23000	8508.62	2836.21	170.17	850861.89	283620.63	17017.24	255.26	3892.69	13123.67
24000	8878.56	2959.52	177.57	887855.89	295951.96	17757.12	266.36	4061.94	13694.30
25000	9248.50	3082.83	184.97	924849.88	308283.29	18497.00	277.45	4231.19	14264.93
26000	9618.44	3206.15	192.37	961843.88	320614.63	19236.88	288.55	4400.44	14835.57
27000	9988.38	3329.46	199.77	998837.88	332945.96	19976.76	299.65	4569.68	15406.20
28000	10358.32	3452.77	207.17	1035831.87	345277.29	20716.64	310.75	4738.91	15976.83

RING PRODUCTION FEATURE

INPUT VARIABLES			
END BREAKS/Hour/100 Spindle	: 13	WASTE MULTIPLIER	: 1.50
NUMBER OF SPINDLES/MACHINE	: 432	YARN PRICE (TAKA/Lb)	: 100.00
NUMBER OF MACHINES	: 20	WASTE PRICE (TAKA/Lb)	: 15.25
MACHINE EFFICIENCY (%)	: 95	LABOUR PERFORMANCE (pitch up/hour)	: 45
COUNT	: 45	LABOUR COST (TK./ Labour/Shift)	: 70.00
TWIST MULTIPLIER (T.M)	: 3.500	SPINNING POWER (KW/100 SPINDLES)	: 2.00
TWIST PER INCH (TPI)	: 31.305	COST OF POWER (TK./KWH)	: 3.65

OUTPUTS			
NUMBER OF SIDES PER LABOUR	= 1.60	YARN PRODUCTION RATE (Lb/Shift/100 rpm)	= 12.33
TOTAL NUMBERS OF LABOURS	= 16	WASTE RATE (Lb/Shift/100 rpm)	= 1.20
TOTAL LABOUR COST/SHIFT(Tk.)	= 1820.00		

SPINDLE SPEED (RPM)	YARN PRODUCTION			PRICE OF YARN PRODUCED			WASTE DUE TO END BREAKAGE		NET LOSS RECOVERED /SHIFT BY PITCH-UP [Taka]
	NET		RECOVERED BY PITCH (Lb/Shift)	PER DAY [Taka]	PER SHIFT (Taka)	RECOVERED PER SHIFT [Taka]	WEIGHT [Lb/SHIFT]	PRICE [Taka]	
	(Lb/Day)	(Lb/Shift)							
1	2	3	4	5	6	7	8	9	10
4000	1479.76	493.25	32.06	147975.98	49325.33	3206.15	48.09	733.41	2471.79
5000	1849.70	616.57	40.08	184969.98	61656.66	4007.68	60.12	916.76	3089.98
6000	2219.64	739.88	48.09	221963.97	73987.99	4809.22	72.14	1100.11	3708.16
7000	2589.58	863.19	56.11	258957.97	86319.32	5610.76	84.16	1283.46	4326.35
8000	2959.52	986.51	64.12	295951.96	98650.65	6412.29	96.18	1466.81	4944.53
9000	3329.46	1109.82	72.14	332945.96	110981.99	7213.83	108.21	1650.16	5562.72
10000	3699.40	1233.13	80.15	369939.95	123313.32	8015.37	120.23	1833.51	6180.90
11000	4069.34	1356.45	88.17	406933.95	135644.65	8816.90	132.25	2016.87	6799.09
12000	4439.28	1479.76	96.18	443927.94	147975.98	9618.44	144.28	2200.22	7417.27
13000	4809.22	1603.07	104.20	480921.94	160307.31	10419.98	156.30	2383.57	8035.46
14000	5179.16	1726.39	112.22	517915.94	172638.65	11221.51	168.32	2566.92	8653.64
15000	5549.10	1849.70	120.23	554909.93	184969.98	12023.05	180.35	2750.27	9271.83
16000	5919.04	1973.01	128.25	591903.93	197301.31	12824.59	192.37	2933.62	9890.01
17000	6288.98	2096.33	136.26	628897.92	209632.64	13626.12	204.39	3116.98	10508.20
18000	6658.92	2219.64	144.28	665891.92	221963.97	14427.66	216.41	3300.33	11126.38
19000	7028.86	2342.95	152.29	702885.91	234295.30	15229.19	228.44	3483.68	11744.57
20000	7398.80	2466.27	160.31	739879.91	246626.64	16030.73	240.46	3667.03	12362.75
21000	7768.74	2589.58	168.32	776873.90	258957.97	16832.27	252.48	3850.38	12980.94
22000	8138.68	2712.89	176.34	813867.90	271289.30	17633.80	264.51	4033.73	13599.12
23000	8508.62	2836.21	184.35	850861.89	283620.63	18435.34	276.53	4217.08	14217.31
24000	8878.56	2959.52	192.37	887855.89	295951.96	19236.88	288.55	4400.44	14835.49
25000	9248.50	3082.83	200.38	924849.88	308283.29	20038.41	300.58	4583.79	15453.68
26000	9618.44	3206.15	208.40	961843.88	320614.63	20839.95	312.60	4767.14	16071.86
27000	9988.38	3329.46	216.41	998837.88	332945.96	21641.49	324.62	4950.49	16690.05
28000	10358.32	3452.77	224.43	1035831.87	345277.29	22443.02	336.65	5133.84	17308.23

RING PRODUCTION FEATURE

INPUT VARIABLES

END BREAKS/Hour/100 Spindle	14	WASTE MULTIPLIER	1.50
NUMBER OF SPINDLES/MACHINE	432	YARN PRICE (TAKA/Lb)	100.00
NUMBER OF MACHINES	20	WASTE PRICE (TAKA/Lb)	15.25
MACHINE EFFICIENCY (%)	95	LABOUR PERFORMANCE (pitch up/hour)	45
COUNT	45	LABOUR COST (TK./ Labour/Shift)	70.00
TWIST MULTIPLIER (T.M)	3.500	SPINNING POWER (KW/100 SPINDLES)	2.00
TWIST PER INCH (TPI)	31.305	COST OF POWER (TK./KWH)	3.65

OUTPUTS

NUMBER OF SIDES PER LABOUR = 1.49
TOTAL NUMBERS OF LABOURS = 28
TOTAL LABOUR COST/SHIFT(Tk.) = 1960.00
YARN PRODUCTION RATE (Lb/Shift/100 rpm) = 12.33
WASTE RATE (Lb/Shift/100 rpm) = 1.29

SPINDLE SPEED (RPM)	YARN PRODUCTION NET (Lb/Day)	NET (Lb/Shift)	RECOVERED BY PITCH- (Lb/Shift)	PRICE PER DAY (Taka)	PER SHIFT (Taka)	RECOVERED PER SHIFT (Taka)	WASTE WEIGHT (Lb/SHIFT)	WASTE PRICE (Taka)	NET LOSS RECOVERED/SHIFT BY PITCH-UP (Taka)
1	2	3	4	5	6	7	8	9	10
4000	1479.76	493.25	34.53	147975.98	49325.33	3452.77	51.79	789.82	2661.93
5000	1849.70	616.57	43.16	184969.98	61656.66	4315.97	64.74	987.28	3327.67
6000	2219.64	739.88	51.79	221963.97	73987.99	5179.16	77.69	1184.73	3993.40
7000	2589.58	863.19	60.42	258957.97	86319.32	6042.35	90.64	1382.19	4659.14
8000	2959.52	986.51	69.06	295951.96	98650.65	6905.55	103.58	1579.64	5324.88
9000	3329.46	1109.82	77.69	332945.96	110981.99	7768.74	116.53	1777.10	5990.62
10000	3699.40	1233.13	86.32	369939.95	123313.32	8631.93	129.48	1974.55	6656.36
11000	4069.34	1356.45	94.95	406933.95	135644.65	9495.13	142.43	2172.01	7322.09
12000	4439.28	1479.76	103.58	443927.94	147975.98	10358.32	155.37	2369.47	7987.83
13000	4809.22	1603.07	112.22	480921.94	160307.31	11221.51	168.32	2566.92	8653.57
14000	5179.16	1726.39	120.85	517915.94	172638.65	12084.71	181.27	2764.38	9319.31
15000	5549.10	1849.70	129.48	554909.93	184969.98	12947.90	194.22	2961.83	9985.04
16000	5919.04	1973.01	138.11	591903.93	197301.31	13811.09	207.17	3159.29	10650.78
17000	6288.98	2096.33	146.74	628897.92	209632.64	14674.28	220.11	3356.74	11316.52
18000	6658.92	2219.64	155.37	665891.92	221963.97	15537.48	233.06	3554.20	11982.26
19000	7028.86	2342.95	164.01	702885.91	234295.30	16400.67	246.01	3751.65	12648.00
20000	7398.80	2466.27	172.64	739879.91	246626.64	17263.86	258.96	3949.11	13313.73
21000	7768.74	2589.58	181.27	776873.90	258957.97	18127.06	271.91	4146.56	13979.47
22000	8138.68	2712.89	189.90	813867.90	271289.30	18990.25	284.85	4344.02	14645.21
23000	8508.62	2836.21	198.53	850861.89	283620.63	19853.44	297.80	4541.48	15310.95
24000	8878.56	2959.52	207.17	887855.89	295951.96	20716.64	310.75	4738.93	15976.68
25000	9248.50	3082.83	215.80	924849.88	308283.29	21579.83	323.70	4936.39	16642.42
26000	9618.44	3206.15	224.43	961843.88	320614.63	22443.02	336.65	5133.84	17308.16
27000	9988.38	3329.46	233.06	998837.88	332945.96	23306.22	349.59	5331.30	17973.90
28000	10358.32	3452.77	241.69	1035831.87	345277.29	24169.41	362.54	5528.75	18639.64

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RING PRODUCTION FEATURE

INPUT VARIABLES

END BREAKS/Hour/100 Spindle	:	15	WASTE MULTIPLIER :	1.50
NUMBER OF SPINDLES/MACHINE	:	432	YARN PRICE (TAKA/Lb) :	100.00
NUMBER OF MACHINES	:	20	WASTE PRICE (TAKA/Lb) :	15.25
MACHINE EFFICIENCY (%)	:	95	LABOUR PERFORMANCE (pitch up/hour) :	45
COUNT	:	45	LABOUR COST (TK./ Labour/Shift) :	70.00
TWIST MULTIPLIER (T.M)	:	3.500	SPINNING POWER (KW/100 SPINDLES) :	2.00
TWIST PER INCH (TPI)	:	31.305	COST OF POWER (TK./KWH) :	3.65

OUTPUTS

NUMBER OF SIDES PER LABOUR	=	1.39	YARN PRODUCTION RATE [Lb/Shift/100 rpm]	=	12.33
TOTAL NUMBERS OF LABOURS	=	30	WASTE RATE [Lb/Shift/100 rpm]	=	1.39
TOTAL LABOUR COST/SHIFT(Tk.)	=	2100.00			

SPINDLE SPEED (RPM)	YARN PRODUCTION			PRICE OF YARN PRODUCED			WASTE DUE TO END BREAKAGE		NET LOSS RECOVERED /SHIFT BY PITCH-UP (Taka)
	NET		RECOVERED BY PITCH-	PER DAY	PER SHIFT	RECOVERED PER SHIFT	WEIGHT	PRICE	
	(Lb/Day)	(Lb/Shift)	(Lb/Shift)	(Taka)	(Taka)	(Taka)	(Lb/Shift)	(Taka)	
1	2	3	4	5	6	7	8	9	10
4000	1479.76	493.25	36.99	147975.98	49325.33	3699.40	55.49	846.24	2852.07
5000	1849.70	616.57	46.24	184969.98	61656.66	4624.25	69.36	1057.80	3565.36
6000	2219.64	739.88	55.49	221963.97	73987.99	5549.10	83.24	1269.36	4278.65
7000	2589.58	863.19	64.74	258957.97	86319.32	6473.95	97.11	1480.92	4991.94
8000	2959.52	986.51	73.99	295951.96	98650.65	7398.80	110.98	1692.48	5705.23
9000	3329.46	1109.82	83.24	332945.96	110981.99	8323.65	124.85	1904.03	6418.52
10000	3699.40	1233.13	92.48	369939.95	123313.32	9248.50	138.73	2115.59	7131.81
11000	4069.34	1356.45	101.73	406933.95	135644.65	10173.35	152.60	2327.15	7845.10
12000	4439.28	1479.76	110.98	443927.94	147975.98	11098.20	166.47	2538.71	8558.39
13000	4809.22	1603.07	120.23	480921.94	160307.31	12023.05	180.35	2750.27	9271.68
14000	5179.16	1726.39	129.48	517915.94	172638.65	12947.90	194.22	2961.83	9984.97
15000	5549.10	1849.70	138.73	554909.93	184969.98	13872.75	208.09	3173.39	10698.26
16000	5919.04	1973.01	147.98	591903.93	197301.31	14797.60	221.96	3384.95	11411.55
17000	6288.98	2096.33	157.22	628897.92	209632.64	15722.45	235.84	3596.51	12124.84
18000	6658.92	2219.64	166.47	665891.92	221963.97	16647.30	249.71	3808.07	12838.13
19000	7028.86	2342.95	175.72	702885.91	234295.30	17572.15	263.58	4019.63	13551.42
20000	7398.80	2466.27	184.97	739879.91	246626.64	18497.00	277.45	4231.19	14264.71
21000	7768.74	2589.58	194.22	776873.90	258957.97	19421.85	291.33	4442.75	14978.00
22000	8138.68	2712.89	203.47	813867.90	271289.30	20346.70	305.20	4654.31	15691.30
23000	8508.62	2836.21	212.72	850861.89	283620.63	21271.55	319.07	4865.87	16404.59
24000	8878.56	2959.52	221.96	887855.89	295951.96	22196.40	332.95	5077.43	17117.88
25000	9248.50	3082.83	231.21	924849.88	308283.29	23121.25	346.82	5288.99	17831.17
26000	9618.44	3206.15	240.46	961843.88	320614.63	24046.10	360.69	5500.54	18544.46
27000	9988.38	3329.46	249.71	998837.88	332945.96	24970.95	374.56	5712.10	19257.75
28000	10158.32	3452.77	258.96	1035831.87	345277.29	25895.80	388.44	5923.66	19971.04

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RING PRODUCTION FEATURE

INPUT VARIABLES			
END BREAKS/Hour/100 Spindle	16	WASTE MULTIPLIER	1.50
NUMBER OF SPINDLES/MACHINE	432	YARN PRICE (TAKA/Lb)	100.00
NUMBER OF MACHINES	20	WASTE PRICE (TAKA/Lb)	15.25
MACHINE EFFICIENCY (%)	95	LABOUR PERFORMANCE (pitch up/hour)	45
COUNT	45	LABOUR COST (TK./ Labour/Shift)	70.00
TWIST MULTIPLIER (T.M)	3.500	SPINNING POWER (KW/100 SPINDLES)	2.00
TWIST PER INCH (TPI)	31.305	COST OF POWER (TK./KWH)	3.65

OUTPUTS			
NUMBER OF SIDES PER LABOUR	= 1.30	YARN PRODUCTION RATE [Lb/Shift/100 rpm]	= 12.33
TOTAL NUMBERS OF LABOURS	= 32	WASTE RATE [Lb/Shift/100 rpm]	= 1.48
TOTAL LABOUR COST/SHIFT(TK.) = 2240.00			

SPINDLE SPEED	YARN PRODUCTION			PRICE OF YARN PRODUCED			WASTE DUE TO END BREAKAGE		NET LOSS RECOVERED /SHIFT BY PITCH-UP
	NET		RECOVERED BY PITCH-	PER DAY	PER SHIFT	RECOVERED PER SHIFT	WEIGHT	PRICE	
(RPM)	(Lb/Day)	(Lb/Shift)	(Lb/Shift)	(Taka)	(Taka)	(Taka)	(Lb/SHIFT)	(Taka)	(Taka)
1	2	3	4	5	6	7	8	9	10
4000	1479.76	493.25	39.46	147975.98	49325.33	3946.03	59.19	902.65	3042.20
5000	1849.70	616.57	49.33	184969.98	61656.66	4932.53	73.99	1128.32	3803.05
6000	2219.64	739.88	59.19	221963.97	73987.99	5919.04	88.79	1353.98	4563.89
7000	2589.58	863.19	69.06	258957.97	86319.32	6905.55	103.58	1579.64	5324.73
8000	2959.52	986.51	78.92	295951.96	98650.65	7892.05	118.38	1805.31	6085.58
9000	3329.46	1109.82	88.79	332945.96	110981.99	8878.56	133.18	2030.97	6846.42
10000	3699.40	1233.13	98.65	369939.95	123313.32	9865.07	147.98	2256.63	7607.26
11000	4069.34	1356.45	108.52	406933.95	135644.65	10851.57	162.77	2482.30	8368.11
12000	4439.28	1479.76	118.38	443927.94	147975.98	11838.08	177.57	2707.96	9128.95
13000	4809.22	1603.07	128.25	480921.94	160307.31	12824.59	192.37	2933.62	9889.79
14000	5179.16	1726.39	138.11	517915.94	172638.65	13811.09	207.17	3159.29	10650.64
15000	5549.10	1849.70	147.98	554909.93	184969.98	14797.60	221.96	3384.95	11411.48
16000	5919.04	1973.01	157.84	591903.93	197301.31	15784.10	236.76	3610.61	12172.32
17000	6288.98	2096.33	167.71	628897.92	209632.64	16770.61	251.56	3836.28	12933.17
18000	6658.92	2219.64	177.57	665891.92	221963.97	17757.12	266.36	4061.94	13694.01
19000	7028.86	2342.95	187.44	702885.91	234295.30	18743.62	281.15	4287.60	14454.85
20000	7398.80	2466.27	197.30	739879.91	246626.64	19730.13	295.95	4513.27	15215.70
21000	7768.74	2589.58	207.17	776873.90	258957.97	20716.64	310.75	4738.93	15976.54
22000	8138.68	2712.89	217.03	813867.90	271289.30	21703.14	325.55	4964.59	16737.38
23000	8508.62	2836.21	226.90	850861.89	283620.63	22689.65	340.34	5190.26	17498.22
24000	8878.56	2959.52	236.76	887855.89	295951.96	23676.16	355.14	5415.92	18259.07
25000	9248.50	3082.83	246.63	924849.88	308283.29	24662.66	369.94	5641.58	19019.91
26000	9618.44	3206.15	256.49	961843.88	320614.63	25649.17	384.74	5867.25	19780.75
27000	9988.38	3329.46	266.36	998837.88	332945.96	26635.68	399.54	6092.91	20541.60
28000	10358.32	3452.77	276.22	1035831.87	345277.29	27622.18	414.33	6318.57	21302.44

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RING PRODUCTION FEATURE

INPUT VARIABLES		
END BREAKS/Hour/100 Spindle	:	17
NUMBER OF SPINDLES/MACHINE	:	432
NUMBER OF MACHINES	:	20
MACHINE EFFICIENCY (%)	:	95
COUNT	:	45
TWIST MULTIPLIER (T.M)	:	3.500
TWIST PER INCH (TPI)	:	31.305
WASTE MULTIPLIER	:	1.50
YARN PRICE (TAKA/Lb)	:	100.00
WASTE PRICE (TAKA/Lb)	:	15.25
LABOUR PERFORMANCE (pitch up/hour)	:	45
LABOUR COST (TK./ Labour/Shift)	:	70.00
SPINNING POWER (KW/100 SPINDLES)	:	2.00
COST OF POWER (TK./KWH)	:	3.65

OUTPUTS

NUMBER OF SIDES PER LABOUR = 1.23
TOTAL NUMBERS OF LABOURS = 34
TOTAL LABOUR COST/SHIFT(Tk.) = 2380.00
YARN PRODUCTION RATE (Lb/Shift/100 rpm) = 12.33
WASTE RATE (Lb/Shift/100 rpm) = 1.57

SPINDLE SPEED (RPM)	YARN PRODUCTION			PRICE OF YARN PRODUCED			WASTE DUE TO END BREAKAGE		NET LOSS RECOVERED /SHIFT BY PITCH-UP (Taka)
	NET		RECOVERED BY PITCH-	PER DAY	PER SHIFT	RECOVERED PER SHIFT	WEIGHT	PRICE	
	(Lb/Day)	(Lb/Shift)	(Lb/Shift)	(Taka)	(Taka)	(Taka)	(Lb/SHIFT)	(Taka)	(Taka)
1	2	3	4	5	6	7	8	9	10
4000	1479.76	493.25	41.93	147975.98	49325.33	4192.65	62.89	959.07	3232.34
5000	1849.70	616.57	52.41	184969.98	61656.66	5240.82	78.61	1198.84	4040.74
6000	2219.64	739.88	62.89	221963.97	73987.99	6288.98	94.33	1438.60	4849.13
7000	2589.58	863.19	73.37	258957.97	86319.32	7337.14	110.06	1678.37	5657.53
8000	2959.52	986.51	83.85	295951.96	98650.65	8385.31	125.78	1918.14	6465.93
9000	3329.46	1109.82	94.33	332945.96	110981.99	9433.47	141.50	2157.91	7274.32
10000	3699.40	1233.13	104.82	369939.95	123313.32	10481.63	157.22	2397.67	8082.72
11000	4069.34	1356.45	115.30	406933.95	135644.65	11529.80	172.95	2637.44	8891.11
12000	4439.28	1479.76	125.78	443927.94	147975.98	12577.96	188.67	2877.21	9699.51
13000	4809.22	1603.07	136.26	480921.94	160307.31	13626.12	204.39	3116.98	10507.91
14000	5179.16	1726.39	146.74	517915.94	172638.65	14674.28	220.11	3356.74	11316.30
15000	5549.10	1849.70	157.22	554909.93	184969.98	15722.45	235.84	3596.51	12124.70
16000	5919.04	1973.01	167.71	591903.93	197301.31	16770.61	251.56	3836.28	12933.09
17000	6288.98	2096.33	178.19	628897.92	209632.64	17818.77	267.28	4076.04	13741.49
18000	6658.92	2219.64	188.67	665891.92	221963.97	18866.94	283.00	4315.81	14549.88
19000	7028.86	2342.95	199.15	702885.91	234295.30	19915.10	298.73	4555.58	15358.28
20000	7398.80	2466.27	209.63	739879.91	246626.64	20963.26	314.45	4795.35	16166.68
21000	7768.74	2589.58	220.11	776873.90	258957.97	22011.43	330.17	5035.11	16975.07
22000	8138.68	2712.89	230.60	813867.90	271289.30	23059.59	345.89	5274.88	17783.47
23000	8508.62	2836.21	241.08	850861.89	283620.63	24107.75	361.62	5514.65	18591.86
24000	8878.56	2959.52	251.56	887855.89	295951.96	25155.92	377.34	5754.42	19400.26
25000	9248.50	3082.83	262.04	924849.88	308283.29	26204.08	393.06	5994.18	20208.66
26000	9618.44	3206.15	272.52	961843.88	320614.63	27252.24	408.78	6233.95	21017.05
27000	9988.38	3329.46	283.00	998837.88	332945.96	28300.41	424.51	6473.72	21825.45
28000	10358.32	3452.77	293.49	1035831.87	345277.29	29348.57	440.23	6713.49	22633.84

RING PRODUCTION FEATURE

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=============================================================================
|                              INPUT VARIABLES                              |
=============================================================================
| END BREAKS/Hour/100 Spindle  :    18  | WASTE MULTIPLIER              :    1.50 |
| NUMBER OF SPINDLES/MACHINE    :   432  | YARN PRICE (TAKA/Lb)         :  100.00 |
| NUMBER OF MACHINES            :    20  | WASTE PRICE (TAKA/Lb)        :   15.25 |
| MACHINE EFFICIENCY (%)        :    95  | LABOUR PERFORMANCE (pitch up/hour) : 45 |
| COUNT                         :    45  | LABOUR COST (TK./ Labour/Shift) :  70.00 |
| TWIST MULTIPLIER (T.M)        : 3.500  | SPINNING POWER (KW/100 SPINDLES) :  2.00 |
| TWIST PER INCH (TPI)          : 31.305 | COST OF POWER (TK./KWH)      :    3.65 |
=============================================================================
|                                 OUTPUTS                                    |
=============================================================================
| NUMBER OF SIDES PER LABOUR  =    1.16  | YARN PRODUCTION RATE (Lb/Shift/100 rpm) =  12.33 |
| TOTAL NUMBERS OF LABOURS    =      36  | WASTE RATE (Lb/Shift/100 rpm)          =   1.66 |
| TOTAL LABOUR COST/SHIFT(Tk.) = 2520.00 |                                          |
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SPINDLE SPEED	YARN PRODUCTION			PRICE OF YARN PRODUCED			WASTE DUE TO END BREAKAGE		NET LOSS RECOVERED /SHIFT BY PITCH-UP
	NET		RECOVERED BY PITCH-	PER DAY	PER SHIFT	RECOVERED PER SHIFT	WEIGHT	PRICE	
(RPM)	(Lb/Day)	(Lb/Shift)	(Lb/Shift)	(Taka)	(Taka)	(Taka)	(Lb/Shift)	(Taka)	(Taka)
1	2	3	4	5	6	7	8	9	10
4000	1479.76	493.25	44.39	147975.98	49325.33	4439.28	66.59	1015.49	3422.48
5000	1849.70	616.57	55.49	184969.98	61656.66	5549.10	83.24	1269.36	4278.43
6000	2219.64	739.88	66.59	221963.97	73987.99	6658.92	99.88	1523.23	5134.38
7000	2589.58	863.19	77.69	258957.97	86319.32	7768.74	116.53	1777.10	5990.33
8000	2959.52	986.51	88.79	295951.96	98650.65	8878.56	133.18	2030.97	6846.27
9000	3329.46	1109.82	99.88	332945.96	110981.99	9988.38	149.83	2284.84	7702.22
10000	3699.40	1233.13	110.98	369939.95	123313.32	11098.20	166.47	2538.71	8558.17
11000	4069.34	1356.45	122.08	406933.95	135644.65	12208.02	183.12	2792.58	9414.12
12000	4439.28	1479.76	133.18	443927.94	147975.98	13317.84	199.77	3046.46	10270.07
13000	4809.22	1603.07	144.28	480921.94	160307.31	14427.66	216.41	3300.33	11126.02
14000	5179.16	1726.39	155.37	517915.94	172638.65	15537.48	233.06	3554.20	11981.97
15000	5549.10	1849.70	166.47	554909.93	184969.98	16647.30	249.71	3808.07	12837.91
16000	5919.04	1973.01	177.57	591903.93	197301.31	17757.12	266.36	4061.94	13693.86
17000	6288.98	2096.33	188.67	628897.92	209632.64	18866.94	283.00	4315.81	14549.81
18000	6658.92	2219.64	199.77	665891.92	221963.97	19976.76	299.65	4569.68	15405.76
19000	7028.86	2342.95	210.87	702885.91	234295.30	21086.58	316.30	4823.55	16261.71
20000	7398.80	2466.27	221.96	739879.91	246626.64	22196.40	332.95	5077.43	17117.66
21000	7768.74	2589.58	233.06	776873.90	258957.97	23306.22	349.59	5331.30	17973.61
22000	8138.68	2712.89	244.16	813867.90	271289.30	24416.04	366.24	5585.17	18829.55
23000	8508.62	2836.21	255.26	850861.89	283620.63	25525.86	382.89	5839.04	19685.50
24000	8878.56	2959.52	266.36	887855.89	295951.96	26635.68	399.54	6092.91	20541.45
25000	9248.50	3082.83	277.45	924849.88	308283.29	27745.50	416.18	6346.78	21397.40
26000	9618.44	3206.15	288.55	961843.88	320614.63	28855.32	432.83	6600.65	22253.35
27000	9988.38	3329.46	299.65	998837.88	332945.96	29965.14	449.48	6854.52	23109.30
28000	10358.32	3452.77	310.75	1035831.87	345277.29	31074.96	466.12	7108.40	23965.25

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RING PRODUCTION FEATURE

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========================================================================
                          INPUT VARIABLES
========================================================================
|END BREAKS/Hour/100 Spindle  :      19  |WASTE MULTIPLIER                        :    1.50 |
|NUMBER OF SPINDLES/MACHINE    :     432  |YARN PRICE (TAKA/Lb)                    :  100.00 |
|NUMBER OF MACHINES            :      20  |WASTE PRICE (TAKA/Lb)                   :   15.25 |
|MACHINE EFFICIENCY (%)        :      95  |LABOUR PERFORMANCE (pitch up/hour)      :      45 |
|COUNT                         :      45  |LABOUR COST (TK./ Labour/Shift)         :   70.00 |
|TWIST MULTIPLIER (T.M)        :   3.500  |SPINNING POWER (KW/100 SPINDLES)        :    2.00 |
|TWIST PER INCH (TPI)          :  31.305  |COST OF POWER (TK./KWH)                 :    3.65 |
========================================================================
                              OUTPUTS
========================================================================
|NUMBER OF SIDES PER LABOUR     =     1.10  |YARN PRODUCTION RATE (Lb/Shift/100 rpm)  =   12.33 |
|TOTAL NUMBERS OF LABOURS       =       37  |WASTE RATE (Lb/Shift/100 rpm)            =    1.76 |
|TOTAL LABOUR COST/SHIFT(Tk.)   = 2590.00   |                                                   |
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SPINDLE SPEED (RPM)	YARN PRODUCTION			PRICE OF YARN PRODUCED			WASTE DUE TO END BREAKAGE		NET LOSS RECOVERED /SHIFT BY PITCH-UP
	NET		RECOVERED BY PITCH-	PER DAY	PER SHIFT	RECOVERED PER SHIFT	WEIGHT	PRICE	
	[Lb/Day]	[Lb/Shift]	[Lb/Shift]	[Taka]	[Taka]	[Taka]	[Lb/SHIFT]	[Taka]	[Taka]
1	2	3	4	5	6	7	8	9	10
4000	1479.76	493.25	46.86	147975.98	49325.33	4685.91	70.29	1071.90	3612.62
5000	1849.70	616.57	58.57	184969.98	61656.66	5857.38	87.86	1339.88	4516.12
6000	2219.64	739.88	70.29	221963.97	73987.99	7028.86	105.43	1607.85	5419.62
7000	2589.58	863.19	82.00	258957.97	86319.32	8200.34	123.01	1875.83	6323.12
8000	2959.52	986.51	93.72	295951.96	98650.65	9371.81	140.58	2143.80	7226.62
9000	3329.46	1109.82	105.43	332945.96	110981.99	10543.29	158.15	2411.78	8130.12
10000	3699.40	1233.13	117.15	369939.95	123313.32	11714.77	175.72	2679.75	9033.63
11000	4069.34	1356.45	128.86	406933.95	135644.65	12886.24	193.29	2947.73	9937.13
12000	4439.28	1479.76	140.58	443927.94	147975.98	14057.72	210.87	3215.70	10840.63
13000	4809.22	1603.07	152.29	480921.94	160307.31	15229.19	228.44	3483.68	11744.13
14000	5179.16	1726.39	164.01	517915.94	172638.65	16400.67	246.01	3751.65	12647.63
15000	5549.10	1849.70	175.72	554909.93	184969.98	17572.15	263.58	4019.63	13551.13
16000	5919.04	1973.01	187.44	591903.93	197301.31	18743.62	281.15	4287.60	14454.63
17000	6288.98	2096.33	199.15	628897.92	209632.64	19915.10	298.73	4555.58	15358.13
18000	6658.92	2219.64	210.87	665891.92	221963.97	21086.58	316.30	4823.55	16261.64
19000	7028.86	2342.95	222.58	702885.91	234295.30	22258.05	333.87	5091.53	17165.14
20000	7398.80	2466.27	234.30	739879.91	246626.64	23429.53	351.44	5359.51	18068.64
21000	7768.74	2589.58	246.01	776873.90	258957.97	24601.01	369.02	5627.48	18972.14
22000	8138.68	2712.89	257.72	813867.90	271289.30	25772.48	386.59	5895.46	19875.64
23000	8508.62	2836.21	269.44	850861.89	283620.63	26943.96	404.16	6163.43	20779.14
24000	8878.56	2959.52	281.15	887855.89	295951.96	28115.44	421.73	6431.41	21682.64
25000	9248.50	3082.83	292.87	924849.88	308283.29	29286.91	439.30	6699.38	22586.14
26000	9618.44	3206.15	304.58	961843.88	320614.63	30458.39	456.88	6967.36	23489.65
27000	9988.38	3329.46	316.30	998837.88	332945.96	31629.87	474.45	7235.33	24393.15
28000	10358.32	3452.77	328.01	1035831.87	345277.29	32801.34	492.02	7503.31	25296.65

RING PRODUCTION FEATURE

INPUT VARIABLES

END BREAKS/Hour/100 Spindle	: 20	WASTE MULTIPLIER	: 1.50
NUMBER OF SPINDLES/MACHINE	: 432	YARN PRICE (TAKA/Lb)	: 100.00
NUMBER OF MACHINES	: 20	WASTE PRICE (TAKA/Lb)	: 15.25
MACHINE EFFICIENCY (%)	: 95	LABOUR PERFORMANCE (pitch up/hour)	: 45
COUNT	: 45	LABOUR COST (TK./ Labour/Shift)	: 70.00
TWIST MULTIPLIER (T.M)	: 3.500	SPINNING POWER (KW/100 SPINDLES)	: 2.00
TWIST PER INCH (TPI)	: 31.305	COST OF POWER (TK./KWH)	: 3.65

OUTPUTS

NUMBER OF SIDES PER LABOUR	= 1.04	YARN PRODUCTION RATE (Lb/Shift/100 rpm) = 12.33
TOTAL NUMBERS OF LABOURS	= 39	WASTE RATE (Lb/Shift/100 rpm) = 1.85
TOTAL LABOUR COST/SHIFT(Tk.)	= 2730.00	

SPINDLE SPEED (RPM)	YARN PRODUCTION NET [Lb/Day]	YARN PRODUCTION NET [Lb/Shift]	RECOVERED BY PITCH- [Lb/Shift]	PRICE OF YARN PRODUCED PER DAY (Taka)	PRICE OF YARN PRODUCED PER SHIFT (Taka)	RECOVERED PER SHIFT (Taka)	WASTE DUE TO END BREAKAGE WEIGHT [Lb/SHIFT]	WASTE DUE TO END BREAKAGE PRICE (Taka)	NET LOSS RECOVERED /SHIFT BY PITCH-UP (Taka)
1	2	3	4	5	6	7	8	9	10
4000	1479.76	493.25	49.33	147975.98	49325.33	4932.53	73.99	1128.32	3802.76
5000	1849.70	616.57	61.66	184969.98	61656.66	6165.67	92.48	1410.40	4753.81
6000	2219.64	739.88	73.99	221963.97	73987.99	7398.80	110.98	1692.48	5704.86
7000	2589.58	863.19	86.32	258957.97	86319.32	8631.93	129.48	1974.55	6655.92
8000	2959.52	986.51	98.65	295951.96	98650.65	9865.07	147.98	2256.63	7606.97
9000	3329.46	1109.82	110.98	332945.96	110981.99	11098.20	166.47	2538.71	8558.03
10000	3699.40	1233.13	123.31	369939.95	123313.32	12331.33	184.97	2820.79	9509.08
11000	4069.34	1356.45	135.64	406933.95	135644.65	13564.46	203.47	3102.87	10460.13
12000	4439.28	1479.76	147.98	443927.94	147975.98	14797.60	221.96	3384.95	11411.19
13000	4809.22	1603.07	160.31	480921.94	160307.31	16030.73	240.46	3667.03	12362.24
14000	5179.16	1726.39	172.64	517915.94	172638.65	17263.86	258.96	3949.11	13313.30
15000	5549.10	1849.70	184.97	554909.93	184969.98	18497.00	277.45	4231.19	14264.35
16000	5919.04	1973.01	197.30	591903.93	197301.31	19730.13	295.95	4513.27	15215.40
17000	6288.98	2096.33	209.63	628897.92	209632.64	20963.26	314.45	4795.35	16166.46
18000	6658.92	2219.64	221.96	665891.92	221963.97	22196.40	332.95	5077.43	17117.51
19000	7028.86	2342.95	234.30	702885.91	234295.30	23429.53	351.44	5359.51	18068.57
20000	7398.80	2466.27	246.63	739879.91	246626.64	24662.66	369.94	5641.58	19019.62
21000	7768.74	2589.58	258.96	776873.90	258957.97	25895.80	388.44	5923.66	19970.67
22000	8138.68	2712.89	271.29	813867.90	271289.30	27128.93	406.93	6205.74	20921.73
23000	8508.62	2836.21	283.62	850861.89	283620.63	28362.06	425.43	6487.82	21872.78
24000	8878.56	2959.52	295.95	887855.89	295951.96	29595.20	443.93	6769.90	22823.84
25000	9248.50	3082.83	308.28	924849.88	308283.29	30828.33	462.42	7051.98	23774.89
26000	9618.44	3206.15	320.61	961843.88	320614.63	32061.46	480.92	7334.06	24725.94
27000	9988.38	3329.46	332.95	998837.88	332945.96	33294.60	499.42	7616.14	25677.00
28000	10358.32	3452.77	345.28	1035831.87	345277.29	34527.73	517.92	7898.22	26628.05

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RING PRODUCTION FEATURE

INPUT VARIABLES

END BREAKS/Hour/100 Spindle	:	21	WASTE MULTIPLIER	:	1.50
NUMBER OF SPINDLES/MACHINE	:	432	YARN PRICE (TAKA/Lb)	:	100.00
NUMBER OF MACHINES	:	20	WASTE PRICE (TAKA/Lb)	:	15.25
MACHINE EFFICIENCY (%)	:	95	LABOUR PERFORMANCE (pitch up/hour)	:	45
COUNT	:	45	LABOUR COST (TK./ Labour/Shift)	:	70.00
TWIST MULTIPLIER (T.M)	:	3.500	SPINNING POWER (KW/100 SPINDLES)	:	2.00
TWIST PER INCH (TPI)	:	11.305	COST OF POWER (TK./KWH)	:	3.65

OUTPUTS

NUMBER OF SIDES PER LABOUR	=	0.99	YARN PRODUCTION RATE (Lb/Shift/100 rpm)	=	12.33
TOTAL NUMBERS OF LABOURS	=	41	WASTE RATE (Lb/Shift/100 rpm)	=	1.94
TOTAL LABOUR COST/SHIFT(Tk.)	=	2870.00			

SPINDLE SPEED (RPM)	YARN PRODUCTION			PRICE OF YARN PRODUCED			WASTE DUE TO END BREAKAGE		NET LOSS RECOVERED /SHIFT BY PITCH-UP (Taka)
	NET		RECOVERED BY PITCH-UP (Lb/Shift)	PER DAY (Taka)	PER SHIFT (Taka)	RECOVERED PER SHIFT (Taka)	WEIGHT (Lb/SHIFT)	PRICE (Taka)	
	(Lb/Day)	(Lb/Shift)							
1	2	3	4	5	6	7	8	9	10
4000	1479.76	493.25	51.79	147975.98	49325.33	5179.16	77.69	1184.73	3992.89
5000	1849.70	616.57	64.74	184969.98	61656.66	6473.95	97.11	1480.92	4991.50
6000	2219.64	739.88	77.69	221963.97	73987.99	7768.74	116.53	1777.10	5990.11
7000	2589.58	863.19	90.64	258957.97	86319.32	9063.53	135.95	2073.28	6988.71
8000	2959.52	986.51	103.58	295951.96	98650.65	10358.32	155.37	2369.47	7987.32
9000	3329.46	1109.82	116.53	332945.96	110981.99	11653.11	174.80	2665.65	8985.93
10000	3699.40	1233.13	129.48	369939.95	123313.32	12947.90	194.22	2961.83	9984.53
11000	4069.34	1356.45	142.43	406933.95	135644.65	14242.69	213.64	3258.01	10983.14
12000	4439.28	1479.76	155.37	443927.94	147975.98	15537.48	233.06	3554.20	11981.75
13000	4809.22	1603.07	168.32	480921.94	160307.31	16832.27	252.48	3850.38	12980.35
14000	5179.16	1726.39	181.27	517915.94	172638.65	18127.06	271.91	4146.56	13978.96
15000	5549.10	1849.70	194.22	554909.93	184969.98	19421.85	291.33	4442.75	14977.57
16000	5919.04	1973.01	207.17	591903.93	197301.31	20716.64	310.75	4738.93	15976.17
17000	6288.98	2096.33	220.11	628897.92	209632.64	22011.43	330.17	5035.11	16974.78
18000	6658.92	2219.64	233.06	665891.92	221963.97	23306.22	349.59	5331.30	17973.39
19000	7028.86	2342.95	246.01	702885.91	234295.30	24601.01	369.02	5627.48	18971.99
20000	7398.80	2466.27	258.96	739879.91	246626.64	25895.80	388.44	5923.66	19970.60
21000	7768.74	2589.58	271.91	776873.90	258957.97	27190.59	407.86	6219.85	20969.21
22000	8138.68	2712.89	284.85	813867.90	271289.30	28485.38	427.28	6516.03	21967.81
23000	8508.62	2836.21	297.80	850861.89	283620.63	29780.17	446.70	6812.21	22966.42
24000	8878.56	2959.52	310.75	887855.89	295951.96	31074.96	466.12	7108.40	23965.03
25000	9248.50	3082.83	323.70	924849.88	308283.29	32369.75	485.55	7404.58	24963.63
26000	9618.44	3206.15	336.65	961843.88	320614.63	33664.54	504.97	7700.76	25962.24
27000	9988.38	3329.46	349.59	998837.88	332945.96	34959.33	524.39	7996.95	26960.85
28000	10358.32	3452.77	362.54	1035831.87	345277.29	36254.12	543.81	8293.13	27959.45

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RING PRODUCTION FEATURE

INPUT VARIABLES

END BREAKS/Hour/100 Spindle	: 25	WASTE MULTIPLIER	: 1.50
NUMBER OF SPINDLES/MACHINE	: 432	YARN PRICE (TAKA/Lb)	: 100.00
NUMBER OF MACHINES	: 20	WASTE PRICE (TAKA/Lb)	: 15.25
MACHINE EFFICIENCY (%)	: 95	LABOUR PERFORMANCE (pitch up/hour)	: 45
COUNT	: 45	LABOUR COST (TK./ Labour/Shift)	: 70.00
TWIST MULTIPLIER (T.M)	: 3.500	SPINNING POWER (KW/100 SPINDLES)	: 2.00
TWIST PER INCH (TPI)	: 31.305	COST OF POWER (TK./KWH)	: 3.65

OUTPUTS

NUMBER OF SIDES PER LABOUR	= 0.83	YARN PRODUCTION RATE (Lb/Shift/100 rpm)	= 12.33
TOTAL NUMBERS OF LABOURS	= 49	WASTE RATE (Lb/Shift/100 rpm)	= 2.31
TOTAL LABOUR COST/SHIFT(Tk.)	= 3430.00		

SPINDLE SPEED (RPM)	YARN PRODUCTION			PRICE OF YARN PRODUCED			WASTE DUE TO END BREAKAGE		NET LOSS RECOVERED /SHIFT BY PITCH-UP
	NET		RECOVERED BY PITCH-	PER DAY	PER SHIFT	RECOVERED PER SHIFT	WEIGHT	PRICE	
	[Lb/Day]	[Lb/Shift]	[Lb/Shift]	[Taka]	(Taka)	(Taka)	[Lb/SHIFT]	[Taka]	[Taka]
1	2	3	4	5	6	7	8	9	10
4000	1479.76	493.25	61.66	147975.98	49325.33	6165.67	92.48	1410.40	4753.44
5000	1849.70	616.57	77.07	184969.98	61656.66	7707.08	115.61	1763.00	5942.26
6000	2219.64	739.88	92.48	221963.97	73987.99	9248.50	138.73	2115.59	7131.08
7000	2589.58	863.19	107.90	258957.97	86319.32	10789.92	161.85	2468.19	8319.90
8000	2959.52	986.51	123.31	295951.96	98650.65	12331.33	184.97.	2820.79	9508.71
9000	3329.46	1109.82	138.73	332945.96	110981.99	13872.75	208.09	3173.39	10697.53
10000	3699.40	1233.13	154.14	369939.95	123313.32	15414.16	231.21	3525.99	11886.35
11000	4069.34	1356.45	169.56	406933.95	135644.65	16955.58	254.33	3878.59	13075.17
12000	4439.28	1479.76	184.97	443927.94	147975.98	18497.00	277.45	4231.19	14263.98
13000	4809.22	1603.07	200.38	480921.94	160307.31	20038.41	300.58	4583.79	15452.80
14000	5179.16	1726.39	215.80	517915.94	172638.65	21579.83	323.70	4936.39	16641.62
15000	5549.10	1849.70	231.21	554909.93	184969.98	23121.25	346.82	5288.99	17830.44
16000	5919.04	1973.01	246.63	591903.93	197301.31	24662.66	369.94	5641.58	19019.25
17000	6288.98	2096.33	262.04	628897.92	209632.64	26204.08	393.06	5994.18	20208.07
18000	6658.92	2219.64	277.45	665891.92	221963.97	27745.50	416.18	6346.78	21396.89
19000	7028.86	2342.95	292.87	702885.91	234295.30	29286.91	439.30	6699.38	22585.71
20000	7398.80	2466.27	308.28	739879.91	246626.64	30828.33	462.42	7051.98	23774.52
21000	7768.74	2589.58	323.70	776873.90	258957.97	32369.75	485.55	7404.58	24963.34
22000	8138.68	2712.89	339.11	813867.90	271289.30	33911.16	508.67	7757.18	26152.16
23000	8508.62	2836.21	354.53	850861.89	283620.63	35452.58	531.79	8109.78	27340.98
24000	8878.56	2959.52	369.94	887855.89	295951.96	36994.00	554.91	8462.38	28529.79
25000	9248.50	3082.83	385.35	924849.88	308283.29	38535.41	578.03	8814.98	29718.61
26000	9618.44	3206.15	400.77	961843.88	320614.63	40076.83	601.15	9167.57	30907.43
27000	9988.38	3329.46	416.18	998837.88	332945.96	41618.24	624.27	9520.17	32096.25
28000	10358.32	3452.77	431.60	1035831.87	345277.29	43159.66	647.39	9872.77	33285.06

RING PRODUCTION FEATURE

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==================================================================================================
                                  INPUT VARIABLES
==================================================================================================
END BREAKS/Hour/100 Spindle :     29      | WASTE MULTIPLIER                         :    1.50
NUMBER OF SPINDLES/MACHINE   :    432      | YARN PRICE (TAKA/Lb)                     :  100.00
NUMBER OF MACHINES           :     20      | WASTE PRICE (TAKA/Lb)                    :   15.25
MACHINE EFFICIENCY (%)       :     95      | LABOUR PERFORMANCE (pitch up/hour)       :     45
COUNT                        :     45      | LABOUR COST (TK./ Labour/Shift)          :   70.00
TWIST MULTIPLIER (T.M)       :  3.500      | SPINNING POWER (KW/100 SPINDLES)         :    2.00
TWIST PER INCH (TPI)         : 31.305      | COST OF POWER (TK./KWH)                  :    3.65
==================================================================================================
                                     OUTPUTS
==================================================================================================
NUMBER OF SIDES PER LABOUR    =    0.72     | YARN PRODUCTION RATE (Lb/Shift/100 rpm)  =   12.33
TOTAL NUMBERS OF LABOURS      =      57     | WASTE RATE (Lb/Shift/100 rpm)            =    2.68
TOTAL LABOUR COST/SHIFT(Tk.)  = 3990.00     |
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SPINDLE SPEED (RPM)	YARN PRODUCTION			PRICE OF YARN PRODUCED			WASTE DUE TO END BREAKAGE		NET LOSS RECOVERED /SHIFT BY PITCH-UP (Taka)
	NET		RECOVERED BY PITCH-UP (Lb/Shift)	PER DAY (Taka)	PER SHIFT (Taka)	RECOVERED PER SHIFT (Taka)	WEIGHT (Lb/SHIFT)	PRICE (Taka)	
	(Lb/Day)	(Lb/Shift)							
1	2	3	4	5	6	7	8	9	10
4000	1479.76	493.25	71.52	147975.98	49325.33	7152.17	107.28	1636.06	5514.00
5000	1849.70	616.57	89.40	184969.98	61656.66	8940.22	134.10	2045.07	6893.02
6000	2219.64	739.88	107.28	221963.97	73987.99	10728.26	160.92	2454.09	8272.05
7000	2589.58	863.19	125.16	258957.97	86319.32	12516.30	187.74	2863.10	9651.08
8000	2959.52	986.51	143.04	295951.96	98650.65	14304.34	214.57	3272.12	11030.11
9000	3329.46	1109.82	160.92	332945.96	110981.99	16092.39	241.39	3681.13	12409.14
10000	3699.40	1233.13	178.80	369939.95	123313.32	17880.43	268.21	4090.15	13788.17
11000	4069.34	1356.45	196.68	406933.95	135644.65	19668.47	295.03	4499.16	15167.19
12000	4439.28	1479.76	214.57	443927.94	147975.98	21456.52	321.85	4908.18	16546.22
13000	4809.22	1603.07	232.45	480921.94	160307.31	23244.56	348.67	5317.19	17925.25
14000	5179.16	1726.39	250.33	517915.94	172638.65	25032.60	375.49	5726.21	19304.28
15000	5549.10	1849.70	268.21	554909.93	184969.98	26820.65	402.31	6135.22	20683.31
16000	5919.04	1973.01	286.09	591903.93	197301.31	28608.69	429.13	6544.24	22062.33
17000	6288.98	2096.33	303.97	628897.92	209632.64	30396.73	455.95	6953.25	23441.36
18000	6658.92	2219.64	321.85	665891.92	221963.97	32184.78	482.77	7362.27	24820.39
19000	7028.86	2342.95	339.73	702885.91	234295.30	33972.82	509.59	7771.28	26199.42
20000	7398.80	2466.27	357.61	739879.91	246626.64	35760.86	536.41	8180.30	27578.45
21000	7768.74	2589.58	375.49	776873.90	258957.97	37548.91	563.23	8589.31	28957.48
22000	8138.68	2712.89	393.37	813867.90	271289.30	39336.95	590.05	8998.33	30336.50
23000	8508.62	2836.21	411.25	850861.89	283620.63	41124.99	616.87	9407.34	31715.53
24000	8878.56	2959.52	429.13	887855.89	295951.96	42913.03	643.70	9816.36	33094.56
25000	9248.50	3082.83	447.01	924849.88	308283.29	44701.08	670.52	10225.37	34473.59
26000	9618.44	3206.15	464.89	961843.88	320614.63	46489.12	697.34	10634.39	35852.62
27000	9988.38	3329.46	482.77	998837.88	332945.96	48277.16	724.16	11043.40	37231.65
28000	10358.32	3452.77	500.65	1035831.87	345277.29	50065.21	750.98	11452.42	38610.67

RING PRODUCTION FEATURE

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============================================================================
                              INPUT VARIABLES
============================================================================
END BREAKS/Hour/100 Spindle  :      1    | WASTE MULTIPLIER            :    1.50
NUMBER OF SPINDLES/MACHINE    :    432    | YARN PRICE (TAKA/Lb)        :  120.00
NUMBER OF MACHINES            :     20    | WASTE PRICE (TAKA/Lb)       :   15.25
MACHINE EFFICIENCY (%)        :     95    | LABOUR PERFORMANCE (pitch up/hour) : 45
COUNT                         :     60    | LABOUR COST (TK./ Labour/Shift)    : 70.00
TWIST MULTIPLIER (T.M)        :  3.500    | SPINNING POWER (KW/100 SPINDLES)   :  2.00
TWIST PER INCH (TPI)          : 31.305    | COST OF POWER (TK./KWH)            :  3.65
============================================================================
                                 OUTPUTS
============================================================================
NUMBER OF SIDES PER LABOUR  =   20.83   | YARN PRODUCTION RATE (Lb/Shift/100 rpm) =  8.01
TOTAL NUMBERS OF LABOURS    =      3    | WASTE RATE (Lb/Shift/100 rpm)           =  0.06
TOTAL LABOUR COST/SHIFT(TK.) = 210.00
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SPINDLE SPEED (RPM)	YARN PRODUCTION			PRICE OF YARN PRODUCED			WASTE DUE TO END BREAKAGE		NET LOSS RECOVERED /SHIFT BY PITCH-UP (Taka)
	NET		RECOVERED BY PITCH-	PER DAY	PER SHIFT	RECOVERED PER SHIFT	WEIGHT	PRICE	
	(Lb/Day)	(Lb/Shift)	(Lb/Shift)	(Taka)	(Taka)	(Taka)	(Lb/SHIFT)	(Taka)	(Taka)
1	2	3	4	5	6	7	8	9	10
4000	961.13	320.38	1.60	115335.86	38445.29	192.23	2.40	36.64	155.51
5000	1201.42	400.47	2.00	144169.83	48056.61	240.28	3.00	45.80	194.41
6000	1441.70	480.57	2.40	173003.79	57667.93	288.34	3.60	54.96	233.30
7000	1681.98	560.66	2.80	201837.76	67279.25	336.40	4.20	64.13	272.20
8000	1922.26	640.75	3.20	230671.73	76890.58	384.45	4.81	73.29	311.09
9000	2162.55	720.85	3.60	259505.69	86501.90	432.51	5.41	82.45	349.99
10000	2402.83	800.94	4.00	288339.66	96113.22	480.57	6.01	91.61	388.89
11000	2643.11	881.04	4.41	317173.62	105724.54	528.62	6.61	100.77	427.78
12000	2883.40	961.13	4.81	346007.59	115335.86	576.68	7.21	109.93	466.68
13000	3123.68	1041.23	5.21	374841.56	124947.19	624.74	7.81	119.09	505.57
14000	3363.96	1121.32	5.61	403675.52	134558.51	672.79	8.41	128.25	544.47
15000	3604.25	1201.42	6.01	432509.49	144169.83	720.85	9.01	137.41	583.36
16000	3844.53	1281.51	6.41	461343.45	153781.15	768.91	9.61	146.57	622.26
17000	4084.81	1361.60	6.81	490177.42	163392.47	816.96	10.21	155.73	661.16
18000	4325.09	1441.70	7.21	519011.38	173003.79	865.02	10.81	164.89	700.05
19000	4565.38	1521.79	7.61	547845.35	182615.12	913.08	11.41	174.06	738.95
20000	4805.66	1601.89	8.01	576679.32	192226.44	961.13	12.01	183.22	777.84
21000	5045.94	1681.98	8.41	605513.28	201837.76	1009.19	12.61	192.38	816.74
22000	5286.23	1762.08	8.81	634347.25	211449.08	1057.25	13.22	201.54	855.64
23000	5526.51	1842.17	9.21	663181.21	221060.40	1105.30	13.82	210.70	894.53
24000	5766.79	1922.26	9.61	692015.18	230671.73	1153.36	14.42	219.86	933.43
25000	6007.08	2002.36	10.01	720849.15	240283.05	1201.42	15.02	229.02	972.32
26000	6247.36	2082.45	10.41	749683.11	249894.37	1249.47	15.62	238.18	1011.22
27000	6487.64	2162.55	10.81	778517.08	259505.69	1297.53	16.22	247.34	1050.11
28000	6727.93	2242.64	11.21	807351.04	269117.01	1345.59	16.82	256.50	1089.01

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RING PRODUCTION FEATURE

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                               INPUT VARIABLES
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END BREAKS/Hour/100 Spindle	: 11	WASTE MULTIPLIER	: 1.50
NUMBER OF SPINDLES/MACHINE	: 432	YARN PRICE (TAKA/Lb)	: 120.00
NUMBER OF MACHINES	: 20	WASTE PRICE (TAKA/Lb)	: 15.25
MACHINE EFFICIENCY (%)	: 95	LABOUR PERFORMANCE (pitch up/hour)	: 45
COUNT	: 60	LABOUR COST (TK./ Labour/Shift)	: 70.00
TWIST MULTIPLIER (T.M)	: 3.500	SPINNING POWER (KW/100 SPINDLES)	: 2.00
TWIST PER INCH (TPI)	: 31.305	COST OF POWER (TK./KWH)	: 3.65

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                                   OUTPUTS
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NUMBER OF SIDES PER LABOUR	= 1.89	YARN PRODUCTION RATE (Lb/Shift/100 rpm)	= 8.01
TOTAL NUMBERS OF LABOURS	= 22	WASTE RATE (Lb/Shift/100 rpm)	= 0.66
TOTAL LABOUR COST/SHIFT(TK.)	= 1540.00		

SPINDLE SPEED (RPM)	YARN PRODUCTION NET [Lb/Day]	YARN PRODUCTION NET [Lb/Shift]	RECOVERED BY PITCH- [Lb/Shift]	PRICE OF YARN PRODUCED PER DAY (Taka)	PRICE OF YARN PRODUCED PER SHIFT (Taka)	RECOVERED PER SHIFT (Taka)	WASTE DUE TO END BREAKAGE WEIGHT [Lb/SHIFT]	WASTE DUE TO END BREAKAGE PRICE (Taka)	NET LOSS RECOVERED /SHIFT BY PITCH-UP (Taka)
1	2	3	4	5	6	7	8	9	10
4000	961.13	320.38	17.62	115335.86	38445.29	2114.49	26.43	403.07	1710.61
5000	1201.42	400.47	22.03	144169.83	48056.61	2643.11	33.04	503.84	2138.47
6000	1441.70	480.57	26.43	173003.79	57667.93	3171.74	39.65	604.61	2566.32
7000	1681.98	560.66	30.84	201837.76	67279.25	3700.36	46.25	705.38	2994.18
8000	1922.26	640.75	35.24	230671.73	76890.58	4228.98	52.86	806.15	3422.03
9000	2162.55	720.85	39.65	259505.69	86501.90	4757.60	59.47	906.92	3849.88
10000	2402.83	800.94	44.05	288339.66	96113.22	5286.23	66.08	1007.69	4277.74
11000	2643.11	881.04	48.46	317173.62	105724.54	5814.85	72.69	1108.46	4705.59
12000	2883.40	961.13	52.86	346007.59	115335.86	6343.47	79.29	1209.22	5133.45
13000	3123.68	1041.23	57.27	374841.56	124947.19	6872.10	85.90	1309.99	5561.30
14000	3363.96	1121.32	61.67	403675.52	134558.51	7400.72	92.51	1410.76	5989.15
15000	3604.25	1201.42	66.08	432509.49	144169.83	7929.34	99.12	1511.53	6417.01
16000	3844.53	1281.51	70.48	461343.45	153781.15	8457.96	105.72	1612.30	6844.86
17000	4084.81	1361.60	74.89	490177.42	163392.47	8986.59	112.33	1713.07	7272.72
18000	4325.09	1441.70	79.29	519011.38	173003.79	9515.21	118.94	1813.84	7700.57
19000	4565.38	1521.79	83.70	547845.35	182615.12	10043.83	125.55	1914.61	8128.42
20000	4805.66	1601.89	88.10	576679.32	192226.44	10572.45	132.16	2015.37	8556.28
21000	5045.94	1681.98	92.51	605513.28	201837.76	11101.08	138.76	2116.14	8984.13
22000	5286.23	1762.08	96.91	634347.25	211449.08	11629.70	145.37	2216.91	9411.99
23000	5526.51	1842.17	101.32	663181.21	221060.40	12158.32	151.98	2317.68	9839.84
24000	5766.79	1922.26	105.72	692015.18	230671.73	12686.94	158.59	2418.45	10267.69
25000	6007.08	2002.36	110.13	720849.15	240283.05	13215.57	165.19	2519.22	10695.55
26000	6247.36	2082.45	114.53	749683.11	249894.37	13744.19	171.80	2619.99	11123.40
27000	6487.64	2162.55	118.94	778517.08	259505.69	14272.81	178.41	2720.75	11551.26
28000	6727.93	2242.64	123.35	807351.04	269117.01	14801.44	185.02	2821.52	11979.11

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=============================================================================
|                              INPUT VARIABLES                              |
=============================================================================
| END BREAKS/Hour/100 Spindle :      12  | WASTE MULTIPLIER             :    1.50 |
| NUMBER OF SPINDLES/MACHINE   :     432  | YARN PRICE (TAKA/Lb)        :  120.00 |
| NUMBER OF MACHINES           :      20  | WASTE PRICE (TAKA/Lb)       :   15.25 |
| MACHINE EFFICIENCY (%)       :      95  | LABOUR PERFORMANCE (pitch up/hour) :  45 |
| COUNT                        :      60  | LABOUR COST (TK./ Labour/Shift) :  70.00 |
| TWIST MULTIPLIER (T.M)       :   3.500  | SPINNING POWER (KW/100 SPINDLES) :  2.00 |
| TWIST PER INCH (TPI)         :  31.305  | COST OF POWER (TK./KWH)      :    3.65 |
=============================================================================
|                                  OUTPUTS                                  |
=============================================================================
| NUMBER OF SIDES PER LABOUR    =    1.74 | YARN PRODUCTION RATE (Lb/Shift/100 rpm) =  8.01 |
| TOTAL NUMBERS OF LABOURS      =      24 | WASTE RATE (Lb/Shift/100 rpm)           =  0.72 |
| TOTAL LABOUR COST/SHIFT(Tk.) = 1680.00  |                                                |
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SPINDLE SPEED (RPM)	YARN PRODUCTION NET (Lb/Day)	YARN PRODUCTION NET (Lb/Shift)	RECOVERED BY PITCH- (Lb/Shift)	PRICE OF YARN PRODUCED PER DAY (Taka)	PRICE OF YARN PRODUCED PER SHIFT (Taka)	RECOVERED PER SHIFT (Taka)	WASTE DUE TO END BREAKAGE WEIGHT (Lb/SHIFT)	WASTE DUE TO END BREAKAGE PRICE (Taka)	NET LOSS RECOVERED /SHIFT BY PITCH-UP (Taka)
1	2	3	4	5	6	7	8	9	10
4000	961.13	320.38	19.22	115335.86	38445.29	2306.72	28.83	439.72	1866.12
5000	1201.42	400.47	24.03	144169.83	48056.61	2883.40	36.04	549.65	2332.87
6000	1441.70	480.57	28.83	173003.79	57667.93	3460.08	43.25	659.58	2799.62
7000	1681.99	560.66	33.64	201837.76	67279.25	4036.76	50.46	769.51	3266.37
8000	1922.26	640.75	38.45	230671.73	76890.58	4613.43	57.67	879.44	3733.12
9000	2162.55	720.85	43.25	259505.69	86501.90	5190.11	64.88	989.37	4199.87
10000	2402.83	800.94	48.06	288339.66	96113.22	5766.79	72.08	1099.29	4666.62
11000	2643.11	881.04	52.86	317173.62	105724.54	6343.47	79.29	1209.22	5133.37
12000	2883.40	961.13	57.67	346007.59	115335.86	6920.15	86.50	1319.15	5600.12
13000	3123.68	1041.23	62.47	374841.56	124947.19	7496.83	93.71	1429.08	6066.87
14000	3363.96	1121.32	67.28	403675.52	134558.51	8073.51	100.92	1539.01	6533.62
15000	3604.25	1201.42	72.08	432509.49	144169.83	8650.19	108.13	1648.94	7000.37
16000	3844.53	1281.51	76.89	461343.45	153781.15	9226.87	115.34	1758.87	7467.12
17000	4084.81	1361.60	81.70	490177.42	163392.47	9803.55	122.54	1868.80	7933.87
18000	4325.09	1441.70	86.50	519011.38	173003.79	10380.23	129.75	1978.73	8400.62
19000	4565.38	1521.79	91.31	547845.35	182615.12	10956.91	136.96	2088.66	8867.37
20000	4805.66	1601.89	96.11	576679.32	192226.44	11533.59	144.17	2198.59	9334.12
21000	.5045.94	1681.98	100.92	605513.28	201837.76	12110.27	151.38	2308.52	9800.87
22000	5286.23	1762.08	105.72	634347.25	211449.08	12686.94	158.59	2418.45	10267.62
23000	5526.51	1842.17	110.53	663181.21	221060.40	13263.62	165.80	2528.38	10734.37
24000	5766.79	1922.26	115.34	692015.18	230671.73	13840.30	173.00	2638.31	11201.12
25000	6007.08	2002.36	120.14	720849.15	240283.05	14416.98	180.21	2748.24	11667.87
26000	6247.36	2082.45	124.95	749683.11	249894.37	14993.66	187.42	2858.17	12134.62
27000	6487.64	2162.55	129.75	778517.08	259505.69	15570.34	194.63	2968.10	12601.37
28000	6727.93	2242.64	134.56	807351.04	269117.01	16147.02	201.84	3078.03	13068.12

RING PRODUCTION FEATURE

INPUT VARIABLES

END BREAKS/Hour/100 Spindle	:	13	WASTE MULTIPLIER	:	1.50
NUMBER OF SPINDLES/MACHINE	:	432	YARN PRICE (TAKA/Lb)	:	120.00
NUMBER OF MACHINES	:	20	WASTE PRICE (TAKA/Lb)	:	15.25
MACHINE EFFICIENCY (%)	:	95	LABOUR PERFORMANCE (pitch up/hour)	:	45
COUNT	:	60	LABOUR COST (TK./ Labour/Shift)	:	70.00
TWIST MULTIPLIER (T.M)	:	3.500	SPINNING POWER (KW/100 SPINDLES)	:	2.00
TWIST PER INCH (TPI)	:	31.305	COST OF POWER (TK./KWH)	:	3.65

OUTPUTS

NUMBER OF SIDES PER LABOUR	=	1.60	YARN PRODUCTION RATE (Lb/Shift/100 rpm)	=	8.01
TOTAL NUMBERS OF LABOURS	=	26	WASTE RATE (Lb/Shift/100 rpm)	=	0.78
TOTAL LABOUR COST/SHIFT(TK.)	=	1820.00			

SPINDLE SPEED (RPM)	YARN PRODUCTION			PRICE OF YARN PRODUCED			WASTE DUE TO END BREAKAGE		NET LOSS RECOVERED /SHIFT BY PITCH-UP (Taka)
	NET		RECOVERED BY PITCH-UP (Lb/Shift)	PER DAY (Taka)	PER SHIFT (Taka)	RECOVERED PER SHIFT (Taka)	WEIGHT (Lb/SHIFT)	PRICE (Taka)	
	(Lb/Day)	(Lb/Shift)							
1	2	3	4	5	6	7	8	9	10
4000	961.13	320.38	20.82	115335.86	38445.29	2498.94	31.24	476.36	2021.63
5000	1201.42	400.47	26.03	144169.83	48056.61	3123.68	39.05	595.45	2527.28
6000	1441.70	480.57	31.24	173003.79	57667.93	3748.42	46.86	714.54	3032.92
7000	1681.98	560.66	36.44	201837.76	67279.25	4373.15	54.66	833.63	3538.57
8000	1922.26	640.75	41.65	230671.73	76890.58	4997.89	62.47	952.72	4044.22
9000	2162.55	720.85	46.86	259505.69	86501.90	5622.62	70.28	1071.81	4549.86
10000	2402.83	800.94	52.06	288339.66	96113.22	6247.36	78.09	1190.90	5055.51
11000	2643.11	881.04	57.27	317173.62	105724.54	6872.10	85.90	1309.99	5561.15
12000	2883.40	961.13	62.47	346007.59	115335.86	7496.83	93.71	1429.08	6066.80
13000	3123.68	1041.23	67.68	374841.56	124947.19	8121.57	101.52	1548.17	6572.44
14000	3363.96	1121.32	72.89	403675.52	134558.51	8746.30	109.33	1667.26	7078.09
15000	3604.25	1201.42	78.09	432509.49	144169.83	9371.04	117.14	1786.35	7583.74
16000	3844.53	1281.51	83.30	461343.45	153781.15	9995.77	124.95	1905.44	8089.38
17000	4084.81	1361.60	88.50	490177.42	163392.47	10620.51	132.76	2024.53	8595.03
18000	4325.09	1441.70	93.71	519011.38	173003.79	11245.25	140.57	2143.63	9100.67
19000	4565.38	1521.79	98.92	547845.35	182615.12	11869.98	148.37	2262.72	9606.32
20000	4805.66	1601.89	104.12	576679.32	192226.44	12494.72	156.18	2381.81	10111.96
21000	5045.94	1681.98	109.33	605513.28	201837.76	13119.45	163.99	2500.90	10617.61
22000	5286.23	1762.08	114.53	634347.25	211449.08	13744.19	171.80	2619.99	11123.26
23000	5526.51	1842.17	119.74	663181.21	221060.40	14368.93	179.61	2739.08	11628.90
24000	5766.79	1922.26	124.95	692015.18	230671.73	14993.66	187.42	2858.17	12134.55
25000	6007.08	2002.36	130.15	720849.15	240283.05	15618.40	195.23	2977.26	12640.19
26000	6247.36	2082.45	135.36	749683.11	249894.37	16243.13	203.04	3096.35	13145.84
27000	6487.64	2162.55	140.57	778517.08	259505.69	16867.87	210.85	3215.44	13651.48
28000	6727.93	2242.64	145.77	807351.04	269117.01	17492.61	218.66	3334.53	14157.13

RING PRODUCTION FEATURE

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                                        INPUT VARIABLES
::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
END BREAKS/Hour/100 Spindle  :    14     | WASTE MULTIPLIER                    :   1.50
NUMBER OF SPINDLES/MACHINE   :   432     | YARN PRICE (TAKA/Lb)               : 120.00
NUMBER OF MACHINES           :    20     | WASTE PRICE (TAKA/Lb)              :  15.25
MACHINE EFFICIENCY (%)       :    95     | LABOUR PERFORMANCE (pitch up/hour)  :     45
COUNT                        :    60     | LABOUR COST [TK./ Labour/Shift]     :  70.00
TWIST MULTIPLIER (T.M)       :  3.500    | SPINNING POWER (KW/100 SPINDLES)    :   2.00
TWIST PER INCH (TPI)         : 31.305    | COST OF POWER (TK./KWH)             :   3.65
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                                           OUTPUTS
::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::::
NUMBER OF SIDES PER LABOUR   =    1.49    | YARN PRODUCTION RATE (Lb/Shift/100 rpm)  =   8.01
TOTAL NUMBERS OF LABOURS     =    28      | WASTE RATE (Lb/Shift/100 rpm)            =   0.84
TOTAL LABOUR COST/SHIFT(TK.) = 1960.00    |
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SPINDLE SPEED (RPM)	YARN PRODUCTION			PRICE OF YARN PRODUCED			WASTE DUE TO END BREAKAGE		NET LOSS RECOVERED /SHIFT BY PITCH-UP (Taka)
	NET		RECOVERED BY PITCH-	PER DAY	PER SHIFT	RECOVERED PER SHIFT	WEIGHT	PRICE	
	(Lb/Day)	(Lb/Shift)	(Lb/Shift)	(Taka)	(Taka)	(Taka)	(Lb/Shift)	(Taka)	(Taka)
1	2	3	4	5	6	7	8	9	10
4000	961.13	320.38	22.43	115335.86	38445.29	2691.17	33.64	513.00	2177.14
5000	1201.42	400.47	28.03	144169.83	48056.61	3363.96	42.05	641.26	2721.69
6000	1441.70	480.57	33.64	173003.79	57667.93	4036.76	50.46	769.51	3266.23
7000	1681.98	560.66	39.25	201837.76	67279.25	4709.55	58.87	897.76	3810.77
8000	1922.26	640.75	44.85	230671.73	76890.58	5382.34	67.28	1026.01	4355.31
9000	2162.55	720.85	50.46	259505.69	86501.90	6055.13	75.69	1154.26	4899.85
10000	2402.83	800.94	56.07	288339.66	96113.22	6727.93	84.10	1282.51	5444.39
11000	2643.11	881.04	61.67	317173.62	105724.54	7400.72	92.51	1410.76	5988.93
12000	2883.40	961.13	67.28	346007.59	115335.86	8073.51	100.92	1539.01	6533.48
13000	3123.68	1041.23	72.89	374841.56	124947.19	8746.30	109.33	1667.26	7078.02
14000	3363.96	1121.32	78.49	403675.52	134558.51	9419.10	117.74	1795.52	7622.56
15000	3604.25	1201.42	84.10	432509.49	144169.83	10091.89	126.15	1923.77	8167.10
16000	3844.53	1281.51	89.71	461343.45	153781.15	10764.68	134.56	2052.02	8711.64
17000	4084.81	1361.60	95.31	490177.42	163392.47	11437.47	142.97	2180.27	9256.18
18000	4325.09	1441.70	100.92	519011.38	173003.79	12110.27	151.38	2308.52	9800.72
19000	4565.38	1521.79	106.53	547845.35	182615.12	12783.06	159.79	2436.77	10345.27
20000	4805.66	1601.89	112.13	576679.32	192226.44	13455.85	168.20	2565.02	10889.81
21000	5045.94	1681.98	117.74	605513.28	201837.76	14128.64	176.61	2693.27	11434.35
22000	5286.23	1762.08	123.35	634347.25	211449.08	14801.44	185.02	2821.52	11978.89
23000	5526.51	1842.17	128.95	663181.21	221060.40	15474.23	193.43	2949.77	12523.43
24000	5766.79	1922.26	134.56	692015.18	230671.73	16147.02	201.84	3078.03	13067.97
25000	6007.08	2002.36	140.17	720849.15	240283.05	16819.81	210.25	3206.28	13612.51
26000	6247.36	2082.45	145.77	749683.11	249894.37	17492.61	218.66	3334.53	14157.06
27000	6487.64	2162.55	151.38	778517.08	259505.69	18165.40	227.07	3462.78	14701.60
28000	6727.93	2242.64	156.98	807351.04	269117.01	18838.19	235.48	3591.03	15246.14

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RING PRODUCTION FEATURE

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                              INPUT VARIABLES
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END BREAKS/Hour/100 Spindle  :      15    | WASTE MULTIPLIER                        :     1.50
NUMBER OF SPINDLES/MACHINE    :     432    | YARN PRICE (TAKA/Lb)                    :   120.00
NUMBER OF MACHINES            :      20    | WASTE PRICE (TAKA/Lb)                   :    15.25
MACHINE EFFICIENCY (%)        :      95    | LABOUR PERFORMANCE (pitch up/hour)      :      45
COUNT                         :      60    | LABOUR COST (TK./ Labour/Shift)         :    70.00
TWIST MULTIPLIER (T.M)        :   3.500    | SPINNING POWER (KW/100 SPINDLES)        :     2.00
TWIST PER INCH (TPI)          :  31.305    | COST OF POWER (TK./KWH)                 :     3.65
============================================================================================
                                   OUTPUTS
============================================================================================
NUMBER OF SIDES PER LABOUR     =     1.39   | YARN PRODUCTION RATE (Lb/Shift/100 rpm) =     8.01
TOTAL NUMBERS OF LABOURS       =       30   | WASTE RATE (Lb/Shift/100 rpm)           =     0.90
TOTAL LABOUR COST/SHIFT(TK.)   =  2100.00   |
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SPINDLE SPEED (RPM)	YARN PRODUCTION			PRICE OF YARN PRODUCED			WASTE DUE TO END BREAKAGE		NET LOSS RECOVERED /SHIFT BY PITCH-UP (Taka)
	NET		RECOVERED BY PITCH-	PER DAY	PER SHIFT	RECOVERED PER SHIFT	WEIGHT	PRICE	
	(Lb/Day)	(Lb/Shift)	(Lb/Shift) (Taka)	(Taka)	(Taka)	(Taka)	(Lb/Shift)	(Taka)	
1	2	3	4	5	6	7	8	9	10
4000	961.13	320.38	24.03	115335.86	38445.29	2883.40	36.04	549.65	2333.65
5000	1201.42	400.47	30.04	144169.83	48056.61	3604.25	45.05	687.06	2916.09
6000	1441.70	480.57	36.04	173003.79	57667.93	4325.09	54.06	824.47	3499.53
7000	1681.98	560.66	42.05	201837.76	67279.25	5045.94	63.07	961.88	4082.97
8000	1922.26	640.75	48.06	230671.73	76890.58	5766.79	72.08	1099.29	4666.40
9000	2162.55	720.85	54.06	259505.69	86501.90	6487.64	81.10	1236.71	5249.84
10000	2402.83	800.94	60.07	288339.66	96113.22	7208.49	90.11	1374.12	5833.28
11000	2643.11	881.04	66.08	317173.62	105724.54	7929.34	99.12	1511.53	6416.72
12000	2883.40	961.13	72.08	346007.59	115335.86	8650.19	108.13	1648.94	7000.15
13000	3123.68	1041.23	78.09	374841.56	124947.19	9371.04	117.14	1786.35	7583.59
14000	3363.96	1121.32	84.10	403675.52	134558.51	10091.89	126.15	1923.77	8167.03
15000	3604.25	1201.42	90.11	432509.49	144169.83	10812.74	135.16	2061.18	8750.46
16000	3844.53	1281.51	96.11	461343.45	153781.15	11533.59	144.17	2198.59	9333.90
17000	4084.81	1361.60	102.12	490177.42	163392.47	12254.44	153.18	2336.00	9917.34
18000	4325.09	1441.70	108.13	519011.38	173003.79	12975.28	162.19	2473.41	10500.78
19000	4565.38	1521.79	114.13	547845.35	182615.12	13696.13	171.20	2610.83	11084.21
20000	4805.66	1601.89	120.14	576679.32	192226.44	14416.98	180.21	2748.24	11667.65
21000	5045.94	1681.98	126.15	605513.28	201837.76	15137.83	189.22	2885.65	12251.09
22000	5286.23	1762.08	132.16	634347.25	211449.08	15858.68	198.23	3023.06	12834.53
23000	5526.51	1842.17	138.16	663181.21	221060.40	16579.53	207.24	3160.47	13417.96
24000	5766.79	1922.26	144.17	692015.18	230671.73	17300.38	216.25	3297.88	14001.40
25000	6007.08	2002.36	150.18	720849.15	240283.05	18021.23	225.27	3435.30	14584.84
26000	6247.36	2082.45	156.18	749683.11	249894.37	18742.08	234.28	3572.71	15168.27
27000	6487.64	2162.55	162.19	778517.08	259505.69	19462.93	243.29	3710.12	15751.71
28000	6727.93	2242.64	168.20	807351.04	269117.01	20183.78	252.30	3847.53	16335.15

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RING PRODUCTION FEATURE

INPUT VARIABLES			
END BREAKS/Hour/100 Spindle	: 16	WASTE MULTIPLIER	: 1.50
NUMBER OF SPINDLES/MACHINE	: 432	YARN PRICE (TAKA/Lb)	: 120.00
NUMBER OF MACHINES	: 20	WASTE PRICE (TAKA/Lb)	: 15.25
MACHINE EFFICIENCY (%)	: 95	LABOUR PERFORMANCE (pitch up/hour)	: 45
COUNT	: 60	LABOUR COST (TK./ Labour/Shift)	: 70.00
TWIST MULTIPLIER (T.M)	: 3.500	SPINNING POWER (KW/100 SPINDLES)	: 2.00
TWIST PER INCH (TPI)	: 31.305	COST OF POWER (TK./KWH)	: 3.65

OUTPUTS			
NUMBER OF SIDES PER LABOUR	= 1.30	YARN PRODUCTION RATE (Lb/Shift/100 rpm)	= 8.01
TOTAL NUMBERS OF LABOURS	= 32	WASTE RATE (Lb/Shift/100 rpm)	= 0.96
TOTAL LABOUR COST/SHIFT(Tk.)	= 2240.00		

SPINDLE SPEED	YARN PRODUCTION			PRICE OF YARN PRODUCED			WASTE DUE TO END BREAKAGE		NET LOSS RECOVERED /SHIFT BY PITCH-UP
	NET		RECOVERED BY PITCH-	PER DAY	PER SHIFT	RECOVERED PER SHIFT	WEIGHT	PRICE	
[RPM]	(Lb/Day)	(Lb/Shift)	(Lb/Shift)	(Taka)	(Taka)	(Taka)	(Lb/SHIFT)	(Taka)	(Taka)
1	2	3	4	5	6	7	8	9	10
4000	961.13	320.38	25.63	115335.86	38445.29	3075.62	38.45	586.29	2488.16
5000	1201.42	400.47	32.04	144169.83	48056.61	3844.53	48.06	732.86	3110.50
6000	1441.70	480.57	38.45	173003.79	57667.93	4613.43	57.67	879.44	3732.83
7000	1681.98	560.66	44.85	201837.76	67279.25	5382.34	67.28	1026.01	4355.16
8000	1922.26	640.75	51.26	230671.73	76890.58	6151.25	76.89	1172.58	4977.50
9000	2162.55	720.85	57.67	259505.69	86501.90	6920.15	86.50	1319.15	5599.83
10000	2402.83	800.94	64.08	288339.66	96113.22	7689.06	96.11	1465.73	6222.16
11000	2643.11	881.04	70.48	317173.62	105724.54	8457.96	105.72	1612.30	6844.50
12000	2883.40	961.13	76.89	346007.59	115335.86	9226.87	115.34	1758.87	7466.83
13000	3123.68	1041.23	83.30	374841.56	124947.19	9995.77	124.95	1905.44	8089.16
14000	3363.96	1121.32	89.71	403675.52	134558.51	10764.68	134.56	2052.02	8711.50
15000	3604.25	1201.42	96.11	432509.49	144169.83	11533.59	144.17	2198.59	9333.83
16000	3844.53	1281.51	102.52	461343.45	153781.15	12302.49	153.78	2345.16	9956.16
17000	4084.81	1361.60	108.93	490177.42	163392.47	13071.40	163.39	2491.74	10578.49
18000	4325.09	1441.70	115.34	519011.38	173003.79	13840.30	173.00	2638.31	11200.83
19000	4565.38	1521.79	121.74	547845.35	182615.12	14609.21	182.62	2784.88	11823.16
20000	4805.66	1601.89	128.15	576679.32	192226.44	15378.12	192.23	2931.45	12445.49
21000	5045.94	1681.98	134.56	605513.28	201837.76	16147.02	201.84	3078.03	13067.83
22000	5286.23	1762.08	140.97	634347.25	211449.08	16915.93	211.45	3224.60	13690.16
23000	5526.51	1842.17	147.37	663181.21	221060.40	17684.83	221.06	3371.17	14312.49
24000	5766.79	1922.26	153.78	692015.18	230671.73	18453.74	230.67	3517.74	14934.83
25000	6007.08	2002.36	160.19	720849.15	240283.05	19222.64	240.28	3664.32	15557.16
26000	6247.36	2082.45	166.60	749683.11	249894.37	19991.55	249.89	3810.89	16179.49
27000	6487.64	2162.55	173.00	778517.08	259505.69	20760.46	259.51	3957.46	16801.83
28000	6727.93	2242.64	179.41	807351.04	269117.01	21529.36	269.12	4104.03	17424.16

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RING PRODUCTION FEATURE

INPUT VARIABLES

END BREAKS/Hour/100 Spindle	: 17	WASTE MULTIPLIER	: 1.50
NUMBER OF SPINDLES/MACHINE	: 432	YARN PRICE (TAKA/Lb)	: 120.00
NUMBER OF MACHINES	: 20	WASTE PRICE (TAKA/Lb)	: 15.25
MACHINE EFFICIENCY (%)	: 95	LABOUR PERFORMANCE (pitch up/hour)	: 45
COUNT	: 60	LABOUR COST (TK./ Labour/Shift)	: 70.00
TWIST MULTIPLIER (T.M)	: 3.500	SPINNING POWER (KW/100 SPINDLES)	: 2.00
TWIST PER INCH (TPI)	: 31.305	COST OF POWER (TK./KWH)	: 3.65

OUTPUTS

NUMBER OF SIDES PER LABOUR	= 1.23	YARN PRODUCTION RATE (Lb/Shift/100 rpm)	= 8.01
TOTAL NUMBERS OF LABOURS	= 34	WASTE RATE (Lb/Shift/100 rpm)	= 1.02
TOTAL LABOUR COST/SHIFT(Tk.)	= 2380.00		

SPINDLE SPEED (RPM)	YARN PRODUCTION			PRICE OF YARN PRODUCED			WASTE DUE TO END BREAKAGE		NET LOSS RECOVERED /SHIFT BY PITCH-UP
	NET		RECOVERED BY PITCH-	PER DAY	PER SHIFT	RECOVERED PER SHIFT	WEIGHT	PRICE	
	(Lb/Day)	(Lb/Shift)	(Lb/Shift)	(Taka)	(Taka)	(Taka)	(Lb/SHIFT)	(Taka)	(Taka)
1	2	3	4	5	6	7	8	9	10
4000	961.13	320.38	27.23	115335.86	38445.29	3267.85	40.85	622.93	2643.67
5000	1201.42	400.47	34.04	144169.83	48056.61	4084.81	51.06	778.67	3304.90
6000	1441.70	480.57	40.85	173003.79	57667.93	4901.77	61.27	934.40	3966.13
7000	1681.98	560.66	47.66	201837.76	67279.25	5718.74	71.48	1090.13	4627.36
8000	1922.26	640.75	54.46	230671.73	76890.58	6535.70	81.70	1245.87	5288.59
9000	2162.55	720.85	61.27	259505.69	86501.90	7352.66	91.91	1401.60	5949.82
10000	2402.83	800.94	68.08	288339.66	96113.22	8169.62	102.12	1557.33	6611.05
11000	2643.11	881.04	74.89	317173.62	105724.54	8986.59	112.33	1713.07	7272.28
12000	2883.40	961.13	81.70	346007.59	115335.86	9803.55	122.54	1868.80	7933.51
13000	3123.68	1041.23	88.50	374841.56	124947.19	10620.51	132.76	2024.53	8594.73
14000	3363.96	1121.32	95.31	403675.52	134558.51	11437.47	142.97	2180.27	9255.96
15000	3604.25	1201.42	102.12	432509.49	144169.83	12254.44	153.18	2336.00	9917.19
16000	3844.53	1281.51	108.93	461343.45	153781.15	13071.40	163.39	2491.74	10578.42
17000	4084.81	1361.60	115.74	490177.42	163392.47	13888.36	173.60	2647.47	11239.65
18000	4325.09	1441.70	122.54	519011.38	173003.79	14705.32	183.82	2803.20	11900.88
19000	4565.38	1521.79	129.35	547845.35	182615.12	15522.28	194.03	2958.94	12562.11
20000	4805.66	1601.89	136.16	576679.32	192226.44	16339.25	204.24	3114.67	13223.34
21000	5045.94	1681.98	142.97	605513.28	201837.76	17156.21	214.45	3270.40	13884.57
22000	5286.23	1762.08	149.78	634347.25	211449.08	17973.17	224.66	3426.14	14545.80
23000	5526.51	1842.17	156.58	663181.21	221060.40	18790.13	234.88	3581.87	15207.02
24000	5766.79	1922.26	163.39	692015.18	230671.73	19607.10	245.09	3737.60	15868.25
25000	6007.08	2002.36	170.20	720849.15	240283.05	20424.06	255.30	3893.34	16529.48
26000	6247.36	2082.45	177.01	749683.11	249894.37	21241.02	265.51	4049.07	17190.71
27000	6487.64	2162.55	183.82	778517.08	259505.69	22057.98	275.72	4204.80	17851.94
28000	6727.93	2242.64	190.62	807351.04	269117.01	22874.95	285.94	4360.54	18513.17

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RING PRODUCTION FEATURE

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=========================================================================
                              INPUT VARIABLES
=========================================================================
END BREAKS/Hour/100 Spindle  :      18  | WASTE MULTIPLIER              :    1.50
NUMBER OF SPINDLES/MACHINE    :     432  | YARN PRICE (TAKA/Lb)          :  120.00
NUMBER OF MACHINES            :      20  | WASTE PRICE (TAKA/Lb)         :   15.25
MACHINE EFFICIENCY (%)        :      95  | LABOUR PERFORMANCE (pitch up/hour) : 45
COUNT                         :      60  | LABOUR COST (TK./ Labour/Shift) :  70.00
TWIST MULTIPLIER (T.M)        :   3.500  | SPINNING POWER (KW/100 SPINDLES) :  2.00
TWIST PER INCH (TPI)          :  31.305  | COST OF POWER (TK./KWH)        :    3.65
=========================================================================
                                 OUTPUTS
=========================================================================
NUMBER OF SIDES PER LABOUR   =   1.16   | YARN PRODUCTION RATE (Lb/Shift/100 rpm) =  8.01
TOTAL NUMBERS OF LABOURS     =    36    | WASTE RATE (Lb/Shift/100 rpm)           =  1.08
TOTAL LABOUR COST/SHIFT(Tk.) = 2520.00  |
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SPINDLE SPEED (RPM)	YARN PRODUCTION			PRICE OF YARN PRODUCED			WASTE DUE TO END BREAKAGE		NET LOSS RECOVERED /SHIFT BY PITCH-UP
	NET		RECOVERED BY PITCH-	PER DAY	PER SHIFT	RECOVERED PER SHIFT			
	(Lb/Day)	(Lb/Shift)	(Lb/Shift)	[Taka]	[Taka]	[Taka]	WEIGHT (Lb/Shift)	PRICE [Taka]	[Taka]
1	2	3	4	5	6	7	8	9	10
4000	961.13	320.38	28.83	115335.86	38445.29	3460.08	43.25	659.58	2799.18
5000	1201.42	400.47	36.04	144169.83	48056.61	4325.09	54.06	824.47	3499.31
6000	1441.70	480.57	43.25	173003.79	57667.93	5190.11	64.88	989.37	4199.43
7000	1681.98	560.66	50.46	201837.76	67279.25	6055.13	75.69	1154.26	4899.56
8000	1922.26	640.75	57.67	230671.73	76890.58	6920.15	86.50	1319.15	5599.68
9000	2162.55	720.85	64.88	259505.69	86501.90	7785.17	97.31	1484.05	6299.81
10000	2402.83	800.94	72.08	288339.66	96113.22	8650.19	108.13	1648.94	6999.93
11000	2643.11	881.04	79.29	317173.62	105724.54	9515.21	118.94	1813.84	7700.06
12000	2883.40	961.13	86.50	346007.59	115335.86	10380.23	129.75	1978.73	8400.18
13000	3123.68	1041.23	93.71	374841.56	124947.19	11245.25	140.57	2143.63	9100.31
14000	3363.96	1121.32	100.92	403675.52	134558.51	12110.27	151.38	2308.52	9800.43
15000	3604.25	1201.42	108.13	432509.49	144169.83	12975.28	162.19	2473.41	10500.56
16000	3844.53	1281.51	115.34	461343.45	153781.15	13840.30	173.00	2638.31	11200.68
17000	4084.81	1361.60	122.54	490177.42	163392.47	14705.32	183.82	2803.20	11900.81
18000	4325.09	1441.70	129.75	519011.38	173003.79	15570.34	194.63	2968.10	12600.93
19000	4565.38	1521.79	136.96	547845.35	182615.12	16435.36	205.44	3132.99	13301.06
20000	4805.66	1601.89	144.17	576679.32	192226.44	17300.38	216.25	3297.88	14001.18
21000	5045.94	1681.98	151.38	605513.28	201837.76	18165.40	227.07	3462.78	14701.31
22000	5286.23	1762.08	158.59	634347.25	211449.08	19030.42	237.88	3627.67	15401.43
23000	5526.51	1842.17	165.80	663181.21	221060.40	19895.44	248.69	3792.57	16101.55
24000	5766.79	1922.26	173.00	692015.18	230671.73	20760.46	259.51	3957.46	16801.68
25000	6007.08	2002.36	180.21	720849.15	240283.05	21625.47	270.32	4122.36	17501.80
26000	6247.36	2082.45	187.42	749683.11	249894.37	22490.49	281.13	4287.25	18201.93
27000	6487.64	2162.55	194.63	778517.08	259505.69	23355.51	291.94	4452.14	18902.05
28000	6727.93	2242.64	201.84	807351.04	269117.01	24220.53	302.76	4617.04	19602.18

RING PRODUCTION FEATURE

INPUT VARIABLES		
END BREAKS/Hour/100 Spindle : 19	WASTE MULTIPLIER	: 1.50
NUMBER OF SPINDLES/MACHINE : 432	YARN PRICE (TAKA/Lb)	: 120.00
NUMBER OF MACHINES : 20	WASTE PRICE (TAKA/Lb)	: 15.25
MACHINE EFFICIENCY (%) : 95	LABOUR PERFORMANCE (pitch up/hour)	: 45
COUNT : 60	LABOUR COST (TK./ Labour/Shift)	: 70.00
TWIST MULTIPLIER (T.M) : 3.500	SPINNING POWER (KW/100 SPINDLES)	: 2.00
TWIST PER INCH (TPI) : 31.305	COST OF POWER (TK./KWH)	: 3.65

OUTPUTS	
NUMBER OF SIDES PER LABOUR = 1.10	YARN PRODUCTION RATE (Lb/Shift/100 rpm) = 8.01
TOTAL NUMBERS OF LABOURS = 37	WASTE RATE (Lb/Shift/100 rpm) = 1.14
TOTAL LABOUR COST/SHIFT(TK.) = 2590.00	

SPINDLE SPEED (RPM)	YARN PRODUCTION			PRICE OF YARN PRODUCED			WASTE DUE TO END BREAKAGE		NET LOSS RECOVERED /SHIFT BY PITCH-UP (Taka)
	NET		RECOVERED BY PITCH-	PER DAY	PER SHIFT	RECOVERED PER SHIFT	WEIGHT	PRICE	
	(Lb/Day)	(Lb/Shift)	(Lb/Shift)	(Taka)	(Taka)	(Taka)	(Lb/SHIFT)	(Taka)	
1	2	3	4	5	6	7	8	9	10
4000	961.13	320.38	30.44	115335.86	38445.29	3652.30	45.65	696.22	2954.70
5000	1201.42	400.47	38.04	144169.83	48056.61	4565.38	57.07	870.28	3693.72
6000	1441.70	480.57	45.65	173003.79	57667.93	5478.45	68.48	1044.33	4432.74
7000	1681.98	560.66	53.26	201837.76	67279.25	6391.53	79.89	1218.39	5171.76
8000	1922.26	640.75	60.87	230671.73	76890.58	7304.60	91.31	1392.44	5910.78
9000	2162.55	720.85	68.48	259505.69	86501.90	8217.68	102.72	1566.50	6649.80
10000	2402.83	800.94	76.09	288339.66	96113.22	9130.76	114.13	1740.55	7388.82
11000	2643.11	881.04	83.70	317173.62	105724.54	10043.83	125.55	1914.61	8127.84
12000	2883.40	961.13	91.31	346007.59	115335.86	10956.91	136.96	2088.66	8866.86
13000	3123.68	1041.23	98.92	374841.56	124947.19	11869.98	148.37	2262.72	9605.88
14000	3363.96	1121.32	106.53	403675.52	134558.51	12783.06	159.79	2436.77	10344.90
15000	3604.25	1201.42	114.13	432509.49	144169.83	13696.13	171.20	2610.83	11083.92
16000	3844.53	1281.51	121.74	461343.45	153781.15	14609.21	182.62	2784.88	11822.94
17000	4084.81	1361.60	129.35	490177.42	163392.47	15522.28	194.03	2958.94	12561.96
18000	4325.09	1441.70	136.96	519011.38	173003.79	16435.36	205.44	3132.99	13300.98
19000	4565.38	1521.79	144.57	547845.35	182615.12	17348.44	216.86	3307.05	14040.00
20000	4805.66	1601.89	152.18	576679.32	192226.44	18261.51	228.27	3481.10	14779.02
21000	5045.94	1681.98	159.79	605513.28	201837.76	19174.59	239.68	3655.16	15518.04
22000	5286.23	1762.08	167.40	634347.25	211449.08	20087.66	251.10	3829.21	16257.07
23000	5526.51	1842.17	175.01	663181.21	221060.40	21000.74	262.51	4003.27	16996.09
24000	5766.79	1922.26	182.62	692015.18	230671.73	21913.81	273.92	4177.32	17735.11
25000	6007.08	2002.36	190.22	720849.15	240283.05	22826.89	285.34	4351.38	18474.13
26000	6247.36	2082.45	197.83	749683.11	249894.37	23739.97	296.75	4525.43	19213.15
27000	6487.64	2162.55	205.44	778517.08	259505.69	24653.04	308.16	4699.49	19952.17
28000	6727.93	2242.64	213.05	807351.04	269117.01	25566.12	319.58	4873.54	20691.19

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RING PRODUCTION FEATURE

INPUT VARIABLES		
END BREAKS/Hour/100 Spindle : 20	WASTE MULTIPLIER	: 1.50
NUMBER OF SPINDLES/MACHINE : 432	YARN PRICE (TAKA/Lb)	: 120.00
NUMBER OF MACHINES : 20	WASTE PRICE (TAKA/Lb)	: 15.25
MACHINE EFFICIENCY (%) : 95	LABOUR PERFORMANCE (pitch up/hour)	: 45
COUNT : 60	LABOUR COST (TK./ Labour/Shift)	: 70.00
TWIST MULTIPLIER (T.M) : 3.500	SPINNING POWER (KW/100 SPINDLES)	: 2.00
TWIST PER INCH (TPI) : 31.305	COST OF POWER (TK./KWH)	: 3.65

OUTPUTS	
NUMBER OF SIDES PER LABOUR = 1.04	YARN PRODUCTION RATE (Lb/Shift/100 rpm) = 8.01
TOTAL NUMBERS OF LABOURS = 39	WASTE RATE (Lb/Shift/100 rpm) = 1.20
TOTAL LABOUR COST/SHIFT(TK.) = 2730.00	

SPINDLE SPEED (RPM)	YARN PRODUCTION			PRICE OF YARN PRODUCED			WASTE DUE TO END BREAKAGE		NET LOSS RECOVERED /SHIFT BY PITCH-UP
	NET		RECOVERED BY PITCH-	PER DAY	PER SHIFT	RECOVERED PER SHIFT	WEIGHT	PRICE	
	(Lb/Day)	(Lb/Shift)	(Lb/Shift)	(Taka)	(Taka)	(Taka)	(Lb/SHIFT)	(Taka)	(Taka)
1	2	3	4	5	6	7	8	9	10
4000	961.13	320.38	32.04	115335.86	38445.29	3844.53	48.06	732.86	3110.21
5000	1201.42	400.47	40.05	144169.83	48056.61	4805.66	60.07	916.08	3888.12
6000	1441.70	480.57	48.06	173003.79	57667.93	5766.79	72.08	1099.29	4666.04
7000	1681.98	560.66	56.07	201837.76	67279.25	6727.93	84.10	1282.51	5443.95
8000	1922.26	640.75	64.08	230671.73	76890.58	7689.06	96.11	1465.73	6221.87
9000	2162.55	720.85	72.08	259505.69	86501.90	8650.19	108.13	1648.94	6999.79
10000	2402.83	800.94	80.09	288339.66	96113.22	9611.32	120.14	1832.16	7777.70
11000	2643.11	881.04	88.10	317173.62	105724.54	10572.45	132.16	2015.37	8555.62
12000	2883.40	961.13	96.11	346007.59	115335.86	11533.59	144.17	2198.59	9333.54
13000	3123.68	1041.23	104.12	374841.56	124947.19	12494.72	156.18	2381.81	10111.45
14000	3363.96	1121.32	112.13	403675.52	134558.51	13455.85	168.20	2565.02	10889.37
15000	3604.25	1201.42	120.14	432509.49	144169.83	14416.98	180.21	2748.24	11667.29
16000	3844.53	1281.51	128.15	461343.45	153781.15	15378.12	192.23	2931.45	12445.20
17000	4084.81	1361.60	136.16	490177.42	163392.47	16339.25	204.24	3114.67	13223.12
18000	4325.09	1441.70	144.17	519011.38	173003.79	17300.38	216.25	3297.88	14001.03
19000	4565.38	1521.79	152.18	547845.35	182615.12	18261.51	228.27	3481.10	14778.95
20000	4805.66	1601.89	160.19	576679.32	192226.44	19222.64	240.28	3664.32	15556.87
21000	5045.94	1681.98	168.20	605513.28	201837.76	20183.78	252.30	3847.53	16334.78
22000	5286.23	1762.08	176.21	634347.25	211449.08	21144.91	264.31	4030.75	17112.70
23000	5526.51	1842.17	184.22	663181.21	221060.40	22106.04	276.33	4213.96	17890.62
24000	5766.79	1922.26	192.23	692015.18	230671.73	23067.17	288.34	4397.18	18668.53
25000	6007.08	2002.36	200.24	720849.15	240283.05	24028.30	300.35	4580.40	19446.45
26000	6247.36	2082.45	208.25	749683.11	249894.37	24989.44	312.37	4763.61	20224.37
27000	6487.64	2162.55	216.25	778517.08	259505.69	25950.57	324.38	4946.83	21002.28
28000	6727.93	2242.64	224.26	807351.04	269117.01	26911.70	336.40	5130.04	21780.20

ANNEXURE-C
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RING PRODUCTION FEATURE

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=================================================================================
                                INPUT VARIABLES
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END BREAKS/Hour/100 Spindle  :    21    | WASTE MULTIPLIER               :   1.50
NUMBER OF SPINDLES/MACHINE    :   432    | YARN PRICE (TAKA/Lb)           : 120.00
NUMBER OF MACHINES            :    20    | WASTE PRICE (TAKA/Lb)          :  15.25
MACHINE EFFICIENCY (%)        :    95    | LABOUR PERFORMANCE (pitch up/hour) :  45
COUNT                         :    60    | LABOUR COST (TK./ Labour/Shift) :  70.00
TWIST MULTIPLIER (T.M)        : 3.500    | SPINNING POWER (KW/100 SPINDLES) :  2.00
TWIST PER INCH (TPI)          : 31.305   | COST OF POWER (TK./KWH)         :   3.65
=================================================================================
                                    OUTPUTS
=================================================================================
NUMBER OF SIDES PER LABOUR  =   0.99  | YARN PRODUCTION RATE (Lb/Shift/100 rpm) = 8.01
TOTAL NUMBERS OF LABOURS    =    41   | WASTE RATE (Lb/Shift/100 rpm)           = 1.26
TOTAL LABOUR COST/SHIFT(TK.) = 2870.00 |
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SPINDLE SPEED (RPM)	YARN PRODUCTION			PRICE OF YARN PRODUCED			WASTE DUE TO END BREAKAGE		NET LOSS RECOVERED /SHIFT BY PITCH-UP
	NET		RECOVERED BY PITCH-	PER DAY	PER SHIFT	RECOVERED PER SHIFT	WEIGHT	PRICE	
	(Lb/Day)	(Lb/Shift)	(Lb/Shift)	(Taka)	(Taka)	(Taka)	(Lb/SHIFT)	(Taka)	(Taka)
1	2	3	4	5	6	7	8	9	10
4000	961.13	320.38	33.64	115335.86	38445.29	4036.76	50.46	769.51	3265.72
5000	1201.42	400.47	42.05	144169.83	48056.61	5045.94	63.07	961.88	4082.53
6000	1441.70	480.57	50.46	173003.79	57667.93	6055.13	75.69	1154.26	4899.34
7000	1681.98	560.66	58.87	201837.76	67279.25	7064.32	88.30	1346.64	5716.15
8000	1922.26	640.75	67.28	230671.73	76890.58	8073.51	100.92	1539.01	6532.96
9000	2162.55	720.85	75.69	259505.69	86501.90	9082.70	113.53	1731.39	7349.78
10000	2402.83	800.94	84.10	288339.66	96113.22	10091.89	126.15	1923.77	8166.59
11000	2643.11	881.04	92.51	317173.62	105724.54	11101.08	138.76	2116.14	8983.40
12000	2883.40	961.13	100.92	346007.59	115335.86	12110.27	151.38	2308.52	9800.21
13000	3123.68	1041.23	109.33	374841.56	124947.19	13119.45	163.99	2500.90	10617.03
14000	3363.96	1121.32	117.74	403675.52	134558.51	14128.64	176.61	2693.27	11433.84
15000	3604.25	1201.42	126.15	432509.49	144169.83	15137.83	189.22	2885.65	12250.65
16000	3844.53	1281.51	134.56	461343.45	153781.15	16147.02	201.84	3078.03	13067.46
17000	4084.81	1361.60	142.97	490177.42	163392.47	17156.21	214.45	3270.40	13884.27
18000	4325.09	1441.70	151.38	519011.38	173003.79	18165.40	227.07	3462.78	14701.09
19000	4565.38	1521.79	159.79	547845.35	182615.12	19174.59	239.68	3655.16	15517.90
20000	4805.66	1601.89	168.20	576679.32	192226.44	20183.78	252.30	3847.53	16334.71
21000	5045.94	1681.98	176.61	605513.28	201837.76	21192.96	264.91	4039.91	17151.52
22000	5286.23	1762.08	185.02	634347.25	211449.08	22202.15	277.53	4232.29	17968.34
23000	5526.51	1842.17	193.43	663181.21	221060.40	23211.34	290.14	4424.66	18785.15
24000	5766.79	1922.26	201.84	692015.18	230671.73	24220.53	302.76	4617.04	19601.96
25000	6007.08	2002.36	210.25	720849.15	240283.05	25229.72	315.37	4809.42	20418.77
26000	6247.36	2082.45	218.66	749683.11	249894.37	26238.91	327.99	5001.79	21235.58
27000	6487.64	2162.55	227.07	778517.08	259505.69	27248.10	340.60	5194.17	22052.40
28000	6727.93	2242.64	235.48	807351.04	269117.01	28257.29	353.22	5386.55	22869.21

RING PRODUCTION FEATURE

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====================================================================================
                              INPUT VARIABLES
====================================================================================
END BREAKS/Hour/100 Spindle  :     25    | WASTE MULTIPLIER                    :    1.50
NUMBER OF SPINDLES/MACHINE   :    432    | YARN PRICE (TAKA/Lb)               :  120.00
NUMBER OF MACHINES           :     20    | WASTE PRICE (TAKA/Lb)              :   15.25
MACHINE EFFICIENCY (%)       :     95    | LABOUR PERFORMANCE (pitch up/hour) :     45
COUNT                        :     60    | LABOUR COST (TK./ Labour/Shift)    :   70.00
TWIST MULTIPLIER (T.M)       :  3.500    | SPINNING POWER (KW/100 SPINDLES)   :    2.00
TWIST PER INCH (TPI)         : 31.305    | COST OF POWER (TK./KWH)            :    3.65
====================================================================================
                                 OUTPUTS
====================================================================================
NUMBER OF SIDES PER LABOUR    =     0.83  | YARN PRODUCTION RATE (Lb/Shift/100 rpm) =   8.01
TOTAL NUMBERS OF LABOURS      =       49  | WASTE RATE (Lb/Shift/100 rpm)           =   1.50
TOTAL LABOUR COST/SHIFT(TK.)  = 3430.00  |
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SPINDLE SPEED (RPM)	YARN PRODUCTION			PRICE OF YARN PRODUCED			WASTE DUE TO END BREAKAGE		NET LOSS RECOVERED /SHIFT BY PITCH-UP
	NET		RECOVERED BY PITCH-	PER DAY	PER SHIFT	RECOVERED PER SHIFT	WEIGHT	PRICE	
	(Lb/Day)	(Lb/Shift)	(Lb/Shift)	(Taka)	(Taka)	(Taka)	(Lb/Shift)	(Taka)	(Taka)
1	2	3	4	5	6	7	8	9	10
4000	961.13	320.38	40.05	115335.86	38445.29	4805.66	60.07	916.08	3837.76
5000	1201.42	400.47	50.06	144169.83	48056.61	6007.08	75.09	1145.10	4860.15
6000	1441.70	480.57	60.07	173003.79	57667.93	7208.49	90.11	1374.12	5832.55
7000	1681.98	560.66	70.08	201837.76	67279.25	8409.91	105.12	1603.14	6804.94
8000	1922.26	640.75	80.09	230671.73	76890.58	9611.32	120.14	1832.16	7777.34
9000	2162.55	720.85	90.11	259505.69	86501.90	10812.74	135.16	2061.18	8749.73
10000	2402.83	800.94	100.12	288339.66	96113.22	12014.15	150.18	2290.20	9722.13
11000	2643.11	881.04	110.13	317173.62	105724.54	13215.57	165.19	2519.23	10694.53
12000	2883.40	961.13	120.14	346007.59	115335.86	14416.98	180.21	2748.24	11666.92
13000	3123.68	1041.23	130.15	374841.56	124947.19	15618.40	195.23	2977.26	12639.32
14000	3363.96	1121.32	140.17	403675.52	134558.51	16819.81	210.25	3206.28	13611.71
15000	3604.25	1201.42	150.18	432509.49	144169.83	18021.23	225.27	3435.30	14584.11
16000	3844.53	1281.51	160.19	461343.45	153781.15	19222.64	240.28	3664.32	15556.50
17000	4084.81	1361.60	170.20	490177.42	163392.47	20424.06	255.30	3893.34	16528.90
18000	4325.09	1441.70	180.21	519011.38	173003.79	21625.47	270.32	4122.36	17501.29
19000	4565.38	1521.79	190.22	547845.35	182615.12	22826.89	285.34	4351.38	18473.69
20000	4805.66	1601.89	200.24	576679.32	192226.44	24028.30	300.35	4580.40	19446.08
21000	5045.94	1681.98	210.25	605513.28	201837.76	25229.72	315.37	4809.42	20418.48
22000	5286.23	1762.08	220.26	634347.25	211449.08	26431.14	330.39	5038.44	21390.88
23000	5526.51	1842.17	230.27	663181.21	221060.40	27632.55	345.41	5267.45	22363.27
24000	5766.79	1922.26	240.28	692015.18	230671.73	28833.97	360.42	5496.47	23335.67
25000	6007.08	2002.36	250.29	720849.15	240283.05	30035.38	375.44	5725.49	24308.06
26000	6247.36	2082.45	260.31	749683.11	249894.37	31236.80	390.46	5954.51	25280.46
27000	6487.64	2162.55	270.32	778517.08	259505.69	32438.21	405.48	6183.53	26252.85
28000	6727.93	2242.64	280.33	807351.04	269117.01	33639.63	420.50	6412.55	27225.25

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RING PRODUCTION FEATURE

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=================================================================================
|                                INPUT VARIABLES                                |
=================================================================================
| END BREAKS/Hour/100 Spindle  :     29    | WASTE MULTIPLIER              :   1.50  |
| NUMBER OF SPINDLES/MACHINE    :    432    | YARN PRICE (TAKA/Lb)         : 120.00  |
| NUMBER OF MACHINES            :     20    | WASTE PRICE (TAKA/Lb)        :  15.25  |
| MACHINE EFFICIENCY (%)        :     95    | LABOUR PERFORMANCE (pitch up/hour):  45  |
| COUNT                         :     60    | LABOUR COST (TK./ Labour/Shift):  70.00 |
| TWIST MULTIPLIER (T.M)        :  3.500    | SPINNING POWER (KW/100 SPINDLES):  2.00 |
| TWIST PER INCH (TPI)          : 31.305    | COST OF POWER (TK./KWH)       :   3.65  |
=================================================================================
|                                   OUTPUTS                                     |
=================================================================================
| NUMBER OF SIDES PER LABOUR  =    0.72  | YARN PRODUCTION RATE (Lb/Shift/100 rpm) =  8.01 |
| TOTAL NUMBERS OF LABOURS    =     57   | WASTE RATE (Lb/Shift/100 rpm)           =  1.74 |
| TOTAL LABOUR COST/SHIFT(Tk.) = 3990.00 |                                               |
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SPINDLE SPEED	YARN PRODUCTION			PRICE OF YARN PRODUCED			WASTE DUE TO END BREAKAGE		NET LOSS RECOVERED /SHIFT BY PITCH-UP
	NET		RECOVERED BY PITCH	PER DAY	PER SHIFT	RECOVERED PER SHIFT	WEIGHT	PRICE	
(RPM)	(Lb/Day)	(Lb/Shift)	(Lb/Shift)	(Taka)	(Taka)	(Taka)	(Lb/SHIFT)	(Taka)	(Taka)
1	2	3	4	5	6	7	8	9	10
4000	961.13	320.38	46.45	115335.86	38445.29	5574.57	69.68	1062.65	4509.80
5000	1201.42	400.47	58.07	144169.83	48056.61	6968.21	87.10	1328.31	5637.78
6000	1441.70	480.57	69.68	173003.79	57667.93	8361.85	104.52	1593.98	6765.76
7000	1681.98	560.66	81.30	201837.76	67279.25	9755.49	121.94	1859.64	7893.73
8000	1922.26	640.75	92.91	230671.73	76890.58	11149.13	139.36	2125.30	9021.71
9000	2162.55	720.85	104.52	259505.69	86501.90	12542.78	156.78	2390.97	10149.69
10000	2402.83	800.94	116.14	288339.66	96113.22	13936.42	174.21	2656.63	11277.67
11000	2643.11	881.04	127.75	317173.62	105724.54	15330.06	191.63	2922.29	12405.65
12000	2883.40	961.13	139.36	346007.59	115335.86	16723.70	209.05	3187.96	13533.63
13000	3123.68	1041.23	150.98	374841.56	124947.19	18117.34	226.47	3453.62	14661.61
14000	3363.96	1121.32	162.59	403675.52	134558.51	19510.98	243.89	3719.28	15789.59
15000	3604.25	1201.42	174.21	432509.49	144169.83	20904.63	261.31	3984.94	16917.56
16000	3844.53	1281.51	185.82	461343.45	153781.15	22298.27	278.73	4250.61	18045.54
17000	4084.81	1361.60	197.43	490177.42	163392.47	23691.91	296.15	4516.27	19173.52
18000	4325.09	1441.70	209.05	519011.38	173003.79	25085.55	313.57	4781.93	20301.50
19000	4565.38	1521.79	220.66	547845.35	182615.12	26479.19	330.99	5047.60	21429.48
20000	4805.66	1601.89	232.27	576679.32	192226.44	27872.83	348.41	5313.26	22557.46
21000	5045.94	1681.98	243.89	605513.28	201837.76	29266.48	365.83	5578.92	23685.44
22000	5286.23	1762.08	255.50	634347.25	211449.08	30660.12	383.25	5844.58	24813.42
23000	5526.51	1842.17	267.11	663181.21	221060.40	32053.76	400.67	6110.25	25941.39
24000	5766.79	1922.26	278.73	692015.18	230671.73	33447.40	418.09	6375.91	27069.37
25000	6007.08	2002.36	290.34	720849.15	240283.05	34841.04	435.51	6641.57	28197.35
26000	6247.36	2082.45	301.96	749683.11	249894.37	36234.68	452.93	6907.24	29325.33
27000	6487.64	2162.55	313.57	778517.08	259505.69	37628.33	470.35	7172.90	30453.31
28000	6727.93	2242.64	325.18	807351.04	269117.01	39021.97	487.77	7438.56	31581.29

RING PRODUCTION FEATURE

INPUT VARIABLES			
END BREAKS/Hour/100 Spindle	: 1	WASTE MULTIPLIER	: 1.50
NUMBER OF SPINDLES/MACHINE	: 432	YARN PRICE (TAKA/Lb)	: 130.00
NUMBER OF MACHINES	: 20	WASTE PRICE (TAKA/Lb)	: 15.25
MACHINE EFFICIENCY (%)	: 95	LABOUR PERFORMANCE (pitch up/hour)	: 45
COUNT	: 80	LABOUR COST (TK./ Labour/Shift)	: 70.00
TWIST MULTIPLIER (T.M)	: 3.500	SPINNING POWER (KW/100 SPINDLES)	: 2.00
TWIST PER INCH (TPI)	: 31.305	COST OF POWER (TK./KWH)	: 3.65

OUTPUTS			
NUMBER OF SIDES PER LABOUR	= 20.83	YARN PRODUCTION RATE (Lb/Shift/100 rpm)	= 5.20
TOTAL NUMBERS OF LABOURS	= 3	WASTE RATE (Lb/Shift/100 rpm)	= 0.04
TOTAL LABOUR COST/SHIFT(Tk.)	= 210.00		

SPINDLE SPEED (RPM)	YARN PRODUCTION			PRICE OF YARN PRODUCED			WASTE DUE TO END BREAKAGE		NET LOSS RECOVERED /SHIFT BY PITCH-UP
	NET		RECOVERED BY PITCH- (Lb/Shift)	PER DAY (Taka)	PER SHIFT (Taka)	RECOVERED PER SHIFT (Taka)	WEIGHT (Lb/SHIFT)	PRICE (Taka)	(Taka)
	(Lb/Day)	(Lb/Shift)							
1	2	3	4	5	6	7	8	9	10
4000	624.27	208.09	1.04	81155.58	27051.86	135.26	1.56	23.80	111.39
5000	780.34	260.11	1.30	101444.47	33814.82	169.07	1.95	29.75	139.25
6000	936.41	312.14	1.56	121733.37	40577.79	202.89	2.34	35.70	167.12
7000	1092.48	364.16	1.82	142022.26	47340.75	236.70	2.73	41.65	194.98
8000	1248.55	416.18	2.08	162311.15	54103.72	270.52	3.12	47.60	222.84
9000	1404.62	468.21	2.34	182600.05	60866.68	304.33	3.51	53.55	250.71
10000	1560.68	520.23	2.60	202888.94	67629.65	338.15	3.90	59.50	278.57
11000	1716.75	572.25	2.86	223177.84	74392.61	371.96	4.29	65.45	306.44
12000	1872.82	624.27	3.12	243466.73	81155.58	405.78	4.68	71.40	334.30
13000	2028.89	676.30	3.38	263755.63	87918.54	439.59	5.07	77.35	362.17
14000	2184.96	728.32	3.64	284044.52	94681.51	473.41	5.46	83.30	390.03
15000	2341.03	780.34	3.90	304333.42	101444.47	507.22	5.85	89.25	417.90
16000	2497.09	832.36	4.16	324622.31	108207.44	541.04	6.24	95.20	445.76
17000	2653.16	884.39	4.42	344911.20	114970.40	574.85	6.63	101.15	473.63
18000	2809.23	936.41	4.68	365200.10	121733.37	608.67	7.02	107.10	501.49
19000	2965.30	988.43	4.94	385488.99	128496.33	642.48	7.41	113.05	529.36
20000	3121.37	1040.46	5.20	405777.89	135259.30	676.30	7.80	119.00	557.22
21000	3277.44	1092.48	5.46	426066.78	142022.26	710.11	8.19	124.95	585.09
22000	3433.51	1144.50	5.72	446355.68	148785.23	743.93	8.58	130.90	612.95
23000	3589.57	1196.52	5.98	466644.57	155548.19	777.74	8.97	136.85	640.82
24000	3745.64	1248.55	6.24	486933.46	162311.15	811.56	9.36	142.80	668.68
25000	3901.71	1300.57	6.50	507222.36	169074.12	845.37	9.75	148.75	696.54
26000	4057.78	1352.59	6.76	527511.25	175837.08	879.19	10.14	154.70	724.41
27000	4213.85	1404.62	7.02	547800.15	182600.05	913.00	10.53	160.65	752.27
28000	4369.92	1456.64	7.28	568089.04	189363.01	946.82	10.92	166.60	780.14

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RING PRODUCTION FEATURE

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=================================================================================
                              INPUT VARIABLES
=================================================================================
END BREAKS/Hour/100 Spindle  :    11      | WASTE MULTIPLIER              :   1.50
NUMBER OF SPINDLES/MACHINE    :   432      | YARN PRICE (TAKA/Lb)         : 130.00
NUMBER OF MACHINES            :    20      | WASTE PRICE (TAKA/Lb)        :  15.25
MACHINE EFFICIENCY (%)        :    95      | LABOUR PERFORMANCE (pitch op/hour):  45
COUNT                         :    80      | LABOUR COST (TK./ Labour/Shift): 70.00
TWIST MULTIPLIER (T.M)        : 3.500      | SPINNING POWER (KW/100 SPINDLES): 2.00
TWIST PER INCH (TPI)          : 31.305     | COST OF POWER (TK./KWH)       :   3.65
=================================================================================
                                 OUTPUTS
=================================================================================
NUMBER OF SIDES PER LABOUR   =    1.89     | YARN PRODUCTION RATE (Lb/Shift/100 rpm) =  5.20
TOTAL NUMBERS OF LABOURS     =      22     | WASTE RATE (Lb/Shift/100 rpm)           =  0.43
TOTAL LABOUR COST/SHIFT(Tk.) = 1540.00     |
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SPINDLE SPEED (RPM)	YARN PRODUCTION			PRICE OF YARN PRODUCED			WASTE DUE TO END BREAKAGE		NET LOSS RECOVERED /SHIFT BY PITCH-UP
	NET		RECOVERED BY PITCH-	PER DAY	PER SHIFT	RECOVERED PER SHIFT	WEIGHT	PRICE	
	(Lb/Day)	(Lb/Shift)	(Lb/Shift)	(Taka)	(Taka)	(Taka)	(Lb/SHIFT)	(Taka)	(Taka)
1	2	3	4	5	6	7	8	9	10
4000	624.27	208.09	11.45	81155.58	27051.86	1487.85	17.17	261.80	1225.24
5000	780.34	260.11	14.31	101444.47	33814.82	1859.82	21.46	327.26	1531.76
6000	936.41	312.14	17.17	121733.37	40577.79	2231.78	25.75	392.71	1838.27
7000	1092.48	364.16	20.03	142022.26	47340.75	2603.74	30.04	458.16	2144.78
8000	1248.55	416.18	22.89	162311.15	54103.72	2975.70	34.34	523.61	2451.29
9000	1404.62	468.21	25.75	182600.05	60866.68	3347.67	38.63	589.06	2757.80
10000	1560.68	520.23	28.61	202888.94	67629.65	3719.63	42.92	654.51	3064.32
11000	1716.75	572.25	31.47	223177.84	74392.61	4091.59	47.21	719.96	3370.83
12000	1872.82	624.27	34.34	243466.73	81155.58	4463.56	51.50	785.41	3677.34
13000	2028.89	676.30	37.20	263755.63	87918.54	4835.52	55.79	850.87	3983.85
14000	2184.96	728.32	40.06	284044.52	94681.51	5207.48	60.09	916.32	4290.36
15000	2341.03	780.34	42.92	304333.42	101444.47	5579.45	64.38	981.77	4596.88
16000	2497.09	832.36	45.78	324622.31	108207.44	5951.41	68.67	1047.22	4903.39
17000	2653.16	884.39	48.64	344911.20	114970.40	6323.37	72.96	1112.67	5209.90
18000	2809.23	936.41	51.50	365200.10	121733.37	6695.34	77.25	1178.12	5516.41
19000	2965.30	988.43	54.36	385488.99	128496.33	7067.30	81.55	1243.57	5822.92
20000	3121.37	1040.46	57.23	405777.89	135259.30	7439.26	85.84	1309.02	6129.43
21000	3277.44	1092.48	60.09	426066.78	142022.26	7811.22	90.13	1374.48	6435.95
22000	3433.51	1144.50	62.95	446355.68	148785.23	8183.19	94.42	1439.93	6742.46
23000	3589.57	1196.52	65.81	466644.57	155548.19	8555.15	98.71	1505.38	7048.97
24000	3745.64	1248.55	68.67	486933.46	162311.15	8927.11	103.01	1570.83	7355.48
25000	3901.71	1300.57	71.53	507222.36	169074.12	9299.08	107.30	1636.28	7661.99
26000	4057.78	1352.59	74.39	527511.25	175837.08	9671.04	111.59	1701.73	7968.51
27000	4213.85	1404.62	77.25	547800.15	182600.05	10043.00	115.88	1767.18	8275.02
28000	4369.92	1456.64	80.12	568089.04	189363.01	10414.97	120.17	1832.63	8581.53

RING PRODUCTION FEATURE

INPUT VARIABLES		
END BREAKS/Hour/100 Spindle : 12	WASTE MULTIPLIER	: 1.50
NUMBER OF SPINDLES/MACHINE : 432	YARN PRICE (TAKA/Lb)	: 130.00
NUMBER OF MACHINES : 20	WASTE PRICE (TAKA/Lb)	: 15.25
MACHINE EFFICIENCY (%) : 93	LABOUR PERFORMANCE (pitch up/hour)	: 45
COUNT : 80	LABOUR COST (TK./ Labour/Shift)	: 70.00
TWIST MULTIPLIER (T.M) : 3.500	SPINNING POWER (KW/100 SPINDLES)	: 2.00
TWIST PER INCH (TPI) : 31.305	COST OF POWER (TK./KWH)	: 3.65

OUTPUTS	
NUMBER OF SIDES PER LABOUR = 1.74	YARN PRODUCTION RATE (Lb/Shift/100 rpm) = 5.20
TOTAL NUMBERS OF LABOURS = 24	WASTE RATE (Lb/Shift/100 rpm) = 0.47
TOTAL LABOUR COST/SHIFT(Tk.) = 1680.00	

SPINDLE SPEED (RPM)	YARN PRODUCTION			PRICE OF YARN PRODUCED			WASTE DUE TO END BREAKAGE		NET LOSS RECOVERED /SHIFT BY PITCH-UP (Taka)
	NET		RECOVERED BY PITCH-	PER DAY	PER SHIFT	RECOVERED PER SHIFT	WEIGHT	PRICE	
	(Lb/Day)	(Lb/Shift)	(Lb/Shift)	(Taka)	(Taka)	(Taka)	(Lb/SHIFT)	(Taka)	
1	2	3	4	5	6	7	8	9	10
4000	624.27	208.09	12.49	81155.58	27051.86	1623.11	18.73	285.61	1336.63
5000	780.34	260.11	15.61	101444.47	33814.82	2028.89	23.41	357.01	1671.01
6000	936.41	312.14	18.73	121733.37	40577.79	2434.67	28.09	428.41	2005.38
7000	1092.48	364.16	21.85	142022.26	47340.75	2840.45	32.77	499.81	2339.76
8000	1248.55	416.18	24.97	162311.15	54103.72	3246.22	37.46	571.21	2674.14
9000	1404.62	468.21	28.09	182600.05	60866.68	3652.00	42.14	642.61	3008.51
10000	1560.68	520.23	31.21	202888.94	67629.65	4057.78	46.82	714.01	3342.89
11000	1716.75	572.25	34.34	223177.84	74392.61	4463.56	51.50	785.41	3677.27
12000	1872.82	624.27	37.46	243466.73	81155.58	4869.33	56.18	856.82	4011.64
13000	2028.89	676.30	40.58	263755.63	87918.54	5275.11	60.87	928.22	4346.02
14000	2184.96	728.32	43.70	284044.52	94681.51	5680.89	65.55	999.62	4680.40
15000	2341.03	780.34	46.82	304333.42	101444.47	6086.67	70.23	1071.02	5014.77
16000	2497.09	832.36	49.94	324622.31	108207.44	6492.45	74.91	1142.42	5349.15
17000	2653.16	884.39	53.06	344911.20	114970.40	6898.22	79.59	1213.82	5683.53
18000	2809.23	936.41	56.18	365200.10	121733.37	7304.00	84.28	1285.22	6017.90
19000	2965.30	988.43	59.31	385488.99	128496.33	7709.78	88.96	1356.62	6352.28
20000	3121.37	1040.46	62.43	405777.89	135259.30	8115.56	93.64	1428.03	6686.66
21000	3277.44	1092.48	65.55	426066.78	142022.26	8521.34	98.32	1499.43	7021.03
22000	3433.51	1144.50	68.67	446355.68	148785.23	8927.11	103.01	1570.83	7355.41
23000	3589.57	1196.52	71.79	466644.57	155548.19	9332.89	107.69	1642.23	7689.79
24000	3745.64	1248.55	74.91	486933.46	162311.15	9738.67	112.37	1713.63	8024.16
25000	3901.71	1300.57	78.03	507222.36	169074.12	10144.45	117.05	1785.03	8358.54
26000	4057.78	1352.59	81.16	527511.25	175837.08	10550.23	121.73	1856.43	8692.92
27000	4213.85	1404.62	84.28	547800.15	182600.05	10956.00	126.42	1927.84	9027.29
28000	4369.92	1456.64	87.40	568089.04	189363.01	11361.78	131.10	1999.24	9361.67

RING PRODUCTION FEATURE

INPUT VARIABLES

END BREAKS/Hour/100 Spindle	:	13	WASTE MULTIPLIER	:	1.50
NUMBER OF SPINDLES/MACHINE	:	432	YARN PRICE (TAKA/Lb)	:	130.00
NUMBER OF MACHINES	:	20	WASTE PRICE (TAKA/Lb)	:	15.25
MACHINE EFFICIENCY (%)	:	95	LABOUR PERFORMANCE (pitch up/hour)	:	45
COUNT	:	80	LABOUR COST (TK./ Labour/Shift)	:	70.00
TWIST MULTIPLIER (T.M)	:	3.500	SPINNING POWER (KW/100 SPINDLES)	:	2.00
TWIST PER INCH (TPI)	:	31.305	COST OF POWER (TK./KWH)	:	3.65

OUTPUTS

NUMBER OF SIDES PER LABOUR	=	1.60	YARN PRODUCTION RATE (Lb/Shift/100 rpm)	=	5.20
TOTAL NUMBERS OF LABOURS	=	26	WASTE RATE (Lb/Shift/100 rpm)	=	0.51
TOTAL LABOUR COST/SHIFT(TK.)	=	1820.00			

SPINDLE SPEED (RPM)	YARN PRODUCTION			PRICE OF YARN PRODUCED			WASTE DUE TO END BREAKAGE		NET LOSS RECOVERED /SHIFT BY PITCH-UP (Taka)
	NET		RECOVERED BY PITCH-	PER DAY	PER SHIFT	RECOVERED PER SHIFT	WEIGHT	PRICE	
	(Lb/Day)	(Lb/Shift)	(Lb/Shift)	(Taka)	(Taka)	(Taka)	(Lb/Shift)	(Taka)	
1	2	3	4	5	6	7	8	9	10
4000	624.27	208.09	13.53	81155.58	27051.86	1758.37	20.29	309.41	1448.02
5000	780.34	260.11	16.91	101444.47	33814.82	2197.96	25.36	386.76	1810.26
6000	936.41	312.14	20.29	121733.37	40577.79	2637.56	30.43	464.11	2172.50
7000	1092.48	364.16	23.67	142022.26	47340.75	3077.15	35.51	541.46	2534.74
8000	1248.55	416.18	27.05	162311.15	54103.72	3516.74	40.58	618.81	2896.98
9000	1404.62	468.21	30.43	182600.05	60866.68	3956.33	45.65	696.16	3259.22
10000	1560.68	520.23	33.81	202888.94	67629.65	4395.93	50.72	773.51	3621.46
11000	1716.75	572.25	37.20	223177.84	74392.61	4835.52	55.79	850.87	3983.71
12000	1872.82	624.27	40.58	243466.73	81155.58	5275.11	60.87	928.22	4345.95
13000	2028.89	676.30	43.96	263755.63	87918.54	5714.71	65.94	1005.57	4708.19
14000	2184.96	728.32	47.34	284044.52	94681.51	6154.30	71.01	1082.92	5070.43
15000	2341.03	780.34	50.72	304333.42	101444.47	6593.89	76.08	1160.27	5432.67
16000	2497.09	832.36	54.10	324622.31	108207.44	7033.48	81.16	1237.62	5794.91
17000	2653.16	884.39	57.49	344911.20	114970.40	7473.08	86.23	1314.97	6157.15
18000	2809.23	936.41	60.87	365200.10	121733.37	7912.67	91.30	1392.33	6519.39
19000	2965.30	988.43	64.25	385488.99	128496.33	8352.26	96.37	1469.68	6881.64
20000	3121.37	1040.46	67.63	405777.89	135259.30	8791.85	101.44	1547.03	7243.88
21000	3277.44	1092.48	71.01	426066.78	142022.26	9231.45	106.52	1624.38	7606.12
22000	3433.51	1144.50	74.39	446355.68	148785.23	9671.04	111.59	1701.73	7968.36
23000	3589.57	1196.52	77.77	466644.57	155548.19	10110.63	116.66	1779.08	8330.60
24000	3745.64	1248.55	81.16	486933.46	162311.15	10550.23	121.73	1856.43	8692.84
25000	3901.71	1300.57	84.54	507222.36	169074.12	10989.82	126.81	1933.79	9055.08
26000	4057.78	1352.59	87.92	527511.25	175837.08	11429.41	131.88	2011.14	9417.32
27000	4213.85	1404.62	91.30	547800.15	182600.05	11869.00	136.95	2088.49	9779.57
28000	4369.92	1456.64	94.68	568089.04	189363.01	12308.60	142.02	2165.84	10141.81

RING PRODUCTION FEATURE

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==================================================================================
                              INPUT VARIABLES
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END BREAKS/Hour/100 Spindle  :    14    |  WASTE MULTIPLIER                    :    1.50
NUMBER OF SPINDLES/MACHINE    :   432    |  YARN PRICE (TAKA/Lb)               :  130.00
NUMBER OF MACHINES            :    20    |  WASTE PRICE (TAKA/Lb)              :   15.25
MACHINE EFFICIENCY (%)        :    95    |  LABOUR PERFORMANCE (pitch up/hour) :     45
COUNT                         :    80    |  LABOUR COST (TK./ Labour/Shift)    :   70.00
TWIST MULTIPLIER (T.M)        : 3.500    |  SPINNING POWER (KW/100 SPINDLES)   :    2.00
TWIST PER INCH (TPI)          : 31.305   |  COST OF POWER (TK./KWH)            :    3.65
==================================================================================
                                  OUTPUTS
==================================================================================
NUMBER OF SIDES PER LABOUR  =    1.49    |  YARN PRODUCTION RATE (Lb/Shift/100 rpm) =   5.20
TOTAL NUMBERS OF LABOURS    =      28    |  WASTE RATE (Lb/Shift/100 rpm)          =   0.35
TOTAL LABOUR COST/SHIFT(TK.) = 1960.00   |
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SPINDLE SPEED (RPM)	YARN PRODUCTION			PRICE OF YARN PRODUCED			WASTE DUE TO END BREAKAGE		NET LOSS RECOVERED /SHIFT BY PITCH-UP (Taka)
	NET		RECOVERED BY PITCH-UP (Lb/Shift)	PER DAY (Taka)	PER SHIFT (Taka)	RECOVERED PER SHIFT [Taka]	WEIGHT (Lb/SHIFT)	PRICE [Taka]	
	(Lb/Day)	(Lb/Shift)							
1	2	3	4	5	6	7	8	9	10
4000	624.27	208.09	14.57	81155.58	27051.86	1893.63	21.85	333.21	1559.40
5000	780.34	260.11	18.21	101444.47	33814.82	2367.04	27.31	416.51	1949.51
6000	936.41	312.14	21.85	121733.37	40577.79	2840.45	32.77	499.81	2339.61
7000	1092.48	364.16	25.49	142022.26	47340.75	3313.85	38.24	583.11	2729.72
8000	1248.55	416.18	29.13	162311.15	54103.72	3787.26	43.70	666.41	3119.83
9000	1404.62	468.21	32.77	182600.05	60866.68	4260.67	49.16	749.71	3509.93
10000	1560.68	520.23	36.42	202888.94	67629.65	4734.08	54.62	833.02	3900.04
11000	1716.75	572.25	40.06	223177.84	74392.61	5207.48	60.09	916.32	4290.14
12000	1872.82	624.27	43.70	243466.73	81155.58	5680.89	65.55	999.62	4680.25
13000	2028.89	676.30	47.34	263755.63	87918.54	6154.30	71.01	1082.92	5070.36
14000	2184.96	728.32	50.98	284044.52	94681.51	6627.71	76.47	1166.22	5460.46
15000	2341.03	780.34	54.62	304333.42	101444.47	7101.11	81.94	1249.52	5850.57
16000	2497.09	832.36	58.27	324622.31	108207.44	7574.52	87.40	1332.82	6240.67
17000	2653.16	884.39	61.91	344911.20	114970.40	8047.93	92.86	1416.13	6630.78
18000	2809.23	936.41	65.55	365200.10	121733.37	8521.34	98.32	1499.43	7020.89
19000	2965.30	988.43	69.19	385488.99	128496.33	8994.74	103.79	1582.73	7410.99
20000	3121.37	1040.46	72.83	405777.89	135259.30	9468.15	109.25	1666.03	7801.10
21000	3277.44	1092.48	76.47	426066.78	142022.26	9941.56	114.71	1749.33	8191.20
22000	3433.51	1144.50	80.12	446355.68	148785.23	10414.97	120.17	1832.63	8581.31
23000	3589.57	1196.52	83.76	466644.57	155548.19	10888.37	125.64	1915.93	8971.42
24000	3745.64	1248.55	87.40	486933.46	162311.15	11361.78	131.10	1999.24	9361.52
25000	3901.71	1300.57	91.04	507222.36	169074.12	11835.19	136.56	2082.54	9751.63
26000	4057.78	1352.59	94.68	527511.25	175837.08	12308.60	142.02	2165.84	10141.73
27000	4213.85	1404.62	98.32	547800.15	182600.05	12782.00	147.48	2249.14	10531.84
28000	4369.92	1456.64	101.96	568089.04	189363.01	13255.41	152.95	2332.44	10921.95

RING PRODUCTION FEATURE

INPUT VARIABLES				
END BREAKS/Hour/100 Spindle	:	15	WASTE MULTIPLIER	: 1.50
NUMBER OF SPINDLES/MACHINE	:	432	YARN PRICE (TAKA/Lb)	: 130.00
NUMBER OF MACHINES	:	20	WASTE PRICE (TAKA/Lb)	: 15.25
MACHINE EFFICIENCY (%)	:	95	LABOUR PERFORMANCE (pitch up/hour)	: 45
COUNT	:	80	LABOUR COST (TK./ Labour/Shift)	: 70.00
TWIST MULTIPLIER (T.M)	:	3.500	SPINNING POWER (KW/100 SPINDLES)	: 2.00
TWIST PER INCH (TPI)	:	31.305	COST OF POWER (TK./KWH)	: 3.65

OUTPUTS

NUMBER OF SIDES PER LABOUR	= 1.39	YARN PRODUCTION RATE (Lb/Shift/100 rpm)	= 5.20
TOTAL NUMBERS OF LABOURS	= 30	WASTE RATE (Lb/Shift/100 rpm)	= 0.59
TOTAL LABOUR COST/SHIFT(Tk.)	= 2100.00		

SPINDLE SPEED	YARN PRODUCTION			PRICE OF YARN PRODUCED			WASTE DUE TO END BREAKAGE		NET LOSS RECOVERED /SHIFT BY PITCH-UP
	NET		RECOVERED BY PITCH-	PER DAY	PER SHIFT	RECOVERED PER SHIFT	WEIGHT	PRICE	
(RPM)	(Lb/Day)	(Lb/Shift)	(Lb/Shift)	(Taka)	(Taka)	[Taka]	(Lb/SHIFT)	[Taka]	[Taka]
1	2	3	4	5	6	7	8	9	10
4000	624.27	208.09	15.61	81155.58	27051.86	2028.89	23.41	357.01	1670.79
5000	780.34	260.11	19.51	101444.47	33814.82	2536.11	29.26	446.26	2088.76
6000	936.41	312.14	23.41	121733.37	40577.79	3043.33	35.12	535.51	2506.73
7000	1092.48	364.16	27.31	142022.26	47340.75	3550.56	40.97	624.76	2924.70
8000	1248.55	416.18	31.21	162311.15	54103.72	4057.78	46.82	714.01	3342.67
9000	1404.62	468.21	35.12	182600.05	60866.68	4565.00	52.67	803.26	3760.64
10000	1560.68	520.23	39.02	202888.94	67629.65	5072.22	58.53	892.52	4178.61
11000	1716.75	572.25	42.92	223177.84	74392.61	5579.45	64.38	981.77	4596.58
12000	1872.82	624.27	46.82	243466.73	81155.58	6086.67	70.23	1071.02	5014.55
13000	2028.89	676.30	50.72	263755.63	87918.54	6593.89	76.08	1160.27	5432.52
14000	2184.96	728.32	54.62	284044.52	94681.51	7101.11	81.94	1249.52	5850.50
15000	2341.03	780.34	58.53	304333.42	101444.47	7608.34	87.79	1338.77	6268.47
16000	2497.09	832.36	62.43	324622.31	108207.44	8115.56	93.64	1428.03	6686.44
17000	2653.16	884.39	66.33	344911.20	114970.40	8622.78	99.49	1517.28	7104.41
18000	2809.23	936.41	70.23	365200.10	121733.37	9130.00	105.35	1606.53	7522.38
19000	2965.30	988.43	74.13	385488.99	128496.33	9637.22	111.20	1695.78	7940.35
20000	3121.37	1040.46	78.03	405777.89	135259.30	10144.45	117.05	1785.03	8358.32
21000	3277.44	1092.48	81.94	426066.78	142022.26	10651.67	122.90	1874.28	8776.29
22000	3433.51	1144.50	85.84	446355.68	148785.23	11158.89	128.76	1963.54	9194.26
23000	3589.57	1196.52	89.74	466644.57	155548.19	11666.11	134.61	2052.79	9612.23
24000	3745.64	1248.55	93.64	486933.46	162311.15	12173.34	140.46	2142.04	10030.20
25000	3901.71	1300.57	97.54	507222.36	169074.12	12680.56	146.31	2231.29	10448.17
26000	4057.78	1352.59	101.44	527511.25	175837.08	13187.78	152.17	2320.54	10866.14
27000	4213.85	1404.62	105.35	547800.15	182600.05	13695.00	158.02	2409.79	11284.11
28000	4369.92	1456.64	109.25	568089.04	189363.01	14202.23	163.87	2499.05	11702.09

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RING PRODUCTION FEATURE

INPUT VARIABLES

END BREAKS/Hour/100 Spindle	:	16	WASTE MULTIPLIER	: 1.50
NUMBER OF SPINDLES/MACHINE	:	432	YARN PRICE (TAKA/Lb)	: 130.00
NUMBER OF MACHINES	:	20	WASTE PRICE (TAKA/Lb)	: 15.25
MACHINE EFFICIENCY (%)	:	95	LABOUR PERFORMANCE (pitch up/hour)	: 45
COUNT	:	80	LABOUR COST (TK./ Labour/shift)	: 70.00
TWIST MULTIPLIER (T.M)	:	3.500	SPINNING POWER (KW/100 SPINDLES)	: 2.00
TWIST PER INCH (TPI)	:	31.305	COST OF POWER (TK./KWH]	: 3.65

OUTPUTS

NUMBER OF SIDES PER LABOUR	=	1.30	YARN PRODUCTION RATE (Lb/Shift/100 rpm)	= 5.20
TOTAL NUMBERS OF LABOURS	=	32	WASTE RATE (Lb/Shift/100 rpm)	= 0.62
TOTAL LABOUR COST/SHIFT(Tk.)	=	2240.00		

SPINDLE SPEED (RPM)	YARN PRODUCTION NET (Lb/Day)	YARN PRODUCTION NET (Lb/Shift)	RECOVERED BY PITCH-UP (Lb/Shift)	PRICE OF YARN PRODUCED PER DAY [Taka]	PRICE OF YARN PRODUCED PER SHIFT [Taka]	RECOVERED PER SHIFT [Taka]	WASTE DUE TO END BREAKAGE WEIGHT [Lb/Shift]	WASTE DUE TO END BREAKAGE PRICE [Taka]	NET LOSS RECOVERED /SHIFT BY PITCH-UP [Taka]
1	2	3	4	5	6	7	8	9	10
4000	624.27	208.09	16.65	81155.58	27051.86	2164.15	24.97	380.81	1782.17
5000	780.34	260.11	20.81	101444.47	33814.82	2705.19	31.21	476.01	2228.01
6000	936.41	312.14	24.97	121733.37	40577.79	3246.22	37.46	571.21	2673.84
7000	1092.48	364.16	29.13	142022.26	47340.75	3787.26	43.70	666.41	3119.68
8000	1248.55	416.18	33.29	162311.15	54103.72	4328.30	49.94	761.61	3565.52
9000	1404.62	468.21	37.46	182600.05	60866.68	4869.33	56.18	856.82	4011.35
10000	1560.68	520.23	41.62	202888.94	67629.65	5410.37	62.43	952.02	4457.19
11000	1716.75	572.25	45.78	223177.84	74392.61	5951.41	68.67	1047.22	4903.02
12000	1872.82	624.27	49.94	243466.73	81155.58	6492.45	74.91	1142.42	5348.86
13000	2028.89	676.30	54.10	263755.63	87918.54	7033.48	81.16	1237.62	5794.69
14000	2184.96	728.32	58.27	284044.52	94681.51	7574.52	87.40	1332.82	6240.53
15000	2341.03	780.34	62.43	304333.42	101444.47	8115.56	93.64	1428.03	6686.36
16000	2497.09	832.36	66.59	324622.31	108207.44	8656.59	99.88	1523.23	7132.20
17000	2653.16	884.39	70.75	344911.20	114970.40	9197.63	106.13	1618.43	7578.03
18000	2809.23	936.41	74.91	365200.10	121733.37	9738.67	112.37	1713.63	8023.87
19000	2965.30	988.43	79.07	385488.99	128496.33	10279.71	118.61	1808.83	8469.71
20000	3121.37	1040.46	83.24	405777.89	135259.30	10820.74	124.85	1904.03	8915.54
21000	3277.44	1092.48	87.40	426066.78	142022.26	11361.78	131.10	1999.24	9361.38
22000	3433.51	1144.50	91.56	446355.68	148785.23	11902.82	137.34	2094.44	9807.21
23000	3589.57	1196.52	95.72	466644.57	155548.19	12443.86	143.58	2189.64	10253.05
24000	3745.64	1248.55	99.88	486933.46	162311.15	12984.89	149.83	2284.84	10698.88
25000	3901.71	1300.57	104.05	507222.36	169074.12	13525.93	156.07	2380.04	11144.72
26000	4057.78	1352.59	108.21	527511.25	175837.08	14066.97	162.31	2475.25	11590.55
27000	4213.85	1404.62	112.37	547800.15	182600.05	14608.00	168.55	2570.45	12036.39
28000	4369.92	1456.64	116.53	568089.04	189363.01	15149.04	174.80	2665.65	12482.22

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RING PRODUCTION FEATURE

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===============================================================================
                              INPUT VARIABLES
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END BREAKS/Hour/100 Spindle   :     17    | WASTE MULTIPLIER               :    1.50
NUMBER OF SPINDLES/MACHINE     :    432    | YARN PRICE (TAKA/Lb)           :  130.00
NUMBER OF MACHINES             :     20    | WASTE PRICE (TAKA/Lb)          :   15.25
MACHINE EFFICIENCY (%)         :     95    | LABOUR PERFORMANCE [pitch up/hour] : 45
COUNT                          :     80    | LABOUR COST (TK./ Labour/Shift) :  70.00
TWIST MULTIPLIER (T.M)         :  3.500    | SPINNING POWER [KW/100 SPINDLES] :  2.00
TWIST PER INCH (TPI)           : 31.305    | COST OF POWER (TK./KWH)         :   3.65
===============================================================================
                                 OUTPUTS
===============================================================================
NUMBER OF SIDES PER LABOUR   =   1.23   | YARN PRODUCTION RATE (Lb/Shift/100 rpm) =  5.20
TOTAL NUMBERS OF LABOURS     =    34    | WASTE RATE (Lb/Shift/100 rpm)           =  0.66
TOTAL LABOUR COST/SHIFT(Tk.) = 2380.00  |
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SPINDLE SPEED (RPM)	YARN PRODUCTION			PRICE OF YARN PRODUCED			WASTE DUE TO END BREAKAGE		NET LOSS RECOVERED /SHIFT BY PITCH-UP
	NET		RECOVERED BY PITCH-	PER DAY	PER SHIFT	RECOVERED PER SHIFT	WEIGHT	PRICE	
	(Lb/Day)	(Lb/Shift)	(Lb/Shift)	(Taka)	(Taka)	(Taka)	(Lb/SHIFT)	(Taka)	(Taka)
1	2	3	4	5	6	7	8	9	10
4000	624.27	208.09	17.69	81155.58	27051.86	2299.41	26.53	404.61	1893.56
5000	780.34	260.11	22.11	101444.47	33814.82	2874.26	33.16	505.76	2367.26
6000	936.41	312.14	26.53	121733.37	40577.79	3449.11	39.80	606.91	2840.96
7000	1092.48	364.16	30.95	142022.26	47340.75	4023.96	46.43	708.06	3314.66
8000	1248.55	416.18	35.38	162311.15	54103.72	4598.82	53.06	809.21	3788.36
9000	1404.62	468.21	39.80	182600.05	60866.68	5173.67	59.70	910.37	4262.06
10000	1560.68	520.23	44.22	202888.94	67629.65	5748.52	66.33	1011.52	4735.76
11000	1716.75	572.25	48.64	223177.84	74392.61	6323.37	72.96	1112.67	5209.46
12000	1872.82	624.27	53.06	243466.73	81155.58	6898.22	79.59	1213.82	5683.16
13000	2028.89	676.30	57.49	263755.63	87918.54	7473.08	86.23	1314.97	6156.86
14000	2184.96	728.32	61.91	284044.52	94681.51	8047.93	92.86	1416.13	6630.56
15000	2341.03	780.34	66.33	304333.42	101444.47	8622.78	99.49	1517.28	7104.26
16000	2497.09	832.36	70.75	324622.31	108207.44	9197.63	106.13	1618.43	7577.96
17000	2653.16	884.39	75.17	344911.20	114970.40	9772.48	112.76	1719.58	8051.66
18000	2809.23	936.41	79.59	365200.10	121733.37	10347.34	119.39	1820.73	8525.36
19000	2965.30	988.43	84.02	385488.99	128496.33	10922.19	126.03	1921.89	8999.06
20000	3121.37	1040.46	88.44	405777.89	135259.30	11497.04	132.66	2023.04	9472.76
21000	3277.44	1092.48	92.86	426066.78	142022.26	12071.89	139.29	2124.19	9946.46
22000	3433.51	1144.50	97.28	446355.68	148785.23	12646.74	145.92	2225.34	10420.16
23000	3589.57	1196.52	101.70	466644.57	155548.19	13221.60	152.56	2326.49	10893.86
24000	3745.64	1248.55	106.13	486933.46	162311.15	13796.45	159.19	2427.64	11367.56
25000	3901.71	1300.57	110.55	507222.36	169074.12	14371.30	165.82	2528.80	11841.26
26000	4057.78	1352.59	114.97	527511.25	175837.08	14946.15	172.46	2629.95	12314.96
27000	4213.85	1404.62	119.39	547800.15	182600.05	15521.00	179.09	2731.10	12788.66
28000	4369.92	1456.64	123.81	568089.04	189363.01	16095.86	185.72	2832.25	13262.36

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RING PRODUCTION FEATURE

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:=========================================================================
                              INPUT VARIABLES
:=========================================================================
|END BREAKS/Hour/100 Spindle :     18    | WASTE MULTIPLIER                    :     1.50 |
|NUMBER OF SPINDLES/MACHINE   :    432    | YARN PRICE (TAKA/Lb)               :   130.00 |
|NUMBER OF MACHINES           :     20    | WASTE PRICE (TAKA/Lb)              :    15.25 |
|MACHINE EFFICIENCY (%)       :     95    | LABOUR PERFORMANCE (pitch up/hour) :     45 |
|COUNT                        :     80    | LABOUR COST (TK./ Labour/Shift)    :    70.00 |
|TWIST MULTIPLIER (T.M)       :  3.500    | SPINNING POWER (KW/100 SPINDLES)   :     2.00 |
|TWIST PER INCH (TPI)         : 31.305    | COST OF POWER (TK./KWH)            :     3.65 |
:=========================================================================
                                 OUTPUTS
:=========================================================================
|NUMBER OF SIDES PER LABOUR  =    1.16    | YARN PRODUCTION RATE (Lb/Shift/100 rpm) =   5.20 |
|TOTAL NUMBERS OF LABOURS    =     36     | WASTE RATE (Lb/Shift/100 rpm)           =   0.70 |
|TOTAL LABOUR COST/SHIFT(TK.) = 2520.00   |
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SPINDLE SPEED (RPM)	YARN PRODUCTION			PRICE OF YARN PRODUCED			WASTE DUE TO END BREAKAGE		NET LOSS RECOVERED /SHIFT BY PITCH-UP (Taka)
	NET		RECOVERED BY PITCH-UP (Lb/Shift)	PER DAY (Taka)	PER SHIFT (Taka)	RECOVERED PER SHIFT (Taka)	WEIGHT (Lb/SHIFT)	PRICE (Taka)	
	(Lb/Day)	(Lb/Shift)							
1	2	3	4	5	6	7	8	9	10
4000	624.27	208.09	18.73	81155.58	27051.86	2434.67	28.09	428.41	2004.95
5000	780.34	260.11	23.41	101444.47	33814.82	3043.33	35.12	535.51	2506.51
6000	936.41	312.14	28.09	121733.37	40577.79	3652.00	42.14	642.61	3008.08
7000	1092.48	364.16	32.77	142022.26	47340.75	4260.67	49.16	749.71	3509.64
8000	1248.55	416.18	37.46	162311.15	54103.72	4869.33	56.18	856.82	4011.21
9000	1404.62	468.21	42.14	182600.05	60866.68	5478.00	63.21	963.92	4512.77
10000	1560.68	520.23	46.82	202888.94	67629.65	6086.67	70.23	1071.02	5014.33
11000	1716.75	572.25	51.50	223177.84	74392.61	6695.34	77.25	1178.12	5515.90
12000	1872.82	624.27	56.18	243466.73	81155.58	7304.00	84.28	1285.23	6017.46
13000	2028.89	676.30	60.87	263755.63	87918.54	7912.67	91.30	1392.33	6519.03
14000	2184.96	728.32	65.55	284044.52	94681.51	8521.34	98.32	1499.43	7020.59
15000	2341.03	780.34	70.23	304333.42	101444.47	9130.00	105.35	1606.53	7522.16
16000	2497.09	832.36	74.91	324622.31	108207.44	9738.67	112.37	1713.63	8023.72
17000	2653.16	884.39	79.59	344911.20	114970.40	10347.34	119.39	1820.73	8525.29
18000	2809.23	936.41	84.28	365200.10	121733.37	10956.00	126.42	1927.84	9026.85
19000	2965.30	988.43	88.96	385488.99	128496.33	11564.67	133.44	2034.94	9528.42
20000	3121.37	1040.46	93.64	405777.89	135259.30	12173.34	140.46	2142.04	10029.98
21000	3277.44	1092.48	98.32	426066.78	142022.26	12782.00	147.48	2249.14	10531.55
22000	3433.51	1144.50	103.01	446355.68	148785.23	13390.67	154.51	2356.24	11033.11
23000	3589.57	1196.52	107.69	466644.57	155548.19	13999.34	161.53	2463.34	11534.68
24000	3745.64	1248.55	112.37	486933.46	162311.15	14608.00	168.55	2570.45	12036.24
25000	3901.71	1300.57	117.05	507222.36	169074.12	15216.67	175.58	2677.55	12537.81
26000	4057.78	1352.59	121.73	527511.25	175837.08	15825.34	182.60	2784.65	13039.37
27000	4213.85	1404.62	126.42	547800.15	182600.05	16434.00	189.62	2891.75	13540.94
28000	4369.92	1456.64	131.10	568089.04	189363.01	17042.67	196.65	2998.85	14042.50

RING PRODUCTION FEATURE

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==================================================================================
                              INPUT VARIABLES
==================================================================================
END BREAKS/Hour/100 Spindle :      19    | WASTE MULTIPLIER                :    1.50
NUMBER OF SPINDLES/MACHINE  :     432    | YARN PRICE (TAKA/Lb)            :  130.00
NUMBER OF MACHINES          :      20    | WASTE PRICE (TAKA/Lb)           :   15.25
MACHINE EFFICIENCY (%)      :      95    | LABOUR PERFORMANCE (pitch up/hour) :   45
COUNT                       :      80    | LABOUR COST (TK./ Labour/shift) :   70.00
TWIST MULTIPLIER (T.M)      :   3.500    | SPINNING POWER (KW/100 SPINDLES) :   2.00
TWIST PER INCH (TPI)        :  31.305    | COST OF POWER (TK./KWH)          :    3.65
==================================================================================
                                 OUTPUTS
==================================================================================
NUMBER OF SIDES PER LABOUR  =    1.10    | YARN PRODUCTION RATE (Lb/Shift/100 rpm) =  5.20
TOTAL NUMBERS OF LABOURS    =      37    | WASTE RATE (Lb/Shift/100 rpm)           =  0.74
TOTAL LABOUR COST/SHIFT(TK.) = 2590.00  |
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SPINDLE SPEED (RPM)	YARN PRODUCTION			PRICE OF YARN PRODUCED			WASTE DUE TO END BREAKAGE		NET LOSS RECOVERED /SHIFT BY PITCH-UP (Taka)
	NET		RECOVERED BY PITCH-	PER DAY	PER SHIFT	RECOVERED PER SHIFT	WEIGHT	PRICE	
	(Lb/Day)	(Lb/Shift)	(Lb/Shift)	(Taka)	(Taka)	(Taka)	(Lb/SHIFT)	(Taka)	(Taka)
1	2	3	4	5	6	7	8	9	10
4000	624.27	208.09	19.77	81155.58	27051.86	2569.93	29.65	452.21	2116.33
5000	780.34	260.11	24.71	101444.47	33814.82	3212.41	37.07	565.26	2645.76
6000	936.41	312.14	29.65	121733.37	40577.79	3854.89	44.48	678.31	3175.19
7000	1092.48	364.16	34.60	142022.26	47340.75	4497.37	51.89	791.36	3704.62
8000	1248.55	416.18	39.54	162311.15	54103.72	5139.85	59.31	904.42	4234.05
9000	1404.62	468.21	44.48	182600.05	60866.68	5782.33	66.72	1017.47	4763.48
10000	1560.68	520.23	49.42	202888.94	67629.65	6424.82	74.13	1130.52	5292.91
11000	1716.75	572.25	54.36	223177.84	74392.61	7067.30	81.55	1243.57	5822.34
12000	1872.82	624.27	59.31	243466.73	81155.58	7709.78	88.96	1356.62	6351.77
13000	2028.89	676.30	64.25	263755.63	87918.54	8352.26	96.37	1469.68	6881.20
14000	2184.96	728.32	69.19	284044.52	94681.51	8994.74	103.79	1582.73	7410.63
15000	2341.03	780.34	74.13	304333.42	101444.47	9637.22	111.20	1695.78	7940.06
16000	2497.09	832.36	79.07	324622.31	108207.44	10279.71	118.61	1808.83	8469.49
17000	2653.16	884.39	84.02	344911.20	114970.40	10922.19	126.03	1921.89	8998.92
18000	2809.23	936.41	88.96	365200.10	121733.37	11564.67	133.44	2034.94	9528.35
19000	2965.30	988.43	93.90	385488.99	128496.33	12207.15	140.85	2147.99	10057.78
20000	3121.37	1040.46	98.84	405777.89	135259.30	12849.63	148.26	2261.04	10587.20
21000	3277.44	1092.48	103.79	426066.78	142022.26	13492.11	155.68	2374.09	11116.63
22000	3433.51	1144.50	108.73	446355.68	148785.23	14134.60	163.09	2487.15	11646.06
23000	3589.57	1196.52	113.67	466644.57	155548.19	14777.08	170.50	2600.20	12175.49
24000	3745.64	1248.55	118.61	486933.46	162311.15	15419.56	177.92	2713.25	12704.92
25000	3901.71	1300.57	123.55	507222.36	169074.12	16062.04	185.33	2826.30	13234.35
26000	4057.78	1352.59	128.50	527511.25	175837.08	16704.52	192.74	2939.35	13763.78
27000	4213.85	1404.62	133.44	547800.15	182600.05	17347.00	200.16	3052.41	14293.21
28000	4369.92	1456.64	138.38	568089.04	189363.01	17989.49	207.57	3165.46	14822.64

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RING PRODUCTION FEATURE

INPUT VARIABLES			
END BREAKS/Hour/100 Spindle :	20	WASTE MULTIPLIER :	1.50
NUMBER OF SPINDLES/MACHINE :	432	YARN PRICE (TAKA/Lb) :	130.00
NUMBER OF MACHINES :	20	WASTE PRICE (TAKA/Lb) :	15.25
MACHINE EFFICIENCY (%) :	95	LABOUR PERFORMANCE (pitch up/hour) :	45
COUNT :	80	LABOUR COST (TK./ Labour/Shift) :	70.00
TWIST MULTIPLIER (T.M) :	3.500	SPINNING POWER (KW/100 SPINDLES) :	2.00
TWIST PER INCH (TPI) :	31.305	COST OF POWER (TK./KWH) :	3.65

OUTPUTS			
NUMBER OF SIDES PER LABOUR =	1.04	YARN PRODUCTION RATE (Lb/Shift/100 rpm) =	5.20
TOTAL NUMBERS OF LABOURS =	39	WASTE RATE (Lb/Shift/100 rpm) =	0.78
TOTAL LABOUR COST/SHIFT(TK.) =	2730.00		

SPINDLE SPEED (RPM)	YARN PRODUCTION			PRICE OF YARN PRODUCED			WASTE DUE TO END BREAKAGE		NET LOSS RECOVERED /SHIFT BY PITCH-UP
	NET		RECOVERED BY PITCH-	PER DAY	PER SHIFT	RECOVERED PER SHIFT	WEIGHT	PRICE	
	(Lb/Day)	(Lb/Shift)	(Lb/Shift)	(Taka)	(Taka)	(Taka)	(Lb/Shift)	(Taka)	(Taka)
1	2	3	4	5	6	7	8	9	10
4000	624.27	208.09	20.81	81155.58	27051.86	2705.19	31.21	476.01	2227.72
5000	780.34	260.11	26.01	101444.47	33814.82	3381.48	39.02	595.01	2785.01
6000	936.41	312.14	31.21	121733.37	40577.79	4057.78	46.82	714.01	3342.31
7000	1092.48	364.16	36.42	142022.26	47340.75	4734.08	54.62	833.02	3899.60
8000	1248.55	416.18	41.62	162311.15	54103.72	5410.37	62.43	952.02	4456.89
9000	1404.62	468.21	46.82	182600.05	60866.68	6086.67	70.23	1071.02	5014.19
10000	1560.68	520.23	52.02	202888.94	67629.65	6762.96	78.03	1190.02	5571.48
11000	1716.75	572.25	57.23	223177.84	74392.61	7439.26	85.84	1309.02	6128.78
12000	1872.82	624.27	62.43	243466.73	81155.58	8115.56	93.64	1428.03	6686.07
13000	2028.89	676.30	67.63	263755.63	87918.54	8791.85	101.44	1547.03	7243.37
14000	2184.96	728.32	72.83	284044.52	94681.51	9468.15	109.25	1666.03	7800.66
15000	2341.03	780.34	78.03	304333.42	101444.47	10144.45	117.05	1785.03	8357.95
16000	2497.09	832.36	83.24	324622.31	108207.44	10820.74	124.85	1904.03	8915.25
17000	2653.16	884.39	88.44	344911.20	114970.40	11497.04	132.66	2023.04	9472.54
18000	2809.23	936.41	93.64	365200.10	121733.37	12173.34	140.46	2142.04	10029.84
19000	2965.30	988.43	98.84	385488.99	128496.33	12849.63	148.26	2261.04	10587.13
20000	3121.37	1040.46	104.05	405777.89	135259.30	13525.93	156.07	2380.04	11144.43
21000	3277.44	1092.48	109.25	426066.78	142022.26	14202.23	163.87	2499.05	11701.72
22000	3433.51	1144.50	114.45	446355.68	148785.23	14878.52	171.68	2618.05	12259.01
23000	3589.57	1196.52	119.65	466644.57	155548.19	15554.82	179.48	2737.05	12816.31
24000	3745.64	1248.55	124.85	486933.46	162311.15	16231.12	187.28	2856.05	13373.60
25000	3901.71	1300.57	130.06	507222.36	169074.12	16907.41	195.09	2975.05	13930.90
26000	4057.78	1352.59	135.26	527511.25	175837.08	17583.71	202.89	3094.06	14488.19
27000	4213.85	1404.62	140.46	547800.15	182600.05	18260.00	210.69	3211.06	15045.49
28000	4369.92	1456.64	145.66	568089.04	189363.01	18936.30	218.50	3332.06	15602.78

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RING PRODUCTION FEATURE

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==================================================================================
|                              INPUT VARIABLES                                   |
==================================================================================
| END BREAKS/Hour/100 Spindle  :     21  | WASTE MULTIPLIER                :   1.50 |
| NUMBER OF SPINDLES/MACHINE    :    432  | YARN PRICE (TAKA/Lb)            : 130.00 |
| NUMBER OF MACHINES            :     20  | WASTE PRICE (TAKA/Lb)           :  15.25 |
| MACHINE EFFICIENCY (%)        :     95  | LABOUR PERFORMANCE (pitch up/hour) :  45 |
| COUNT                         :     80  | LABOUR COST (TK./ Labour/Shift)  :  70.00 |
| TWIST MULTIPLIER (T.M)        :  3.500  | SPINNING POWER (KW/100 SPINDLES) :   2.00 |
| TWIST PER INCH (TPI)          : 31.305  | COST OF POWER (TK./KWH)          :   3.65 |
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==================================================================================
|                                  OUTPUTS                                       |
==================================================================================
| NUMBER OF SIDES PER LABOUR    =    0.99  | YARN PRODUCTION RATE [Lb/Shift/100 rpm] =  5.20 |
| TOTAL NUMBERS OF LABOURS      =      41  | WASTE RATE [Lb/Shift/100 rpm]           =  0.82 |
| TOTAL LABOUR COST/SHIFT(Tk.)  = 2870.00  |                                                  |
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SPINDLE SPEED	YARN PRODUCTION			PRICE OF YARN PRODUCED			WASTE DUE TO END BREAKAGE		NET LOSS RECOVERED
	NET		RECOVERED BY PITCH-	PER DAY	PER SHIFT	RECOVERED PER SHIFT	WEIGHT	PRICE	/SHIFT BY PITCH-UP
(RPM)	(Lb/Day)	(Lb/Shift)	(Lb/Shift)	(Taka)	(Taka)	(Taka)	(Lb/SHIFT)	(Taka)	(Taka)
1	2	3	4	5	6	7	8	9	10
4000	624.27	208.09	21.85	81155.58	27051.86	2840.45	32.77	499.81	2339.10
5000	780.34	260.11	27.31	101444.47	33814.82	3550.56	40.97	624.76	2924.26
6000	936.41	312.14	32.77	121733.37	40577.79	4260.67	49.16	749.71	3509.42
7000	1092.48	364.16	38.24	142022.26	47340.75	4970.78	57.36	874.67	4094.58
8000	1248.55	416.18	43.70	162311.15	54103.72	5680.89	65.55	999.62	4679.74
9000	1404.62	468.21	49.16	182600.05	60866.68	6391.00	73.74	1124.57	5264.90
10000	1560.68	520.23	54.62	202888.94	67629.65	7101.11	81.94	1249.52	5850.06
11000	1716.75	572.25	60.09	223177.84	74392.61	7811.22	90.13	1374.48	6435.22
12000	1872.82	624.27	65.55	243466.73	81155.58	8521.34	98.32	1499.43	7020.38
13000	2028.89	676.30	71.01	263755.63	87918.54	9231.45	106.52	1624.38	7605.53
14000	2184.96	728.32	76.47	284044.52	94681.51	9941.56	114.71	1749.33	8190.69
15000	2341.03	780.34	81.94	304333.42	101444.47	10651.67	122.90	1874.28	8775.85
16000	2497.09	832.36	87.40	324622.31	108207.44	11361.78	131.10	1999.24	9361.01
17000	2653.16	884.39	92.86	344911.20	114970.40	12071.89	139.29	2124.19	9946.17
18000	2809.23	936.41	98.32	365200.10	121733.37	12782.00	147.48	2249.14	10531.33
19000	2965.30	988.43	103.79	385488.99	128496.33	13492.11	155.68	2374.09	11116.49
20000	3121.37	1040.46	109.25	405777.89	135259.30	14202.23	163.87	2499.05	11701.65
21000	3277.44	1092.48	114.71	426066.78	142022.26	14912.34	172.07	2624.00	12286.81
22000	3433.51	1144.50	120.17	446355.68	148785.23	15622.45	180.26	2748.95	12871.97
23000	3589.57	1196.52	125.64	466644.57	155548.19	16332.56	188.45	2873.90	13457.12
24000	3745.64	1248.55	131.10	486933.46	162311.15	17042.67	196.65	2998.85	14042.28
25000	3901.71	1300.57	136.56	507222.36	169074.12	17752.78	204.84	3123.81	14627.44
26000	4057.78	1352.59	142.02	527511.25	175837.08	18462.89	213.03	3248.76	15212.60
27000	4213.85	1404.62	147.48	547800.15	182600.05	19173.01	221.23	3373.71	15797.76
28000	4369.92	1456.64	152.95	568089.04	189363.01	19883.12	229.42	3498.66	16382.92

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RING PRODUCTION FEATURE

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=================================================================================
                               INPUT VARIABLES
=================================================================================
|END BREAKS/Hour/100 Spindle  :    25  | WASTE MULTIPLIER                  :   1.50 |
|NUMBER OF SPINDLES/MACHINE    :   432  | YARN PRICE (TAKA/Lb)             : 130.00 |
|NUMBER OF MACHINES            :    20  | WASTE PRICE (TAKA/Lb)            :  15.25 |
|MACHINE EFFICIENCY (%)        :    95  | LABOUR PERFORMANCE (pitch up/hour) :   45 |
|COUNT                         :    80  | LABOUR COST (TK./ Labour/Shift)  :  70.00 |
|TWIST MULTIPLIER (T.M)        : 3.500  | SPINNING POWER (KW/100 SPINDLES) :   2.00 |
|TWIST PER INCH (TPI)          : 31.305 | COST OF POWER (TK./KWH)          :   3.65 |
=================================================================================
                                  OUTPUTS
=================================================================================
|NUMBER OF SIDES PER LABOUR    =   0.83  | YARN PRODUCTION RATE (Lb/Shift/100 rpm) =  5.20 |
|TOTAL NUMBERS OF LABOURS      =    49   | WASTE RATE (Lb/Shift/100 rpm)          =  0.98 |
|TOTAL LABOUR COST/SHIFT(TK.)  = 3430.00 |
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SPINDLE SPEED (RPM)	YARN PRODUCTION			PRICE OF YARN PRODUCED			WASTE DUE TO END BREAKAGE		NET LOSS RECOVERED /SHIFT BY PITCH-UP
	NET		RECOVERED BY PITCH	PER DAY	PER SHIFT	RECOVERED PER SHIFT	WEIGHT	PRICE	
	(Lb/Day)	(Lb/Shift)	(Lb/Shift)	(Taka)	[Taka]	(Taka)	(Lb/SHIFT)	(Taka)	(Taka)
1	2	3	4	5	6	7	8	9	10
4000	624.27	208.09	26.01	81155.58	27051.86	3381.48	39.02	595.01	2784.65
5000	780.34	260.11	32.51	101444.47	33814.82	4226.85	48.77	743.76	3481.26
6000	936.41	312.14	39.02	121733.37	40577.79	5072.22	58.53	892.52	4177.88
7000	1092.48	364.16	45.52	142022.26	47340.75	5917.59	68.28	1041.27	4874.50
8000	1248.55	416.18	52.02	162311.15	54103.72	6762.96	78.03	1190.02	5571.12
9000	1404.62	468.21	58.53	182600.05	60866.68	7608.34	87.79	1338.77	6267.74
10000	1560.68	520.23	65.03	202888.94	67629.65	8453.71	97.54	1487.53	6964.35
11000	1716.75	572.25	71.53	223177.84	74392.61	9299.08	107.30	1636.28	7660.97
12000	1872.82	624.27	78.03	243466.73	81155.58	10144.45	117.05	1785.03	8357.59
13000	2028.89	676.30	84.54	263755.63	87918.54	10989.82	126.81	1933.79	9054.21
14000	2184.96	728.32	91.04	284044.52	94681.51	11835.19	136.56	2082.54	9750.83
15000	2341.03	780.34	97.54	304333.42	101444.47	12680.56	146.31	2231.29	10447.44
16000	2497.09	832.36	104.05	324622.31	108207.44	13525.93	156.07	2380.04	11144.06
17000	2653.16	884.39	110.55	344911.20	114970.40	14371.30	165.82	2528.80	11840.68
18000	2809.23	936.41	117.05	365200.10	121733.37	15216.67	175.58	2677.55	12537.30
19000	2965.30	988.43	123.55	385488.99	128496.33	16062.04	185.33	2826.30	13233.91
20000	3121.37	1040.46	130.06	405777.89	135259.30	16907.41	195.09	2975.05	13930.53
21000	3277.44	1092.48	136.56	426066.78	142022.26	17752.78	204.84	3123.81	14627.15
22000	3433.51	1144.50	143.06	446355.68	148785.23	18598.15	214.59	3272.56	15323.77
23000	3589.57	1196.52	149.57	466644.57	155548.19	19443.52	224.35	3421.31	16020.39
24000	3745.64	1248.55	156.07	486933.46	162311.15	20288.89	234.10	3570.07	16717.00
25000	3901.71	1300.57	162.57	507222.36	169074.12	21134.26	243.86	3718.82	17413.62
26000	4057.78	1352.59	169.07	527511.25	175837.08	21979.64	253.61	3867.57	18110.24
27000	4213.85	1404.62	175.58	547800.15	182600.05	22825.01	263.37	4016.32	18806.86
28000	4369.92	1456.64	182.08	568089.04	189363.01	23670.38	273.12	4165.08	19503.48

RING PRODUCTION FEATURE

INPUT VARIABLES			
END BREAKS/Hour/100 Spindle	: 29	WASTE MULTIPLIER	: 1.50
NUMBER OF SPINDLES/MACHINE	: 432	YARN PRICE (TAKA/Lb)	: 130.00
NUMBER OF MACHINES	: 20	WASTE PRICE (TAKA/Lb)	: 15.25
MACHINE EFFICIENCY (%)	: 95	LABOUR PERFORMANCE (pitch up/hour)	: 45
COUNT	: 80	LABOUR COST (TK./ Labour/Shift)	: 70.00
TWIST MULTIPLIER (T.M)	: 3.500	SPINNING POWER (KW/100 SPINDLES)	: 2.00
TWIST PER INCH (TPI)	: 31.305	COST OF POWER (TK./KWH)	: 3.65

OUTPUTS			
NUMBER OF SIDES PER LABOUR	= 0.72	YARN PRODUCTION RATE (Lb/Shift/100 rpm)	= 5.20
TOTAL NUMBERS OF LABOURS	= 57	WASTE RATE (Lb/Shift/100 rpm)	= 1.13
TOTAL LABOUR COST/SHIFT(Tk.)	= 3990.00		

SPINDLE SPEED (RPM)	YARN PRODUCTION			PRICE OF YARN PRODUCED			WASTE DUE TO END BREAKAGE		NET LOSS RECOVERED /SHIFT BY PITCH-UP (Taka)
	NET		RECOVERED BY PITCH-	PER DAY	PER SHIFT	RECOVERED PER SHIFT	WEIGHT	PRICE	
	(Lb/Day)	(Lb/Shift)	(Lb/Shift)	(Taka)	(Taka)	(Taka)	(Lb/SHIFT)	(Taka)	(Taka)
1	2	3	4	5	6	7	8	9	10
4000	624.27	208.09	30.17	81155.58	27051.86	3922.52	45.26	690.21	3230.19
5000	780.34	260.11	37.72	101444.47	33814.82	4903.15	56.57	862.77	4038.27
6000	936.41	312.14	45.26	121733.37	40577.79	5883.78	67.89	1035.32	4846.34
7000	1092.48	364.16	52.80	142022.26	47340.75	6864.41	79.20	1207.87	5654.42
8000	1248.55	416.18	60.35	162311.15	54103.72	7845.04	90.52	1380.43	6462.50
9000	1404.62	468.21	67.89	182600.05	60866.68	8825.67	101.83	1552.98	7270.57
10000	1560.68	520.23	75.43	202888.94	67629.65	9806.30	113.15	1725.53	8078.65
11000	1716.75	572.25	82.98	223177.84	74392.61	10786.93	124.46	1898.08	8886.73
12000	1872.82	624.27	90.52	243466.73	81155.58	11767.56	135.78	2070.64	9694.80
13000	2028.89	676.30	98.06	263755.63	87918.54	12748.19	147.09	2243.19	10502.88
14000	2184.96	728.32	105.61	284044.52	94681.51	13728.82	158.41	2415.74	11310.96
15000	2341.03	780.34	113.15	304333.42	101444.47	14709.45	169.72	2588.30	12119.03
16000	2497.09	832.36	120.69	324622.31	108207.44	15690.08	181.04	2760.85	12927.11
17000	2653.16	884.39	128.24	344911.20	114970.40	16670.71	192.35	2933.40	13735.19
18000	2809.23	936.41	135.78	365200.10	121733.37	17651.34	203.67	3105.96	14543.26
19000	2965.30	988.43	143.32	385488.99	128496.33	18631.97	214.98	3278.51	15351.34
20000	3121.37	1040.46	150.87	405777.89	135259.30	19612.60	226.30	3451.06	16159.42
21000	3277.44	1092.48	158.41	426066.78	142022.26	20593.23	237.61	3623.62	16967.49
22000	3433.51	1144.50	165.95	446355.68	148785.23	21573.86	248.93	3796.17	17775.57
23000	3589.57	1196.52	173.50	466644.57	155548.19	22554.49	260.24	3968.72	18583.65
24000	3745.64	1248.55	181.04	486933.46	162311.15	23535.12	271.56	4141.28	19391.72
25000	3901.71	1300.57	188.58	507222.36	169074.12	24515.75	282.87	4313.83	20199.80
26000	4057.78	1352.59	196.13	527511.25	175837.08	25496.38	294.19	4486.38	21007.88
27000	4213.85	1404.62	203.67	547800.15	182600.05	26477.01	305.50	4658.93	21815.96
28000	4369.92	1456.64	211.21	568089.04	189363.01	27457.64	316.82	4831.49	22624.01

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