A
Project Report
On

Electric Power Generation Using Roller Mechanism

Submitted in partial fulfillment of Bachelor of Engineering - Mechanical Engineering, by Savitribai Phule Pune University

Submitted to

Savitribai Phule Pune University

By
Mr. Kamesh Jitendra Patil
Mr. Atharva Rupesh Pachpute
Mr. Gaurav Ravindra Patil
Mr. Yahwant Devidas Salunke
Under the guidance of
Prof. M. N. Sonawane

NAAC ACCREDITED INSTITUTE WITH "A" GRADE

Department of Mechanical Engineering

Maratha Vidya Prasarak Samaj's Karmaveer Adv. Baburao Ganpatrao Thakare College of Engineering, Nashik- 422013

[2021-22]

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C E R T I F I C A T E

This is to certify that ***Mr. Kamesh Jitendra Patil, Mr. Atharva Rupesh Pachpute, Mr. Gaurav Ravindra Patil, Mr. Yahwant Devidas Salunke****, have successfully completed the Project entitled "(****Electric power genration using roller mechanism)****" under my supervision, in the partial fulfillment of Bachelor of Engineering - Mechanical Engineering of Savitribai Phule Pune University, Pune.*

Date:

Place: Nashik

Prof. M. N. Sonawane
Guide

Internal Examiner

Dr.V.C.Shewale
Head of the Department

Dr. S.R.Devane
Principal

External Examiner

Seal

RISHI INDUSTRIES

Date 25 / 10 / 2021

To,
Respected principal sir,
Department of Mechanical Engineering,
NDMVP's College of Engineering,
Nashik – 422004

Respected sir,

We are pleased to inform you that we have selected following students of NDMVP's College of Engineering, Nashik, to carry out project titled "ELECTRIC POWER GENERATION USING ROLLER MECHANISM" as a part of University of Pune cuniculum, your college students from Mechanical Engineering department,

Students name:-

1) ATHARV RUPESH PACHPUTE

2) KAMESH JITENDRA PATIL

3) GAURAV RAVINDRA PATIL

4) YASHWANT DEVIDAS SANLUNKE

This project will commence in sep. 2021 and will be completed in Dec. 2021

We will be supporting the students by providing the necessary details and technical guidelines.

Thus students are required to design and manufacture a effective material handling system. They will not be entitled for salary / stipend from our (Rishi) Industries with worm Regards,

RISHI INDUSTRIES GHOTI

Vchordiya
Vinay B. chordiya.

Rishi Industries

Plot No. 82/1, Shirdi-Sinnar Highway, Infornt of Saidarbar, GHOTI-422402, Tal. Igatpuri, Dist. Nashik.
Email - rishi.industries18@gmail.com Mob. 8237855776 , 9822217844

Acknowledgement

It gives us great pleasure in presenting the project report on ***"Electric power generation using roller mechanism".***

We would like to take this opportunity to thank our internal guide ***Prof. M. N. Sonawane*** *for giving us all the help and guidance we needed. We are really grateful to him for his kind support. His valuable suggestions were very helpful.*

We are also grateful to ***Dr .V. C. Shewale****, Head of Mechanical Engineering Department, for his indispensable support and suggestions.*

With deep sense of gratitude, we thank our Principal, ***Dr. S.R.Devane*** *and Management of the MVP Samaj for providing all necessary facilities and their constant encouragement and support.*

We also express our thanks to ***Mr. Mayur Mankar****, of* ***Rishi Industries*** *for guiding us throughout the project and helping us in completing this project work.*

Mr. Kamesh Jitendra Patil
Mr. Atharva Rupesh Pachpute
Mr. Gaurav Ravindra Patil
Mr. Yahwant Devidas Salunke
(B.E. Mechanical Engg.)

Abstract

The main objective of this study is to explore the use of gravity roller conveyor. Gravity conveyor provides one of the most versatile & economical means of moving product gravity conveyor can quickly move large quantities of items in virtually any direction with a minimum of effort & expense. The material used for roller and C-channel frame is a mild steel. In this Project we are generating electrical power as non-conventional method by simply passing material on to the specially designed Roller Setup. This method of Electrical power generation needs no input power. This Project is implemented by using simple drive mechanism such as Roller, some interfaced Electrical components and chain drive Mechanism. The basic principle is simple energy conversion form mechanical to electrical energy by using the material weight (potential energy) & motion (kinetic energy).

This is a industry sponsored project in association with ‘Rishi industry’.

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1. INTRODUCTION

1.1. Problem Statement

1.To develop a material handling roller conveyor which can generate the electricity.

2.It will help to lighting system of industry and hence we can save the amount of electricity required for lighting system.

1.2 Aim and objective of project

1.To design and manufacture Energy regenerating roller conveyor System for material handling purposes in food processing industry.
2.To generate own power for lighting system.
3.To achieve required material transfer rate for smooth operation
4.To bring flexibility in manufacturing process.
5.To fix material handling problem in an industry.
6.Need in industry to move material from one point to another for food processing.
7.To Regenerate Electric Energy.

1.3 Material handling systems

Material handling is the movement, protection, storage and control of materials and products throughout manufacturing, warehousing, distribution, consumption and disposal. Inventory management and control, Customer delivery, After-sales support and service. Material handling plays an important role in manufacturing and logistics. Almost every item of physical commerce has been transported on a conveyor or lift truck or another type of material handling equipment in manufacturing plants, warehouses, and retail stores.

Fig.1 Material handling system

1.3.1. TYPES OF MATERIAL HANDLING SYSTEMS

1.3.1.1. Stackers and reclaimers:

Large machines that are used to dump things into piles or to pick them back up again. They can be hard to visualize, so here's an animation of one working.

Fig. 2 Electric stacker

1.3.1.2. Hoppers:

Picture a large metal funnel. It stores material and can release an exact quantity out the bottom.

Fig.3 Industrial hopper

1.3.1.2. Grain elevators

Buildings used to store grain. They include a series of buckets on a track that automatically transports grain to the top of the building where it can be funneled into different silos.

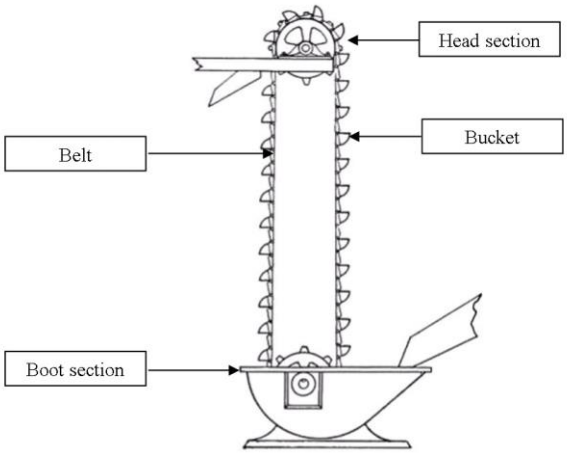


Fig. 4 bucket elevator

1.3.1.3. Conveyor Belts:

Conveyor belts are moving belts that transport material. They can be combined into more complicated conveyor systems which are considered engineered systems. If you want a conveyor system for your business, contact DCS.

Fig.5 belt conveyor

1.3.1.4. Dump Trucks:

Also a type of industrial material transport vehicle.

Fig. 6 Dump truck

1.3.1.5 Screw Conveyor:

A screw-shaped device inside a tube that turns to move material. Rotary car dumper: A device that turns a rail car to dump out its contents.

Fig. 7 screw conveyor

1.3.2. GRAVITY ROLLER CONVEYOR

Conveyors are gravity or powered equipment commonly used for moving bulk or unit load continuously or intermittently, unidirectionally from one point to another over fixed path, where the primary function is conveying of the material by the help of movement of some parts/components of the equipment. The equipment as a whole does not move. A roller conveyor supports unit type of load on a series of rollers, mounted on bearings, resting at fixed spacings on two side frames which are fixed to stands or trestles placed on floor at certain intervals. A roller conveyor essentially coveys unit loads with at least one rigid, near flat surface to touch and maintain stable equilibrium on the rollers, like ingots, plates, rolled stock, pipes, logs, boxes, crates, moulding boxes etc. Roller conveyors are classified into two groups according to the principle of conveying action. These are: 1. Unpowered or Idle Roller Conveyor. 2. Powered or Live Roller Conveyor. In an unpowered roller conveyor, the rollers are not driven or powered from an external source. The loads roll over the series of rollers either by manual push or push from an endless moving chain or rope fitted with pusher dogs, rods or clamps. Generally these conveyors operate at horizontal plane, but at times a gentle slope is given to these conveyors to aid motion of the loads. An inclination of 1.5% to 3% ensures that the load will roll by gravity. Such conveyors are termed “gravity roller conveyor’’. In a powered roller conveyor, all or a selected number of rollers are driven by one or a number of motors depending on the selected drive arrangement. The driven rollers transmit

motion to the loads by friction. The powered roller conveyors may be installed at a slightly inclined position, up to 10° up or up to 17° down. The load can be moved in either directions by changing the direction of rotation of the rollers, where these are called reversing conveyors.

Fig. 8 Roller conveyor

1.4 INTRODUCTION TO INDUSTRY

- Name of Industry : Rishi Industries
- Year of Establishment : 2010
- Name of Owner : Mr. Praful & Mr. Vinay Chordia
- Location : Ghoti BK, Tal. Igatpuri, Nasik.
- Type of Industry : Food Processing Industry
- Approximate Turnover : 3-4 Cr/Yr in Rupees.

2. LITERATURE REVIEW

[1] Electric power generation using roller mechanism (Santosh Sharma & Uday Kumar) 2014 In this project they studied on electric power generation using roller mechanism. By making roller mechanism. If we passed the vehicle from that roller mechanism rollers get rotated and hence electricity gets generated.

[2] Power generation from speed breakersusing multiple roller mechanism (Ardhendu Chakraborty,K Bharadwaj, Ms. Sandeepa)2010 this project they have studied how to generate energy from speed breakers on road.
An unpowered roller conveyor consists of series of rollers, the frame on which the rollers are placed and the stands on which the framework rests. Because of simplicity of design, com-

petitive cost and trouble free operation, these conveyors are used extensively in handling unit loads in workshops or process plants to convey articles from one working station to another. Unpowered roller conveyors are often used as a storing platform and as such are often termed as roller table. These are also used in stores as storing racks and in loading bays for loading / unloading materials from carriages. A gentle slope may be provided in the conveyor to aid movement of the loads on idle rollers. These gravity roller conveyors are used to convey load in one direction only. The conveyors can have a curved section to change direction. Material movement between two levels may be done by an inclined or a spirally formed gravity roller conveyor. The spiral form increases the length of the conveyor and thereby controls the velocity of the articles moving down the conveyor

[3] IOSR Journal of Electrical and Electronics Engineering (IOSR-JEEE) in the year 2014 by author B. Santosh Sarma1, V. Jyothi2, D. Sudhir on the topic This is a small step to try to improve this situation by this project and contribute something for the society. Although less electrical output is being generated. The idea of generating electricity from kinetic energy of the moving.

[4| International Journal for Research in Applied Science & Engineering Electrical Power Generation by Roller Mechanism by Ms. Komal J. Patil1, Ms. Snehal H. Patil2, Ms. Pranauti S. Patil3 , Ms. Shital S. Thorat4, Prof. N. D. Salunkhe in the year 2016 on the topic We need electricity for every small thing. So, this research is a small step to fulfil the requirement of increasing electricity demand and contributes something for the society. This project introduce a generation system for harnessing energy from speed breaker.

While doing this project we have decided to do work in two parts first of all we make two parts these are as following.

1) Design of normal Roller conveyor

2) Electric arrangement for roller conveyor

3. DESIGN OF ROLLER CONVEYOR

Generally roller conveyor design in two types

3.1. types of roller conveyor

3.1.1. powered roller conveyor

In a powered roller conveyor, all or a selected number of rollers are driven by one or a number of motors depending on the selected drive arrangement. The driven rollers transmit motion to the loads by friction. The powered roller conveyors may be installed at a slightly inclined position, up to 10° up or up to 17° down. The load can be moved in either directions by changing the direction of rotation of the rollers, where these are called reversing conveyors.

3.1.2. unpowered roller conveyor

In an unpowered roller conveyor, the rollers are not driven or powered from an external source.The loads roll over the series of rollers either by manual push or push from an endless moving chain or rope fitted with pusher dogs, rods or clamps. Generally these conveyors operate at horizontal plane, but at times a gentle slope is given to these conveyors to aid motion of the loads. An inclination of 1.5% to 3% ensures that the load will roll by gravity. Such conveyors are termed “gravity roller conveyor’’

3.1.2.1. parts of unpowered roller conveyor

Rollers: Cylindrical rollers are generally used which are made from ERW steel pipes with cast or fabricated end flanges to accommodate the antifriction bearings (usually ball bearings). The through axles are stationary and roller barrels can rotate freely. These rollers are called idler rollers. For conveying cylindrical objects (drums, pipes, round steel bars etc.), double tapered rollers or wheel rollers are used. The diameter of the rollers depend on the diameter of standard steel pipes available, and vary from about 20 mm to max 155 mm. Heavier the load to be.

Roller pitch depends on the length and weight of the load handled. The unit load should be supported at least by two rollers, thus the maximum pitch should be ≤ ½ of the load length. For goods vulnerable to jerks/ shaking, roller pitch equal to ¼ to 1/5 of length of load to be considered.

Frame: Frame is that part of the conveyor on which the roller axles rest and are fixed to. The conveyor frame is fabricated from angle or channel sections. The roller axles are held in slots cut in the flanges of the frame. The axles are flat machined at the ends so that the axles do

not rotate in the slots. Axial movement of the axles are prevented by using split pins or lock plates. For heavy rollers, the axles may be fixed on the frame by clamps. Side guards may be provided along two edges of the frame to prevent movement of the loads beyond the roller span. Side guards are particularly necessary at the curved sections of a conveyor. Typical ideal rollers with bearing fittings and their attachment to the frame is shown in Fig.

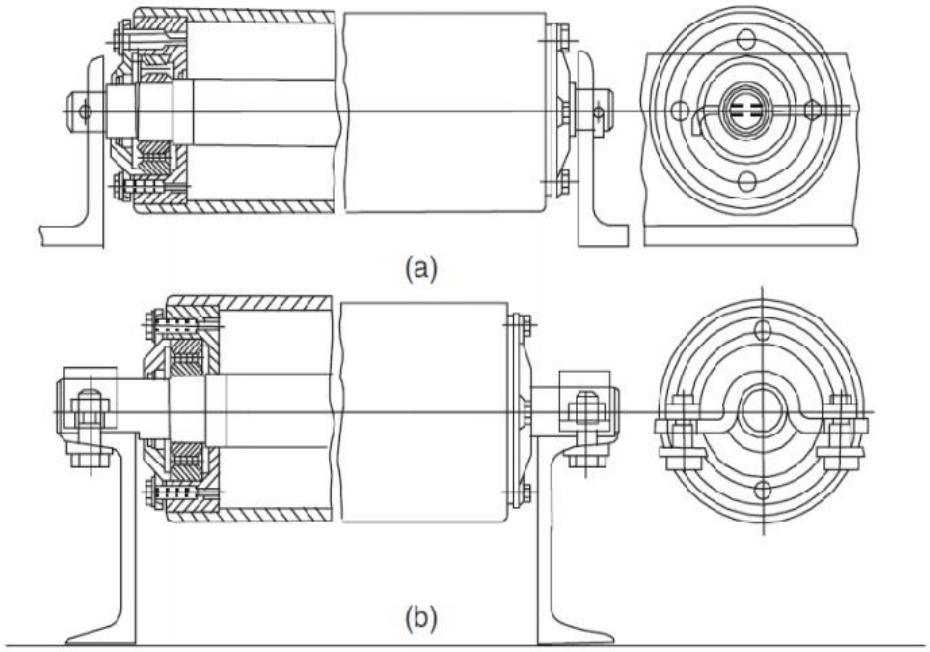


Fig. 9 Typical ideal rollers with bearing fittings

Stands or Trestles: Stands or trestles support the conveyor frames with roller assemblies, from the ground. Stands are generally fabricated from pipes or structural sections, with provision for grouting on the floor. Height of stands are chosen to keep the articles at a convenient level on the conveyor. Small portable conveyors often have telescoping legs for the stands, such that the inclination of the conveyors can be suitably adjusted in Alternator: this is a device which is works on reverse principal of motor. We are going to use alternator in this system.

3.2 Aspects of Gravity Roller Conveyor Design

The major design calculations involved are to determine the force required to overcome the resistance to motion of the loads and the angle of inclination required for a gravity conveyor.Total resistance to motion is made up of:

(i) Resistance to rolling of the load on rollers due to friction.

(ii) Frictional resistance in the roller bearings.

(iii) Resistance due to sliding of the load on the rollers and force required for imparting kinetic energy to rollers.
(i) Resistance to rolling of the total load ‘‘G’’ on the rollers is given by
F1 = Gk/R ...(i)

where k = rolling friction factor also called coefficient of rolling resistance, mm
R = roller radius, mm
(ii) Frictional resistance on roller journals is expressed by
F2 = (G + wn′) μr/R ...(ii)

Where, w = weight of rotating part of each roller.
n′ = number of rollers supporting total load, and hence in motion.
μ = coefficient of friction at the journal.
r = journal radius

When a moving load comes over a static roller, it slides over the roller and starts accelerating the roller till the roller attains the surface speed equal to speed of the load. When the load leaves the roller, it starts decelerating and eventually stops until it is accelerated by the next load. This phenomenon is shown in Fig.

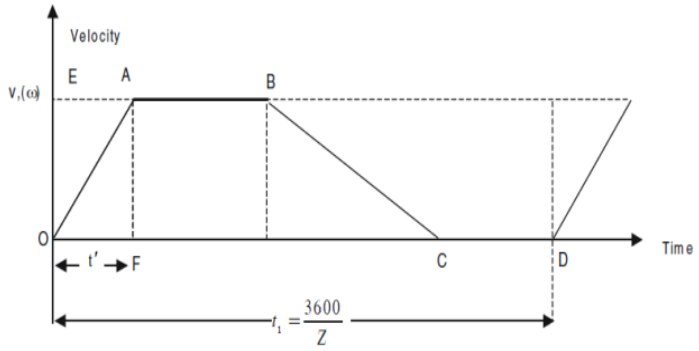


Fig.10 Velocity diagram for roller

O is the point of time when a moving load touches a static roller. Till time t; the load rolls and slides over the roller. The surface or rotational velocity of the roller is under acceleration, expressed by line OA. From A up to B, the load rolls over the roller, and at B it leaves the roller.If the conveyor is conveying Z pieces of load per hour, then the cycle period will be t1 = 3600/ Z seconds.

G′ is part of weight of each load carried by each roller and μ0 the kinetic coefficient offriction, the frictional sliding force between the load and roller during time t′ is = G′ μ0 and the work done by the load = G′μ0vt′ where v linear velocity of the load, and vt′ is the distance moved by the load in time t′, represented by the area OEAF.

The distance travelled by any point on the periphery of the roller during this time will be vt′/2(area OAF), which is also the sliding path. This shows that half of the work done by load is spent in overcoming the friction, and the other half is used in imparting kinetic energy to the roller.
If ‘w’ is the weight of the rotating part of the roller, then its kinetic energy = (1/2)(w/g)(v2q).

Where q is a factor of value between 0.8 to 0.9, because not all the mass of the roller moving parts is on the periphery, and thereby not moving with velocity v., the work done due to sliding and acceleration of one roller is given by
2 ×1/2 × (w/g) × v2
q = wv2 q/g
If there are ‘n’ number of rollers in a total length of ‘L’, then the total work done in ‘n’ number of rollers will be = nwv2q/g for moving one load throughout the length of the conveyor. Hence the average resistance to motion on one load due to sliding and acceleration will be given by,
F3′ = nwv3q/gL ...(iii)

If there are Z0 numbers of loads moving simultaneously on the conveyor, then average totalresistance due to sliding and acceleration will be,

F3 = Z0 nwv2q/gL ...(iv)
Therefore, total resistance to motion of the loads, which is the force required to move the loads on a horizontal unpowered conveyor is
F = F1 + F2 + F3 = (G × k/R) + {(G + wn′) μr/R} + {q × (Z0 nwv2/gL)}...(v)
We can define the equivalent resistance to motion factor ‘f’ by an equation, F = Gf.
∴ f = F/G = (2k/D) + [{1+ (wn′/G)} × (μd/D)] + {q × (Z0 nwv2/gLG)} ...(vi)
where, D = roller Diameter = 2R = journal diameter = 2r
However, for calculating the minimum inclination angle ‘β’ of a gravity conveyor, which will allow movement of a load due to gravity only, resistance to only one load need to be considered, which should be overcome by the component of the gravitational force on the load along the
inclination of the conveyor. Thus,
f = tan β = F/G′= (2k/D) + [{1+ (wn′′/G′)} × (μd/D)] + {q × (nwv2/gLG′)}...(vii)
where, n′′ = number rollers supporting each load =n′/Z0

G′ = weight of each load =G/Z0
Therefore, n′′/G′= (n′/Z0)/(G/Z0) = n′/G
tan β = (2k/D) + [{1+ (wn′/G)} × (μd/D)] + {q × (Z0nwv2/gLG)}...(viii)

3.3. Design Considerations

- The first three rolls will be designed for impact loading. The G will be considered to be 400Kg. The entire weight may impact directly on one of the first 3 rollers. So, for safety point of view, they will be heavy duty rollers (OD 105mm) with axle diameter 30mm.

- Pitch is 200mm. At any time, a minimum of 3 rollers will be in contact with the load.
- For maximum stability, the load was made to sit on the 500x300mm face (length=500mm & breadth=300mm).
- The width of the conveyor should be larger than the width of the load (300mm). A width of 500mm was considered for standardization.
- Jindal Pipes Limited's Seamless and ERW Pipes & Tubes brochure is used for selection of the black pipes.
- Jindal pipes do not manufacture OD 105 mm pipes. The next higher size is 113.1mm. The 113.1 mm should be given a skin-cut to get 110mm as the final OD.
- The rest of the rollers should be medium duty rollers with OD 73 mm with axle diameter 20mm. Jindal pipes produce 75.3mm rough OD pipes. This pipe will be skin-cut to 73mm OD.
- For standardization, all the axles taken should be 30mm. This will constrict the necessity of different bore diameter bearings.
- As the OD of the bearings is less than the ID of the pipes, a bushing will be required to keep the outer race of the bearing in place.
- Machining has to be done along the inner diameter of the pipe in order to push the bearing inside.
- The part of the axle which is between the two bearings on either sided will be given a rough surface finish and can have a diameter of more than 30mm. This will reduce machining costs. The part of the axle in contact with the bearing will be given a good surface finish and will have an exact diameter as the bore of the bearing. There will be an interference fit between the inner race of the bearing and the axle. The part of the axle outside the bearing will have a smaller diameter than 30mm. This will ensure that when the bearing is fitted there is no rubbing between the axle and the bearing
- A cover will also be provided at the end of each roller. This will keep the outer race in its required position and also protect the bearing from outside dust and dirt. The cover is screw to the bushing.
- A grease nipple enclosed within the cover lubricated the bearings.
- A M24 nut holds the inner race in its place.
- An oil seal is also provide so that the oil doesn't leak out.
- Medium duty roller diameter (OD 73mm) was taken into consideration for calculation of the minimum inclination angle 'β' of a gravity conveyor because the smaller OD

corresponds to larger β. If the β is chosen to be large it will also roll for the heavy duty rollers.

- The angle of inclination was taken slightly more than the minimum inclination angle 'β' and this will give rise to an acceleration. The last rollers were kept flat so that it deaccelerates the load.
- To fix the axles to the frame, rectangular grooves will be made on the angle iron and the opposite sides of the stepped axle will be flattened. This will restrict any rotational.
- A groove is also made on the axle and a clip which fits the groove is screwed on the angle iron. This restricts any vertical motion.
- MS C-sections will form the stands of the rollers. Both ends of the C-sections will be welded to a steel plate. This steel plate will be bolted to the angle iron.
- The steel plate at foot of the C-sections will be bolted to the foundation using foundation bolts.

3.4. CALCULATIONS

The minimum inclination angle 'β' of the gravity conveyor:

Pitch = 200mm

length of the conveyor = 4 metres = 4000mm

of rollers necessary = 4000/200 = 20

of the 73OD pipes = $\pi/4 \times h \times (D12-D22)$

$= \pi/4 \times 500 \times (732-652)$

= 433539.79mm3 = 433.5398cm3

of the rotating part of the roller = density of steel × Volume

= 7.8 × 433.5398
= 3381.61g = 3.382 kg

$\tan \beta = (2k/D) + [\{1+ (wn'/G)\} \times (\mu d/D)] + \{q \times (Z0nwv2/gLG)\}$

k = rolling friction factor (wood-steel) = 0.0012m = 1.2mm
D = roller diameter = 73mm

w = weight of the rotating part of the roller = 3.382 kg

n′= 3
G = total load = 200kg
μ = coefficient of friction at the journal = 0.5 d = journal diameter = 30mm
q = factor of value between 0.8 to 0.9, because not all the mass of the roller moving parts is

on the periphery, and thereby not moving with velocity v = 1 (assumed)
Z0 = numbers of loads moving simultaneously on the conveyor = 1 (assumed)
n = number of rollers= 20
v = linear velocity of the load = 0.2 m/s (assumed)
g = acceleration due to gravity = 9.81 m/s2
L = total length = 4m
$\tan \beta = (2k/D) + [\{1+ (wn'/G)\} \times (\mu d/D)] + \{q \times (Z0nwv2/gLG)\}$
$= (2\times1.2/73)+[\{1+(3.382\times3/200)\}\times(0.5\times30/73)]+\{(17\times3.382\times0.22)/(9.81\times3.5\times200)\}$
$= 0.249 = 13.98 ° \approx 14 °$

3.5 Bearing Selection

For simplicity, deep groove roller bearing is used.The relationship between the dynamic load carrying capacity, the equivalent dynamic load and the bearing life is given by,

$L10 = (C/P)p$

P = equivalent dynamic load
L10 = rated bearing life (in million revolutions)
p = 3 (for ball bearing)
The relationship between life in million revolutions and life in working hours is given by,
L10 = 60nL10h/106
L10h = rated bearing life (hours)
n = speed of rotation (rpm)
P = (Wt. of load +Wt. of rollers) × 9.81 = (400+6.43) × 9.81 = 3987.07 N
$v = \pi Dn/60$
$=) 0.2 = (\pi \times 0.105 \times n)/60$

=) n = 36.38 rpm
L10h = 20000
L10 = 60 × 37 × 20000/106 = 44.4
C = 3987.07 × (44.4)
1/3 = 14118.27 N
From SKF bearing catalogue, a bearing is chosen with the nearest C value:
Bore Diameter = 30mm, Outer Diameter = 62mm, Width = 16mm, C = 19500 N, Designation=6206

3.6 Parts drawing in cad

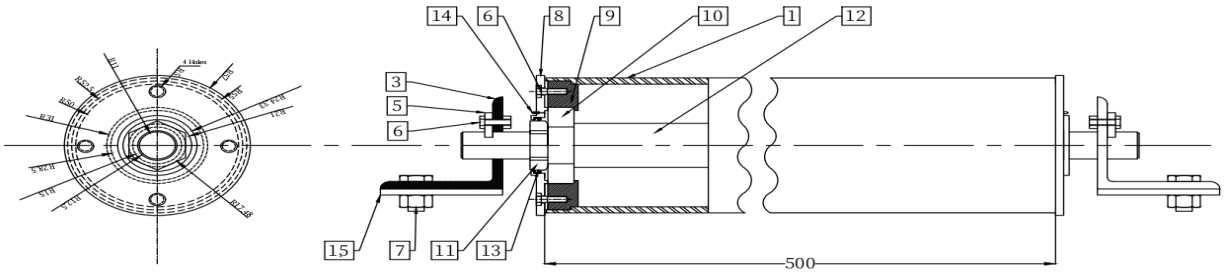


Fig 11. Roller cad fig

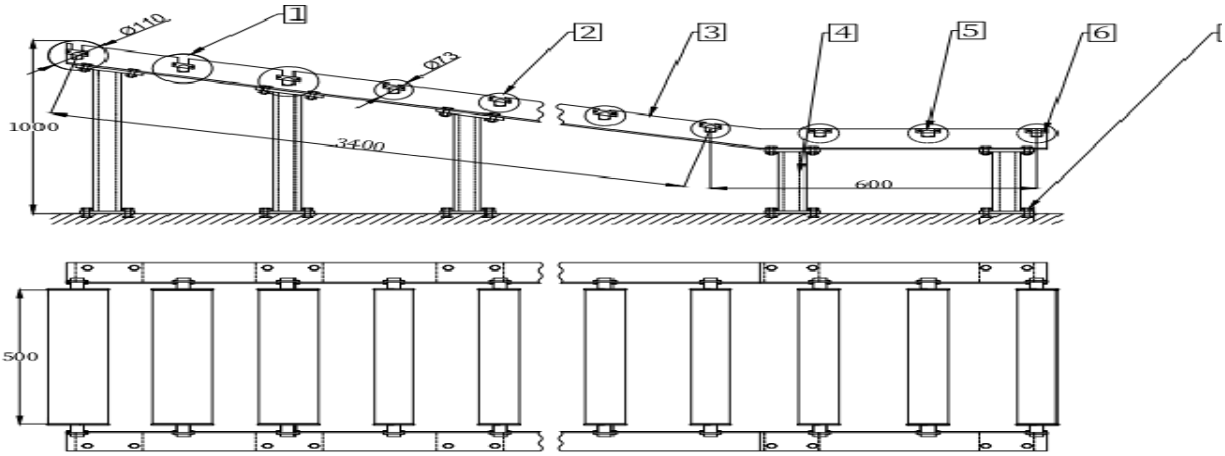


Fig 12. Roller Mechanism Cad Fig.

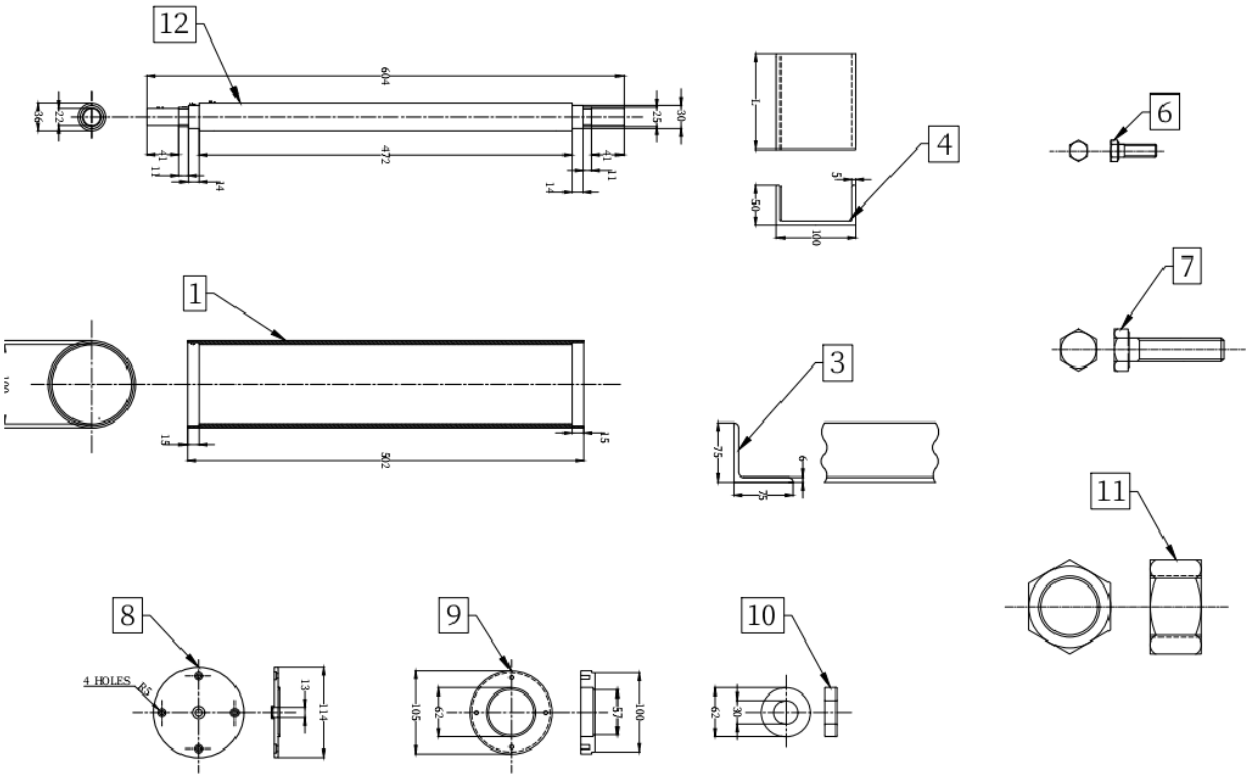


Fig 13. Cad diagrams of parts

4. ELECTRICAL ARRANGEMENT

DC Motor as a Generator

An electrical generator is a device that converts mechanical energy to electrical energy, generally using electromagnetic induction. The source of mechanical energy may be a reciprocating or turbine steam engine, water falling through a turbine or waterwheel, an internal combustion engine, a wind urbine, a hand crank, or any other source of mechanical energy

In this Mechanism, a roller is fitted in between a conveyor and some kind of a grip is provided on the roller so that when a material passes over roller it rotates the roller. This movement of roller is used to rotate the shaft of D.C. generator by the help of chain drive or directly which is there to provide different speed ratios. As the shaft of D.C. generator rotates, it produces electricity. This electricity is stored in a battery. Then the output of the battery is used to lighten the lamps in industry. Now during day time we don't need electricity for lightening the lamps so we are using a control switch which is manually operated. The control switch is connected by wire to the output of the battery. The control switch has ON/OFF mechanism which allows the current to flow when needed.

Motors are connected to the circuit. motor negative has connected to the emitter and positive terminal of motor is connected to diode through which it is connected to the battery here diode acts as rectifier and transistor acts as switch the diode is placed because it stops the reverse flow which makes the motor not to function. The circuit is made for each and every motor and single leads will be connected to the battery for storage.

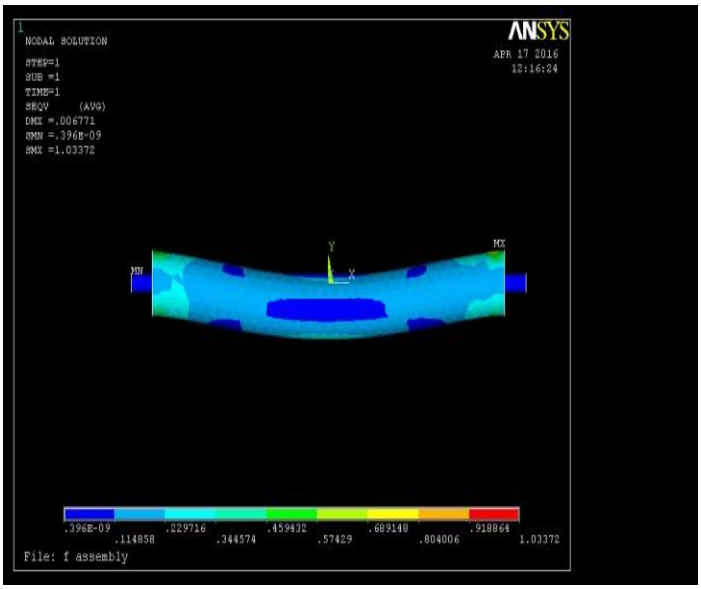
5. Testing and results

speed (km/h)	Output power(W)	Output volt(V)	Output current(A)
5	0.45	2.45	0.115
15	1.89	5.78	0.325
30	3.21	7.23	0.435

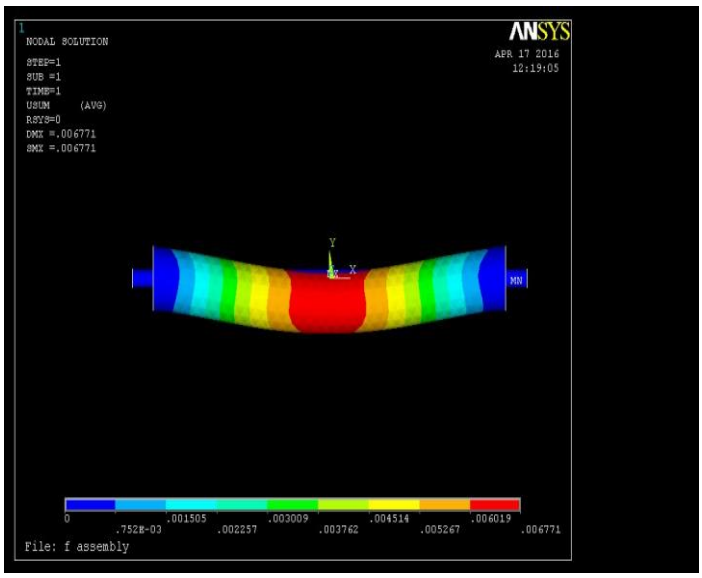
Speed(km/h)	Output power(W)	Output volt(V)	Output current(A)
5	0.56	6.00	0.126
15	1.89	6.00	0.369
30	4.09	6.00	0.560

Induced stresses in roller-shaft assembly are as shown below:

From figure it can be seen that 1.03372 MPa is maximum stress induced in the roller due to loads and boundary conditions.



STRESS PLOT



DEFLECTION PLOT

6. Conclusion

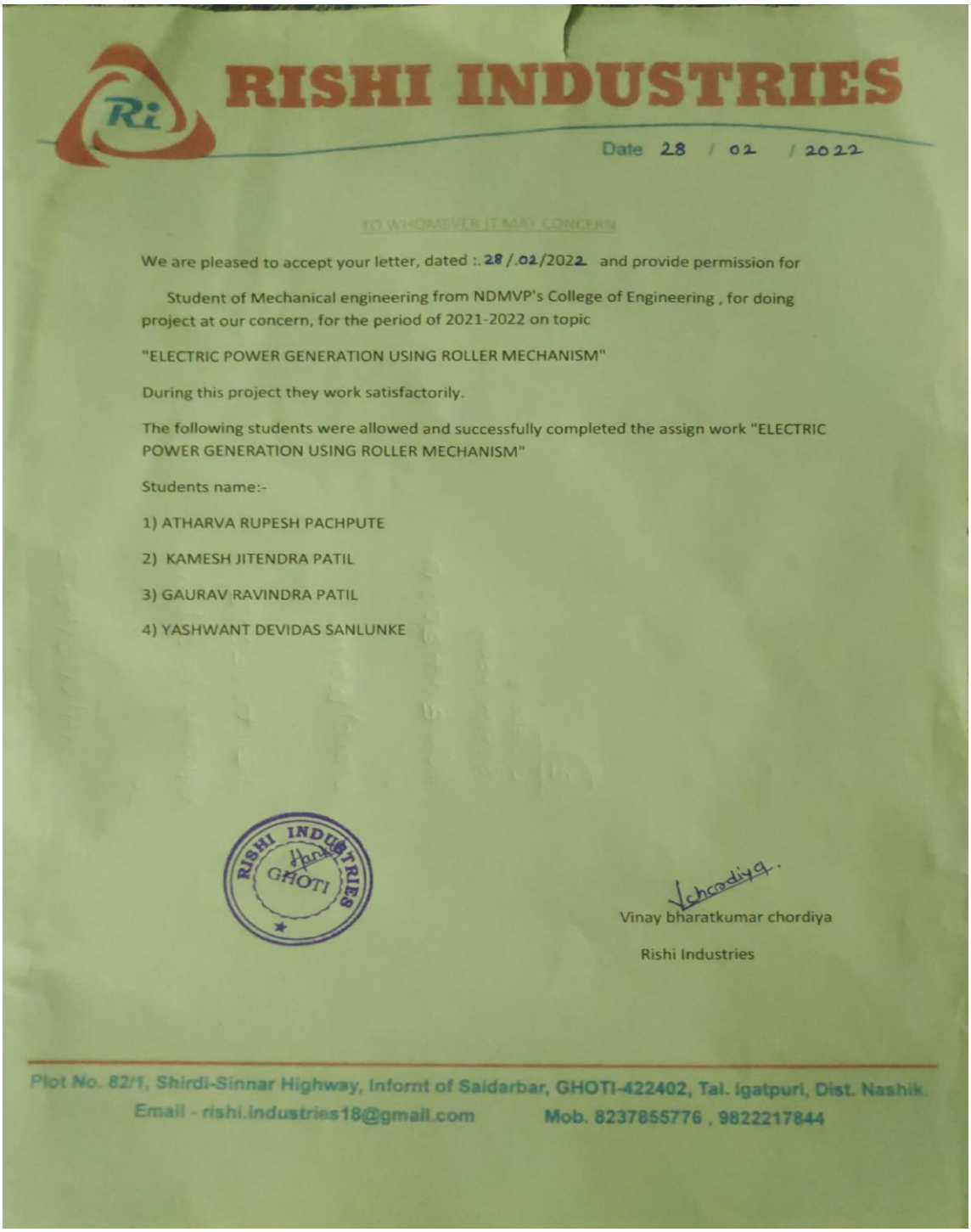
No one is happy with current situation of electricity in India We need electricity for every small thing. More suitable and compact mechanisms to enhance efficiency. Although we get less electrical output, this is a simple idea for generating electricity from kinetic energy of the moving material in industry. If this concept is further developed and is produced in high potential, I am confident that enormous amount of power can be developed. These rollers can be designed for heavy material handling, thus increasing input torque and ultimately output of generator by using the multiple transmission system which is more efficient method. An also no any power required to operate to conveyor in industry.

6.1 Future Scope

Conveyor system market is highly application driven and such conveyor systems are gaining popularity across the end user industries like Automotive, Retail, Food & Beverages, Airports which is referred as one of the major driving factors for market.

The use of conveyors system ensures handling larger volume of goods & efficiency. Moreover, Factors such as growing industrialization, need of automation to reduce manufacturing costs and waste and growth of e-commerce moving them towards adoption of conveyor systems, Fluctuating raw material prices, environmental regulations, as well as uncertainty of final products hampers the growth of the market significantly.

7. PROJECT COMPLETION LETTER



RISHI INDUSTRIES

Date 28 / 02 / 2022

TO WHOMEVER IT MAY CONCERN

We are pleased to accept your letter, dated :. 28 /.02/2022 and provide permission for

Student of Mechanical engineering from NDMVP's College of Engineering , for doing project at our concern, for the period of 2021-2022 on topic

"ELECTRIC POWER GENERATION USING ROLLER MECHANISM"

During this project they work satisfactorily.

The following students were allowed and successfully completed the assign work "ELECTRIC POWER GENERATION USING ROLLER MECHANISM"

Students name:-

1) ATHARVA RUPESH PACHPUTE

2) KAMESH JITENDRA PATIL

3) GAURAV RAVINDRA PATIL

4) YASHWANT DEVIDAS SANLUNKE

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Vchordiya.

Vinay bharatkumar chordiya

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