

Telescopic Conveyor Development to Save Production Time

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Abstract - In industries reducing men price, Space, cash and Time saving purpose each one preferring easy equipment for loading and unloading materials. For the past decade, material handling organizations has been introduced & applied as a possibility for various kinds of loading and Unloaders. It's a straightforward nevertheless effective suggests that reliable and cost- effective manner.

Our gift work deals with utilization of telescopic material unloader for reduces the men price, time saving and safe loading and unloading the materials in industries.

Key Words: Unloading, Conveyor Forward, Conveyor Reverse.

1. INTRODUCTION

The telescopic belt conveyor could be an answer for handling the loading and unloading of parcels. And style and Development of Telescopic Belt Conveyor for Loading and Unloading. Once extended, it minimizes the requirement for operators to hold product manually.

A system features a telescopic conveyor and a minimum of one guiding component. The minimum of one guiding component could also be fastened at a location by suggests that of securing elements. The telescopic conveyor is touched in or counter to the conveyancing direction of the telescopic conveyor from a parking position into AN operative position.

Telescopic belt conveyors are wide employed in warehouses and distribution centre for conveyancing product to and from delivery vehicles. Typically, a telescopic belt conveyor includes a base conveyor unit, AN extendible outer conveyor unit and optionally one or additional intermediate conveyor units that are nested inside each other once backward and might be extended. Custom telescopic conveyors to fit your needs.

1.1 Literature Review

Nalam Surya Sandeep After reading papers supported Telescopic belt conveyor we have a tendency to conclude with the subsequent results:

1.1 Prof. M. M. Kulkarni "Design and Development of Telescopic Conveyor"[1]. Presented at International analysis Journal of Engineering and Technology (IRJET) in May-2016. during this paper the speed of telescopic conveyor system is thirteen bigger than standard conveyor system and

Operation Time needed for transfer the fabric in telescopic conveyor system is thirty third but standard conveyor system.

1.2 R K Bhojar and C C Handa "DESIGN thought FOR RADIAL ADJUSTABLE BELT CONVEYOR SYSTEM"[2]. Presented at International Journal of technology and AI analysis (IJMERR) in four, Oct 2013. during this paper the study is on adjustable height of belt conveyor for variable speed acquiring totally different direction of a belt conveyor system. It transfer material in 2 totally different destination from one supply. This paper makes an attempt to debate the generalized style thought for adjustable radial belt conveyor. The system instructed is straightforward to put in. The system is more reliable and protection. The system doesn't need any difficult elements.

1.3 Nalam Hindu deity Sandeep "Design and Detail of Telescopic Material Unloader" [3]. given at International Journal of Innovative analysis in Science, Engineering and Technology in eleven, November 2014 it's a hydraulic & Chain drive Movable instrumentality for unloading significant materials like Tobacco bales, it'll carry up to 2mtr height with the assistance of hydraulic cylinders & it'll move to and flow direction up to 5mtr with the assistance of chain drive this can be operating with the assistance of intermeshed motors. The capability of this instrumentality is up to a pair of.5 ton as per our style it'll vary.

1.4 Sri Ananth , Vaitla Rakesh "DESIGN AND choosing the right CONVEYOR-BELT"[5]. given at International Journal of Advanced Engineering Technology (IJAET) in Gregorian calendar month, 2013. This paper provides {to style to style} the conveyor system and also the project design stage for the transport of raw materials or finished product, the selection of the strategy should favor the foremost price effective answer for the degree of fabric moved; the plant and its maintenance; its flexibility for adaptation and its ability to hold a spread of masses and even be full every now and then.

2. PROBLEM STATEMENT

The cost, human labor, time, and most importantly energy was wasted during loading and unloading material from trucks without using telescopic belt conveyor.



Fig.1. Loading without Using Telescopic Belt Conveyor

When the transportation of product is depends on labors, there are more chances of accident. Its take more time and energy while loading and unloading material from vehicle as show in the above figure. Due to automation, we not only save energy, but we use our energy in an efficient way. Including this we reduce the cost of conveyor belt since automation. The plant and its maintenance; its flexibility for adaptation and its ability to carry a variety of loads and even be overloaded at times. More importantly a development team can easily monitor the design and accelerate the work.

3. DESIGN CALCULATIONS

3.1 Input Data:

Conveyor Length = 10.5 m

Weight of conveyor material = 50 kg/m

Box dimension = 300 mm X 300mm X 250mm

Target box per minute = 60 – 80 Box

3.2 Find:

Resistance of the belt on the top run (W_o) :

Resistance of the belt on the bottom run (W_u) :

Total resistance force (P) :

Belt speed (S) :

Power of motor (HP) :

3.3 Calculation:

W_o = Resistance of the belt on the top run, kg-f

W_u = Resistance of the belt on the bottom run,

C = Secondary resistance factor

f = Friction between idler and belt

0.016 to 0.018 for non-portable conveyors with good idlers

0.02 For standard conveyors

0.023 to 0.027 for idler in dusty environment

Types of Material Conveyed	Belt Width , mm				
	400	500	650	800	1000
Gravel, Stone, Coal ,ash, ores	1.5	1.75	2	2.75	2.75
Coke, friable materials	1.25	1.5	1.5	1.75	2
Dry and wet sand grains, and light materials	2	3	3.5	4	4
Abrasive materials, fine coke, slag, crushed ore	1.25	2	2	2.5	2.5
Abrasive materials : surge lumps , slaggy rock, ores	-	-	1.75	1.75	2

Table 1.

Allowable Belt Conveyor Speed in m/s

L = Conveyor Length

C_g = Weight of conveyed Material

θ = Inclination of conveyor

H = Height

C_b = Weight of belt / meter length, kg-f / m

Belt width, mm	400	500	650	800	1000
Average weight per meter run , kg-f	5	6.5	9	12	16

Table 2. Weight of Conveyor Belt

G_{ro} = Weight of straight idlers on the top run / meter length kg-f / m

G_{ru} = Weight of straight idlers on the bottom run / meter length kg-f / m

Belt Width mm	Tube Diameter, mm		125		140		150		
	100	20	25	20	25	20	25	20	
TROUGHING IDLERS									
400	13.6	14.1	16.4	20					
500									
650			17.9	21.6	24.4	24.6	-	-	
800			19.4	23.1	26.2	27.4	-	34.7	
1000					29.9	30.2	-	37.8	
STRAIGHT IDLERS									
400	7.6	7.8	9.5	10.7					
500									
650			11	12.2	15.8	15.9	-	-	
800			12.56	13.7	18.2	18.8	-	22.5	
1000					21.3	21.4	-	25.1	

Table 3. Weight of Revolving Parts of Straight Idler on Run

Resistance of the belt on the top run:

$$\begin{aligned}
 W_o &= CFL [(C_g + C_b) \cos\theta + G_{ro}] + H (G_g + G_b) \\
 &= 2 \times 0.02 \times 10.5 [(50 + 5) \cos\theta + 10.7] \\
 &= 27.594 \text{ kgf}
 \end{aligned}$$

Resistance of the belt on the bottom run:

$$\begin{aligned}
 W_u &= C F L [C_b \cos\theta + G_{ru}] + H (G_b) \\
 &= 2 \times 0.02 \times 10.5 [5 \cos\theta + 10.7] \\
 &= 6.594 \text{ kgf}
 \end{aligned}$$

Total resistance force:

$$\begin{aligned}
 P &= W_o + W_u \\
 &= 27.594 + 6.594 \\
 &= 34.188 \text{ kg-f}
 \end{aligned}$$

Belt speed:

Minimum – 60 Box per Min

$$\begin{aligned}
 V &= 60 \times 300 / 60 \times 1000 \\
 &= 0.3 \text{ m/s}
 \end{aligned}$$

Power of motor:

$$\begin{aligned}
 HP &= PV / 75 \\
 &= 34.188 \times 0.3 / 75 \\
 &= 0.136752 \approx 1 \text{ HP}
 \end{aligned}$$

4.4 Specifications:

Conveyor Length: 6 m

Expandable Length : 4.5 m

Belt Width : 400mm x 3mm

Belt Speed : 0.3 m/sec

Power of motor : 1 hp

Telescopic Power : 1 hp

Conveyor Capacity : 50 kg/m

Material of Construction : 2mm and 3mm thick M.S. sheet

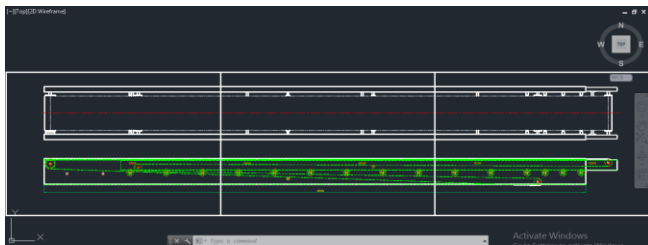


Fig.2. AUTOCAD Drawing of Telescopic belt Conveyor

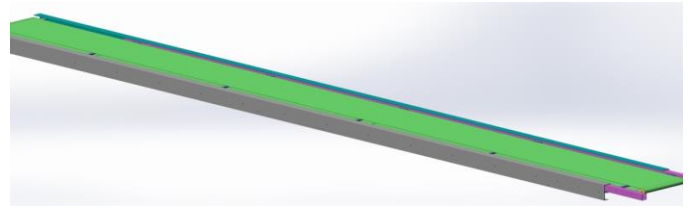


Fig.3. Isometric View of Telescopic belt Conveyor

4. METHODOLOGY

4.1. Fabrication

Fabrication is that the creation of metal structures by cutting, bending and collecting processes. The supported calculation engineering drawings fabrication starts with drawings with precise dimensions and specifications. Then cutting a sheet deliberately. Cutting is finished by torching with hand-held torches. Smaller cutting half cutting by manually and cutting machine. Once all half area unit done by calculate style then all cutting sheets in applying bending method. Bending is finished via press brakes and smaller bending half complete by manually blow.

4.2. Full fastening

Welding could be a fabrication or sculptural method that joins materials, sometimes metals thermoplastics, by inflicting conglutination. this is {often this can be} often done by melting the work items and adding a filler material to create a pool of liquefied material that cools to become a robust joint, with pressure generally utilized in conjunction with heat, or by itself, to supply the weld. This is often in distinction with bonding and brazing that involve melting a lower-melting-point material between the work items to create a bond between them, while not melting the work items.

4.3 Pre assembly

Fabrication and full fastening method is completed then the pre-assembly work is begin during this assembly connecting the mother conveyor and retraction conveyor and that they area unit supporting elements be a part of. For instance belt, pulley, roller, chain, double chain, ext.

4.4. Electrical connections

The electric instrument panel for driving the conveyor and stretch management is put in on the conveyor aspect or on the brink of the conveyor in line with the user's necessities, the operator panel is characterized therein mounted to the front of the conveyor with lighting. Additionally, the wire wiring in line with the management of the electrical instrument panel is characterized therein the wire is connected to the operator panel by a series accent member which will be wired to the chain designed in every of the plurality of frames.

4.5 Final Assembly and Final Quality Checking

After the producing and installation the trials area unit dole out on Telescopic belt conveyor systems. The issues happens throughout trial is overcome in analysis stage. The primary trial was conducted with no load condition on the Telescopic belt conveyor system. The second trial was conducted with load condition on the Telescopic belt conveyor system.

5. RESULT

The major element and parameters of telescopic belt conveyer area unit finalized. The parameters area unit calculated by victimization computer file. The whole resistance force is thirty four.188kgf. The belt speed is zero.3m/s and therefore the drive has power of 1HP motor. The telescopic belt conveyer setup has been created. The length of conveyer is 6m and it's expandable until four.5m for loading and unloading material. This telescopic belt conveyer is convey sixty box per minute. The telescopic belt conveyer is additional economical then labor work.

6. CONCLUSION

Using telescopic belt conveyor, we are able to scale back value, labor needed for work and save the energy throughout loading and unloading material from vehicles. In this method less work force is needed therefore there are units less probabilities of accident throughout transportation of fabric This Telescopic Belt conveyor System for material handling is improves the speed of fabric handling. And this method reduces the human effort. The staff area unit eliminated and

therefore the ultimately the operation value is reduced and profit get increased. This method is helpful and safety for the Loading / Unloading material. The telescopic belt conveyor system is additional economical than typical conveyor system.

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