# Replanning of BC-7 belt conveyor in coal handling system with capacity of 150 tph at Lombok ftp-2 (2x50mw) power plant

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**Abstract— Lombok has high tourism potential that requires a reliable electricity supply, one of which comes from the Lombok FTP-2 2×50 MW Power Plant in Sambelia, East Lombok. This power plant uses coal supplied through a Coal Handling system, with Belt Conveyor BC-7 as one of its main components. This study aims to redesign the BC-7 Belt Conveyor with a capacity of 150 TPH through manual calculations of capacity and motor power and using Helix Delta T-6 Conveyor Design software. The study focuses on one conveyor unit, using coal material, and only discusses aspects of capacity and motor power under stable operating conditions. The methods used include literature studies, field observations, and data collection from the Lombok FTP-2 PLTU. The data was then processed for manual calculations and software simulations. The results showed a transport capacity of 165 tons/hour (a 10% increase from the previous capacity). The highest motor power without SF from the software was 8.49 kW (19.75% greater than the manual result). The use of software proved to be more efficient and helpful in planning belt conveyor systems.**

**Keywords**— Belt Conveyor, Motor Power, Helix Delta T-6, Capacity, PLTU.

## 1. Introduction

Lombok has great tourism potential, with natural beauty mparable to Bali. To support this potential, the availability of infrastructure, especially electricity supply, is very important. Along with the rapid growth of the NTB economic sector, particularly trade, tourism, and services, the demand for electricity has also increased, especially with the development of the Mandalika Special Economic Zone [1].

For this reason, PLN needs to increase its power plant capacity, including coal-fired power plants [2]. Several power plants in Lombok include: Jeranjang FTP-1 PLTU (3x25 MW), Sambelia IPP PLTU (2x25 MW), Lombok Peaker PLTMGU (13x9.6 MW), and Sambelia FTP-2 PLTU (2x50 MW). The Lombok FTP-2 PLTU was built by PT Rekayasa Industri together with PT Rafako (Poland) in Padak Goar Village, Sambelia, East Lombok, with an area of ±38 Ha [1], [3]. This PLTU consumes ±200,000 tons of coal per year and generates 50 MW of electricity [4]. It is in located a coastal area, consisting of offshore, onshore, and land areas [5].

The Coal Handling System handles coal from unloading from barges, stacking in stockpiles, to filling bunkers [6]. One of its main components is the conveyor belt, an efficient material transfer device that supports smooth operations [7]. Belt conveyors transport bulk materials such as coal or unit loads such as boxes. The productivity of each unit depends on its technical parameters, so a study is needed to improve efficiency [8].

Currently, the BC-7 conveyor belt transports coal from chain feeder 1 to diverter gate 5 with a capacity of 150 TPH [9]. However, this capacity is no longer sufficient for the needs of the Lombok FTP-2 power plant. To maintain the continuity of coal supply to the boiler, the capacity needs to be increased to 165 TPH. Previous studies have shown that increasing the speed of the conveyor belt can increase its transport capacity [10]. Therefore, this study aims to redesign the BC-7 Belt Conveyor to increase its capacity. Calculations will be performed manually and with the assistance of Helix Delta T-6 Conveyor Design software to obtain the optimal motor power and capacity [11].

## 2. Previous Researches

Several previous studies have discussed the planning and design of conveyor systems for various industrial needs. Anisa Wahyu Ummami (2018) redesigned the conveyor belt on a 30 tons/hour stone crusher in a small industry, resulting in a motor power requirement of 6 HP and a rubber belt specification of 650 mm wide [12]. Novian Try Kurniawan (2020) designed a scraper chain conveyor for transporting sugarcane bagasse ash with a capacity of 20 tons/hour at PG Tjokier, which required a motor power of 18.36 kW and used a DK09150R chain and bearings with a life of more than 500 hours [13].

Recki Aosoby et al. designed a large-capacity belt conveyor with a capacity of up to 2700 tons/hour for transporting coal, with a belt width of 1800 mm, motor power of 10 HP, and a rubber-cotton coated belt specification [14]. Meanwhile, M. Fatkhur Roziq Ardiansyah (2021) redesigned the chain conveyor at PG Gempol Kerep for a capacity of 75 tons/hour, with a power requirement of 5.3 kW and a bearing life of more than one million working hours [15]. In general, these studies emphasize the importance of motor power calculations, belt or chain type selection, and technical specifications that match material characteristics and operational requirements to achieve an efficient, reliable, and durable conveyor system [16].

## 3. Method

### 3.1. Research Flowchart

The research flowchart for this study is as follows:

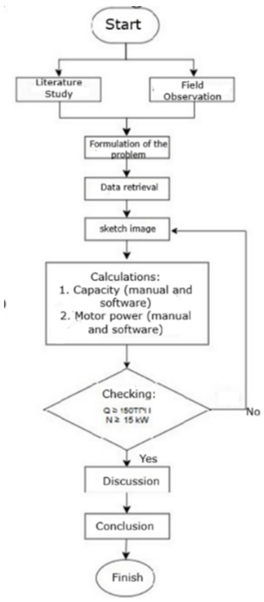



**Figure 2** Research Flowchart

### 3.2. Research Location and Time

The location, place, and time can be seen in the following figure:

**Figure 3** Research Location

Research Time: October 2024

Research Location: Lombok FTP-2 Power Plant Province: West Nusa Tenggara

Regency: East Lombok Subdistrict: SambeliaThe Abstract

3.3. Free Body Diagram

The Free Body Diagram for this plan can be seen as follows:

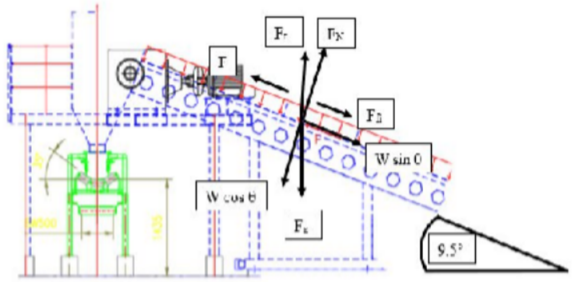


**Figure 4** Free Body Diagram

## 4. RESULT AND DISCUSSION

### 4.1. Observation Data Results

After conducting field observations at the Lombok FTP- 2 2x50MW power plant, several data points were obtained that can support the calculation of the belt conveyor. The data obtained is as follows:Units Use SI unit or SI derived units.

**Table 1** Belt Conveyor Planning

| No. | Description | Observation Result |
|---|---|---|
| 1. | Conveyor Name | Conveyor Belt –7 |
| | Material Transported | Coal |
| | Coal Density | 0.8 – 1.2 tons/$m^3$ |
| | Operating Conditions | Dusty |
| | Motor Power Used | 15 kW |
| | Indoor Outdoor | Outdoor |
| 2. | Belt Conveyor Capacity | 150 tons/hour |
| | Belt Conveyor Speed | 3 m/s |
| | Incline Angle Conveyor (b ) | 9.5◦ |
| | Conveyor Length | 40 m |
| 3. | Belt Length (L) | 89.3 m |
| | Belt Width (B) | 500 mm = 0.5 m |
| | Top Cover Thickness ($d_2$) | 5 mm |
| | Lower Cover Thickness ($d_3$) | 3 mm |

| | | |
|---|---|---|
| | Number of Layers | 3 |
| 4. | Distance Between Upper Rollers ($I_1$ ) | 1.2 m |
| | Lower Roller Distance ($I_2$) | 3 m |
| | Carry Idler Trough Angle | 35° |
| | Return Idler Trough Angle | 0° |
| | Outer Roller Diameter (D) | 114 mm |

4.2. Manual Belt Conveyor Planning

In planning a belt conveyor, various calculations are required for the components in the belt conveyor, including:

1. Cross-sectional Area of the Load Trough Idler

$A = A1+A2$

$= 0.16B^2 \times C_1 \times \tan(0.35j) + 0.0435 \times B^2$

$= 0.16 \,.\, 0.5^2 \,.\, 1 \,.\, \tan(0.35 \,.\, 38) + 0.0435 \,.\, 0.5^2$

$= 0.16 \times 0.5^2 \times 1 \times \tan(13.3) + 0.0108$

$= 0.0202 \approx 0.02m^2$

2. Conveyor Capacity

$Q = 160\ B_{tr}^2.v.g\ [3.6\ C_1 \tan(0.35j)+1]$

$= 160 \times 0.5^2 \times 3 \times 0.72 \times [3.6 \times 1 \times \tan(0.35 \times 38) + 1]$

$= 160.\ 0.5^2.3.\ 0.72\ .\ [3.6\ .\ 1\ .\ \tan(13.3)+1]$

= 160 tons/hour

$$Q\ Expansion = \frac{(Q\ design - Q\ initial\ operation)}{Q\ initial\ operation} x\ 100\%$$

$$= \frac{(160 - 150)}{150} x\ 100\%$$

$$= \frac{10}{150} x\ 100\%$$

$$= 6,7\%$$

3. Load Weight Per Meter

$q = 1000 \times A \times g$

$= 1000 \times 0.02 \times 0.72$

= 14.4 kg/m = 15 kg/m

4. Belt Weight Per Meter

$q_b = 1.1.\ B\ (d_i+d_1+d_2$

= 1.1. B (1.9 mm. 3 + 5 mm + 3 mm)

= 1.1. B (13.7 mm)

= 1.1 kg/dm³ × 0.5 m × 13.7 mm

= Z7.54 kg/m = 8 kg/m

5. Upper Idler Roller

Weight of upper roller

$G'_p = 10\ B + 7\ kg$

$= 10 \times 0.5 + 7$ kg

= 12 kg

Idler roller weight per meter

$q'_p = G'_p / I1$

= 12 kg / 1.2 m

= 10 kg/m

6. Lower Idler Roller Weight of lower roller $G''_p$ = 10 B + 3 kg
   = 10 × 0.5 + 3 kg

   = 8 kg

   Weight of roller per meter
   $q''_p = G''_p / I_2$
   = 8 kg / 3 m
   = 2.66 kg/m = 3 kg/m

7. Belt tension
   $W_{3-4}$= {(q+$q_b$+$q'_p$) L.w' cosb + (q+$q_b$) L sinb / cos b
   = {33 × 40 × 0.04 × cos 9.5 + 23 × 40 × sin 9.5 / cos 9.5
   = 206.84 kg = 207 kg

   $W_{1-2}$= {($q_b$+ $q''_p$) L.w' cosb -$q_b$.L sinb} / cos b
   = {11 × 40 × 0.035 × cos 9.5 – 8 × 40 × sin 9.5} / cos 9.5
   = -38.15 kg = -38.2 kg

Based on Figure 4, the pull at each point can be calculated as follows:

- $S_1$= Tension at point 1 (Belt leaving the driven pulley)
- $S_2$= Tension at point 2 (Belt entering the driven pulley)
  S2= S1+ W1-2
  = $S_1$+ (-38.2 kg)
  = $S_1$– 38.2 kg
- $S_3$= Pull at point 3 (friction resistance of pulley between 5 to 7%) $S_3$ = 1.07 × $S_2$
  = 1.07 ($S_1$– 38.2)
  = 1.07 $S_1$ – 40.9
- $S_4$ = Pull at point 4 (calculated from the material dropped at the end of the pulley tail) S4= S3+ W3-4
  = 1.07 $S_1$– 40.9 + 207
  = 1.07 $S_1$+ 166.1 kg …. (*)

8. Theoretical Belt Pull $S_t$ = $S_4$. $S_{sl}$. $e^{ma}$ S ≤ S. $e^{ma}$
   4 sl
   $S4 \leq S1.\ 2.718^{0.2.\ 3.7}$
   $S_4$≤ $S_1$. 2.09 … (**)
   Equations (*) and (**) yield:
   $S_4$= 1.07 $S_1$+ 166.1 kg
   $S_1$× 2.09³ 1.07 $S_1$+ 166.1 kg
   $S_1$³ 162.84 kg
   $S_1$= 162.84 = 163 kg …. (***)

Next, equation (***) is obtained
for calculating $S_2$, $S_3$, and $S_4$

1. $S_2 = S_1 - 38.2$
   $S_2 = 163 - 38.2$
   $= 124.8$ kg
2. $S_3 = 1.07\ S_1 - 40.9$
   $= 1.07\ (163) - 40.9$
   $= 133.51$ kg
3. $S_4 = 1.07\ S_1 + 166.1$
   $= 1.07\ (163) + 166.1$
   $= 340.51$ kg

9. Pulley Pull
   $W_{dr} = 0.03\ (S_4 + S_1)$
   $= 0.03\ (340.51+163)$
   $= 15.11$ kg
10. Effective Tension
   $W_o = S_4 - S_1 + W_{dr}$
   $= 340.51 - 163 + 15.11$
   $= 192.62$ kg $= 193$ kg
11. Required Electric Motor Power
   • Without using a safety factor

$$N = \frac{W_O \,.\, v}{102.\ \text{T}T}$$

$$N = \frac{193.\ 3}{102.\ 0{,}8}$$

$= 7.09$ kW

• Using a safety factor of 1.3

$$N = \frac{W_O \,.\, v \,.\, FoS}{102.\ \text{T}T}$$

$$N = \frac{193.\ 3.\ 1{,}3}{102.\ 0{,}8}$$

$= 9.23$ kW

4.3. Manual Belt Conveyor Design Result

From the above calculations, the results of the manual belt conveyor design are as follows:

**Table 2** Manual Planning Calculation Results

| No | Planning | Calculation Results |
|---|---|---|
| 1 | Load Cross-Section Area (A) | 0.02 $m^2$ |
| 2 | Conveyor Design Capacity (Q)<br>Initial Actual Capacity Expansion Capacity | 160 tons/hour<br>150 tons/hour<br>6.7 |
| 3 | Load Weight per Meter of Transport Equipment (q) | 15 kg/m |
| 4 | Belt Weight per Meter ($q_{b)}$ | 8 kg/m |
| 5 | Weight of Upper Idler Roller ($G'_p$ ) | 12 kg |

| | | |
|---|---|---|
| 6 | Idler Roller Weight per Meter ($q'_p$ ) | 10 kg/m |
| 7 | Idler Roller Weight Top ($G''_p$ ) | 8 |
| 8 | Idler Roller Weight per Meter ($q''_p$ ) | 3 kg/m |
| 9 | Resistance Force on the Loaded Part ($W_{3-4}$) | 207 kg |
| 10 | Resistance Force on the Unloaded Section ($W_{1-2}$) | -38.2 kg |
| 11 | Theoretical Belt Pull at Point 1 ($S_1$) Theoretical Belt Tension at Point 2 ($S_2$) Theoretical Belt Tension at Point 3 | $S_1$= 163 kg $S_2$= 124.8 kg $S_3$= 133.51 kg $S_4$= 340.51 kg |
| | ($S_3$) Theoretical Belt Pull Point 4 ($S_4$) | |
| 12 | Pulley Pull ($W_{dr}$) | 15.11 kg |
| 13 | Effective Pull Tension ($W_o$) | 193 kg |
| 14 | Electric Motor Power Without SF Electric Motor Power with SF 1.3 Electric Motor Power Available on the Market | 7.09 kW 9.23 kW 11 W |

4.4. Belt Conveyor Planning with Sofware

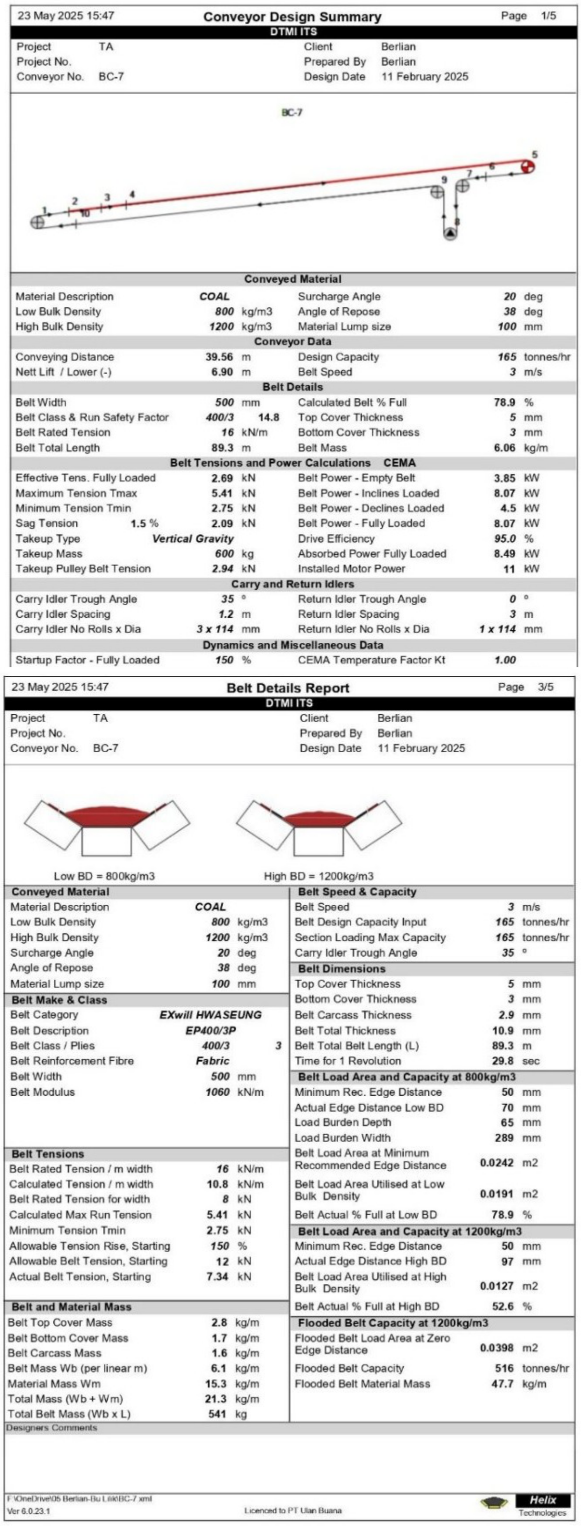
When planning a conveyor belt using software, the steps that can be taken are as follows:

1. Click File > New Project. This project is named TA.
2. Enter the project name, conveyor description, and file location.
3. Click Create to start a new project.
4. Perform 2D design using AutoCAD. This is intended to facilitate the determination of conveyor sections, coordinate points (x, y, z), belt contact angle on the pulley, belt departure angle on the pulley, and pulley rotation direction during data entry.
5. Input the coordinate data (x, y, z), the belt contact angle on the pulley, the belt departure angle on the pulley, and the pulley rotation direction.
6. Input the load on each conveyor section.
7. Input data on the material to be transported/handled.
8. Input the initial specifications of the belt to be used.
9. Input the initial carry idler specification data to be used.
10. Input the initial data specifications for the return idler to be used.
11. Input the initial data specifications for the motor to be used.
12. Input the initial data specifications for the gearbox/speed reducer to be used.
13. Input the initial data specifications for the fluid coupling to be used.
14. Input the initial specification data for the coupling (high speed side) to be used.
15. Input the initial specification data for the coupling (low speed side) to be used.
16. Input the initial specifications of the brake to be used.
17. Input the initial specifications for the holdback to be used.
18. Input the initial specification data for the pulley shaft material to be used.
19. Running

Click Calculate > CEMA. In this planning, the CEMA standard is used because it is the most used standard. When calculated, the software will calculate and display recommendations for the belt, motor, power absorption, and a summary of all the data that has been input and calculated.

20. Show report for further analysis.

From the steps of using Helix Delta T-6 Conveyor Design, the following results were obtained:



23 May 2025 15:47 — **Conveyor Design Summary** — Page 1/5

DTMI ITS

| | | | |
|---|---|---|---|
| Project | TA | Client | Berlian |
| Project No. | | Prepared By | Berlian |
| Conveyor No. | BC-7 | Design Date | 11 February 2025 |



| | | | |
|---|---|---|---|
| **Conveyed Material** | | | |
| Material Description | COAL | Surcharge Angle | 20 deg |
| Low Bulk Density | 800 kg/m3 | Angle of Repose | 38 deg |
| High Bulk Density | 1200 kg/m3 | Material Lump size | 100 mm |
| **Conveyor Data** | | | |
| Conveying Distance | 39.56 m | Design Capacity | 165 tonnes/hr |
| Nett Lift / Lower (-) | 6.90 m | Belt Speed | 3 m/s |
| **Belt Details** | | | |
| Belt Width | 500 mm | Calculated Belt % Full | 78.9 % |
| Belt Class & Run Safety Factor | 400/3 14.8 | Top Cover Thickness | 5 mm |
| Belt Rated Tension | 16 kN/m | Bottom Cover Thickness | 3 mm |
| Belt Total Length | 89.3 m | Belt Mass | 6.06 kg/m |
| **Belt Tensions and Power Calculations CEMA** | | | |
| Effective Tens. Fully Loaded | 2.69 kN | Belt Power - Empty Belt | 3.85 kW |
| Maximum Tension Tmax | 5.41 kN | Belt Power - Inclines Loaded | 8.07 kW |
| Minimum Tension Tmin | 2.75 kN | Belt Power - Declines Loaded | 4.5 kW |
| Sag Tension 1.5 % | 2.09 kN | Belt Power - Fully Loaded | 8.07 kW |
| Takeup Type | Vertical Gravity | Drive Efficiency | 95.0 % |
| Takeup Mass | 600 kg | Absorbed Power Fully Loaded | 8.49 kW |
| Takeup Pulley Belt Tension | 2.94 kN | Installed Motor Power | 11 kW |
| **Carry and Return Idlers** | | | |
| Carry Idler Trough Angle | 35 ° | Return Idler Trough Angle | 0 ° |
| Carry Idler Spacing | 1.2 m | Return Idler Spacing | 3 m |
| Carry Idler No Rolls x Dia | 3 x 114 mm | Return Idler No Rolls x Dia | 1 x 114 mm |
| **Dynamics and Miscellaneous Data** | | | |
| Startup Factor - Fully Loaded | 150 % | CEMA Temperature Factor Kt | 1.00 |

23 May 2025 15:47 — **Belt Details Report** — Page 3/5

DTMI ITS

| | | | |
|---|---|---|---|
| Project | TA | Client | Berlian |
| Project No. | | Prepared By | Berlian |
| Conveyor No. | BC-7 | Design Date | 11 February 2025 |



| | | | |
|---|---|---|---|
| **Conveyed Material** | | **Belt Speed & Capacity** | |
| Material Description | COAL | Belt Speed | 3 m/s |
| Low Bulk Density | 800 kg/m3 | Belt Design Capacity Input | 165 tonnes/hr |
| High Bulk Density | 1200 kg/m3 | Section Loading Max Capacity | 165 tonnes/hr |
| Surcharge Angle | 20 deg | Carry Idler Trough Angle | 35 ° |
| Angle of Repose | 38 deg | **Belt Dimensions** | |
| Material Lump size | 100 mm | Top Cover Thickness | 5 mm |
| **Belt Make & Class** | | Bottom Cover Thickness | 3 mm |
| Belt Category | EXwill HWASEUNG | Belt Carcass Thickness | 2.9 mm |
| Belt Description | EP400/3P | Belt Total Thickness | 10.9 mm |
| Belt Class / Plies | 400/3 3 | Belt Total Belt Length (L) | 89.3 m |
| Belt Reinforcement Fibre | Fabric | Time for 1 Revolution | 29.8 sec |
| Belt Width | 500 mm | **Belt Load Area and Capacity at 800kg/m3** | |
| Belt Modulus | 1060 kN/m | Minimum Rec. Edge Distance | 50 mm |
| | | Actual Edge Distance Low BD | 70 mm |
| | | Load Burden Depth | 65 mm |
| | | Load Burden Width | 289 mm |
| **Belt Tensions** | | Belt Load Area at Minimum Recommended Edge Distance | 0.0242 m2 |
| Belt Rated Tension / m width | 16 kN/m | Belt Load Area Utilised at Low Bulk Density | 0.0191 m2 |
| Calculated Tension / m width | 10.8 kN/m | | |
| Belt Rated Tension for width | 8 kN | | |
| Calculated Max Run Tension | 5.41 kN | Belt Actual % Full at Low BD | 78.9 % |
| Minimum Tension Tmin | 2.75 kN | **Belt Load Area and Capacity at 1200kg/m3** | |
| Allowable Tension Rise, Starting | 150 % | Minimum Rec. Edge Distance | 50 mm |
| Allowable Belt Tension, Starting | 12 kN | Actual Edge Distance High BD | 97 mm |
| Actual Belt Tension, Starting | 7.34 kN | Belt Load Area Utilised at High Bulk Density | 0.0127 m2 |
| | | Belt Actual % Full at High BD | 52.6 % |
| **Belt and Material Mass** | | **Flooded Belt Capacity at 1200kg/m3** | |
| Belt Top Cover Mass | 2.8 kg/m | Flooded Belt Load Area at Zero Edge Distance | 0.0398 m2 |
| Belt Bottom Cover Mass | 1.7 kg/m | | |
| Belt Carcass Mass | 1.6 kg/m | | |
| Belt Mass Wb (per linear m) | 6.1 kg/m | Flooded Belt Capacity | 516 tonnes/hr |
| Material Mass Wm | 15.3 kg/m | Flooded Belt Material Mass | 47.7 kg/m |
| Total Mass (Wb + Wm) | 21.3 kg/m | | |
| Total Belt Mass (Wb x L) | 541 kg | | |

Designers Comments

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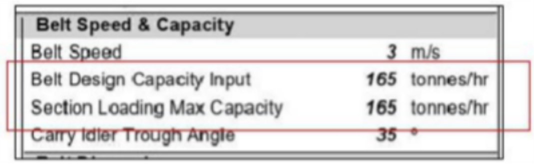
**Figure 6** Helix Delta T-6.2 Report

4.5 Belt Conveyor Capacity Planning with Software

The results of the belt capacity calculation for the conveyor using software are as shown in the table below:



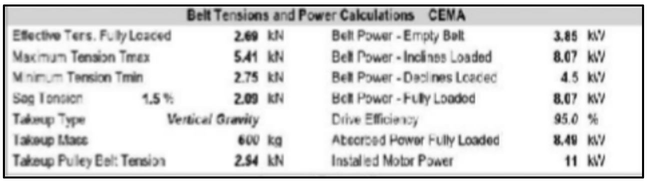
| Belt Speed & Capacity | | |
|---|---|---|
| Belt Speed | 3 | m/s |
| Belt Design Capacity Input | 165 | tonnes/hr |
| Section Loading Max Capacity | 165 | tonnes/hr |
| Carry Idler Trough Angle | 35 | ° |

**Figure 7** Software Capacity Calculation Results

The capacity calculation results for the Belt Conveyor using the Helix Delta T-6 Conveyor Design software are 165 tons/hour. During initial operation, the capacity was 150 tons/hour. From this increase, a capacity expansion percentage of 10% was obtained.

4.6 Motor Power Planning for Belt Conveyor Using Software

The results of calculating the power of the Belt- - conveyor motor using the software are shown in the table below:



| Belt Tensions and Power Calculations CEMA | | | | | | |
|---|---|---|---|---|---|---|
| Effective Tens. Fully Loaded | | 2.69 kN | Belt Power - Empty Belt | 3.85 | kW |
| Maximum Tension Tmax | | 5.41 kN | Belt Power - Inclines Loaded | 8.07 | kW |
| Minimum Tension Tmin | | 2.75 kN | Belt Power - Declines Loaded | 4.5 | kW |
| Sag Tension | 1.5 % | 2.09 kN | Belt Power - Fully Loaded | 8.07 | kW |
| Takeup Type | Vertical Gravity | | Drive Efficiency | 95.0 | % |
| Takeup Mass | | 600 kg | Absorbed Power Fully Loaded | 8.49 | kW |
| Takeup Pulley Belt Tension | | 2.54 kN | Installed Motor Power | 11 | kW |

**Figure 8** Motor Power Results Using Software

From the results of the motor power planning calculation using the software above, the safety factor (SF) used is as follows:

Where:

Motor power without SF = 8.49 kW

Motor power available on the market = 11 kW

Therefore:

SF = (Motor power available on the market)/ (Motor power Without SF)

SF = (11 kW)/ (8.49 kW) SF = 1.3

4.7 Discussion

From the manual calculations above and calculations using the Helix Delta T-6 Conveyor Design software, the following results were obtained:

1. Comparison of Belt Conveyor Carrying Capacity

   The comparison of the conveyor belt capacity can be seen in the following table:

**Table 3** Results of Manual and Software Capacity Comparison

| No | Capacity Analysis | Manual | Software |
|---|---|---|---|
| 1 | Expansion Design Capacity | 160 tons/hour | 165 tons/hour |
| 2. | Initial Operating Capacity | 150 tons/hour | 150 tons/hour |
| 3 | Expansion Capacity | 6.7 | 10 |

2. Motor Power Comparison

   The comparison of motor power from the Belt Conveyor can be seen in the following table:

**Table 4** Manual Motor Power Comparison Results and Software

| No | Motor Power Analysis | Manual Results | Software Results |
|---|---|---|---|
| 1. | Motor Power Without FoS | 7.09 kW | 8.49 kW |
| SF | | 1.3 | 1.3 |
| 2 | Motor Power with FoS | 9.23 kW | 11 kW |
| 3. | Motor Power Available on the Market | 11 kW | 11 kW |
| SF Final | | 1.5 | 1.3 |

## 5. CONCLUSION

Manual capacity calculations and those performed using the Helix Delta T-6 software yielded identical results: design capacity of 165 tons/hour, actual capacity of 150 tons/hour, and 10% expansion. While manual calculations are accurate, the use of software is superior in terms of speed, ease of use, and efficiency, and minimizes the risk of errors.

Power without SF is 8.49 kW and final power is 11 kW with SF 1.3 as required by the system. Calculations using Helix Delta T-6 proved to be more efficient and accurate because they consider all operational variables. The importance of planning that considers actual needs and motor availability is emphasized to be more energy efficient and effective.

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