



# Conveyor Damage in Coal Transshipment Activities at PT. Pelindo II Cabang Teluk Bayur

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## Article Info

## Abstrak

### Abstract

Keywords:  
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The aim of this research is to determine the impact that occurs on conveyor damage during coal transshipment activities and to find out what efforts are being made and to overcome the impact of damage at PT. Pelindo Teluk Bayur. This study used descriptive qualitative method. Data was collected through interviews, observation, literature study and documentation. The results of the research show the impact that occurred on conveyor damage during coal transshipment activities at PT. Pelindo Teluk Bayur, namely all loading activities at the jetty stopped, then the transshipment activity process at Teluk Bayur was hampered, and demurrage was given by the buyer to PT. Pelindo Teluk Bayur. Efforts to reduce the impact of damage to the conveyor at the TCM jetty on coal transshipment activities in Muara Berau anchorage at PT. Pelindo Teluk Bayur is by speeding up conveyor repairs at the TCM jetty, diverting several barges that have arrived at the TCM jetty area to other jetty areas, changing vessel schedules so that there is no accumulation of vessels at Teluk Bayur and speeding up the loading of coal into vessels with the aim of not prolonging demurrage given.

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## 1. INTRODUCTION

Conveyor as a horizontal, inclined, or vertical device for moving or transporting bulk materials, packages, objects, or passengers on a path predetermined by the design of the device. Andrejiova, et al (2021) explain that conveyors are a means of transportation that is often used in mining, coal, ports, power plants to transport goods with large capacities on an ongoing basis. Erwin (2017) states that the conveyor machine is one of the most widely used raw material transportation tools. Apart from the very long distances, this tool also has quite a large transport capacity, such as in fertilizer, coal and cement factories. This tool can transport material. bulk from small lumps to medium lumps such as coal. In general, a conveyor is a mechanical system that has the function of moving loads from one place to the desired place. Conveyors have main components, namely belts which act as traction (pulling), emittance (transmitting power) and motion, as well as supporting material loads. Conveyor belts represent an important component in the practical transportation of materials, it is necessary to monitor and understand the operating periods that may cause damage (Grincova, et al, 2019). Belt conveyor is one of the conveyor systems used in transporting coal and has efficient speed, long transportation distance, low energy consumption, safe operation and simple maintenance. This conveyor belt is mainly used to carry coal from the extraction location to the location of consumption as well as further

processing or storage. The life of a conveyor belt depends on the type of material being transported, the specifics of the transport point and the length and age of the conveyor. This tool works continuously, transporting material from the tail pulley to the head pulley. During belt conveyor operation, the belt passes over two pulleys to change its running direction. Between the pulleys, along its entire length, the belt is supported by a set of idlers. Above the conveyor belt, there is a foot chute, the arrangement and shape of which guarantees the correct arrangement of the material discharged on the conveyor belt and prevents it from spilling out of the belt area. The belt is the most important element in installing a conveyor belt and is the most expensive component of the conveyor. It is estimated that the cost is around 60% of the total cost of the conveyor. Important material properties and technological parameters of conveyor belts are contact force and dynamic resistance. It plays a very important role in construction and operation. Therefore, the conveyor belt must be selected very carefully. Thus, diagnosing the impact of conveyor belt damage is the most important thing because conveyor belt damage results in costs not only related to repairs, but also related to forced downtime in coal transshipment activities. Irwandy (2014) states that coal is a dark brown, easy-to-burn rock that is obtained when land and water plants accumulate and become embedded throughout geographic ages, which are transmitted by heat and pressure. According to Grinova, et al (2019), conveyor belt damage generally occurs as a result of a number of factors. The most basic damage results from insufficient puncture resistance of the conveyor belt which does not match the belt structure, the wrong support system is selected, the wrong channel structure, and especially from a fall height that is too high so that it is unable to absorb the impact energy. The main factors that cause conveyor damage according to Fedorko , et al (2013), are: 1) Improper conveyor construction. 2) Inappropriate support system. 3) Poor solution of launch and carriage. 4) Ignoring the special properties of the materials being transported. 5) Inadequate maintenance. 6) Monitoring device failure Transshipment is the activity of moving goods or cargo carried out in the middle of the sea from ship to ship (ship to ship). Tiworo, et al (2021) explain that transshipment is a coal loading and unloading process that is carried out or carried out offshore using an intermediary in the loading. And also transshipment can also be interpreted as cargo that will be continued from another region to another region, as for supporting activities. Transshipment: With the cargo (Cargo); Loading port; Tugboats and barges; Floating cranes; Movement (ShiftingPermit); MV (Mother Vessel). The aim of this research is to determine the impact that occurs on conveyor damage during coal transshipment activities and to find out what efforts are being made and to overcome the impact of damage at PT. Pelindo Teluk Bayur.

## 2. METHODS

The method used in this research is descriptive qualitative (Sugiyono, 2018). The research was carried out in order to search for and collect data in order to get a picture of the impact of conveyor damage on coal transshipment activities at PT. Pelindo Teluk Bayur. Therefore, researchers use a qualitative descriptive method that describes the object under study. The research was carried out at PT. Pelindo Teluk Bayur, Padang City, West Sumatera for approximately 12 months. Data collection was carried out by direct observation at the TCM jetty and the object of research was conveyor damage. This is intended to obtain as much data as possible regarding conveyor damage. Then hold discussions or interviews with Fleet Management, Cargo Handling, Shipper Representative to obtain data on conveyor damage and data on the implementation of standard operational procedures (SOP). Data was also obtained from various literature, including instruction manuals, SOPs for running conveyors and related articles. By collecting valid data, it will easily help in the data processing process so that problem solving results will be obtained exactly as expected. The analytical approach taken is a qualitative descriptive of conveyor damage based on processing of data obtained from observations and information from various sources as well as from various literature, scientific articles as a comparison and analytical conclusions are obtained. The ongoing problems are described, explained and the triggers identified, then the solution to the problem is analyzed.

## 3. RESULT AND DISCUSSION

Based on the results of observations, it was found that there were reports of damage to the conveyor at the TCM jetty which was caused by damage to the conveyor belt. This is in line with research by Syarifuddin and Suriyanto (2019) which stated that after several years of operation it was found that conveyor belts often had problems which caused the belt to wear out quickly, for example joints peeling and jogging which of course hampered the process of stocking (stacking) and dredging (rackclaiming) coal at the coal yard. This is

supported by research by Suwanto, Rohadi, and Asnadi (2020) which states the problems and obstacles that occur in conveyor machines belonging to PT. Pelindo Teluk Bayur, as with the conveyor belt, the conveyor frame and conveyor do not move straight and smoothly when carrying loads or materials and wear and tear occurs on the upper and lower conveyor belts which will disrupt the performance of the conveyor itself if damage occurs which results in the conveyor not work optimally.

This conveyor damage has an impact on operations at PT. Pelindo Teluk Bayur, especially for transshipment activities that will take place or activities that have been planned, so that in the future this transshipment activity will experience a setback, the operational partner as the manager of the TCM jetty must be able to take responsibility for this incident. The damage that occurred had an impact on production delays in sending cargo to the barge, where the barge being towed by the tug boat would sail carrying the cargo, the estimated sailing time would be longer and take 3 x 24 hours or more depending on the condition of the channel. This means that vessels that are already on standby in Teluk Bayur will also be delayed in loading. This is in line with research by Rosliawaty, Jumriani and Muh. Wirawan Perdana (2019) which shows that the slow process of anchoring barges to the hull of large ships or to floating cranes and floating conveyors causes slow coal loading times to vessels. Damage to the loading and unloading equipment made the process of loading coal from barges to large ships delayed.

According to the results of shipment monitoring taken at the end of June 2021, there were 7 ships that had arrived in Muara Berau and were estimated to be loaded in June 2021, but had to wait for cargo due to damage to the conveyor at the TCM jetty which resulted in delays in delivering coal to Muara Berau. This has an impact on delays in transshipment activities and requires rescheduling by parties such as buyers, FLF, surveyors and agents so that they can be prepared according to the load of the barge that is ready to be loaded. The following are details of the coal cargo from several shippers that will be loaded on the 7 delayed ships.

Vessels that are delayed with the total load of several coal shippers. Judging from the loading load, TCM and BEK have more load, where the load is assisted by the TCM barge conveyor loading jetty to load onto the barge. This causes the vessel to be delayed because it has to wait for cargo from TCM or BEK Based on the description above, the impact that occurred on conveyor damage during coal transshipment activities at PT. Pelindo Teluk Bayur, namely:

1. Cessation of dijetty loading activities which resulted in tugboats and barges those that have been chartered have stopped operating for a while, which makes Bunyut mooring at that time was full of tug boats and barges on standby
2. PT. Pelindo Teluk Bayur when carrying out transshipment activities is assisted by a floating loading facility (FLF). FLF that is ready to load vessels also delayed.
3. The company gets the demurrage given by the buyer to PT. Pelindo Teluk Bayur USD 15,000/day and requires to pay the demurrage according to the number of days of delay

#### 4. CONCLUSION

- a. The impact that occurred on conveyor damage during coal transshipment activities at PT. Pelindo Teluk Bayur, namely: 1) Loading activities at the jetty have all stopped. 2) The process of transshipment activities at Teluk Bayur anchorage was hampered. 3) The buyer provides a demurrage fee to the shipper and must pay USD 15,000/day according to the total days of delay.
- b. Efforts made to overcome the impact of conveyor damage on coal transshipment activities are 1) Accelerating conveyor repairs at the TCM jetty and diverting several barges that have arrived at the TCM jetty area to another jetty area. 2) Change the vessel schedule so that there is no accumulation of vessels at the Teluk Bayur anchorage. 3) Speed up the loading of coal into vessels with the aim of not extending the demurrage provided
- c. Suggestions that can be given are as follows which is the operational implementer at Jetty TCM, should carry out regular daily, monthly and annual inspections and maintenance on the conveyor.

#### 5. REFERENCES

- Andrejiova, Miriam, Anna Grincova, Daniel Marasova. (2021). Identification with machine learning techniques of a classification model for the degree of damage to rubber-textile conveyor belts with the aim to achieve sustainability. *Engineering Failure Analysis*, 127.
- Erwin, (2017), Konsep perancangan kualitas sistem transmisi conveyor, (*Jurnal Kajian Teknik Mesin*), (Vol. 2 No. 2, Agust 2017)

- Fedorco, Gabriel, Vieroslav Molnar, Daniela Marasova, Anna Grincova, Miroslav Dovica, Jozef Zivcak, Teodor Toth, Nikoleta Husakova. (2013). Failure analysis of belt conveyor damage caused by the falling material. Part II: Application of computer metrotomography. *Engineering Failure Analysis*, 34, 431-442.
- Grincova, Anna, Miriam Andrejiova, Daniela Marasova, Samer Khouri. (2019). Measurement and determination of the absorbed impact energy for conveyor belts of various structures under impact loading. *Measurement*, 131, 362-371.
- Rosliawaty, R., Jumriani, J., & Perdana, M. I. (2021). Analisis Proses Bongkar Muat Batu Bara di PT. SURYA BAHAU MANDIRI di TARAKAN. *JURNAL VENUS*, 9(01), 49-55.
- Sugiyono, D. (2018). Metode penelitian kuantitatif, kualitatif dan R&D/Sugiyono. Bandung: Alfabeta, 15(2010).
- Suwarto, S., Rohadi, R., & Asnadi, A. (2020). Pengaruh Kerusakan Mesin Conveyor Batubara Pada Proses Produksi Di Pt. Kitadin Embalut Site. In *Seminar Nasional Hasil Penelitian & Pengabdian Kepada Masyarakat (SNP2M)* (pp. 22-29).
- Syarifuddin, M. A., & Suriyanto, S. (2019). Analisis Penyebab Utama Kerusakan Belt conveyor Pada BC 6 System Menggunakan Metode Fishbone Diagram. In *SEMNASTERA (Seminar Nasional Teknologi dan Riset Terapan)* (Vol. 1, pp. 223-228).
- Tiworo, La Ode Ahmad Syarwan Tiworo, Sitti Syamsiah dan Mirdin Ahmad, (2021), Analisis Keterlambatan Proses Bongkar Muat Batu Bara Pada Kegiatan Transshipment DL TG Kampeh di PT. Bukit Prima Bahari, (*Jurnal Andromeda*), (Volume 05, Nomor 1 Maret 2021)