



## Analysis of Factors Causing Delays in Coal Loading on the MV TAI SPRING Due to Fire in the Cargo

### Analisis Faktor Keterlambatan Pemuatan Batu Bara di MV TAI SPRING Karena Kebakaran Pada Muatan

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**Abstract:** Coal cargo fire during the loading process is very dangerous and detrimental to various parties involved. In Indonesia, one of the incidents of coal cargo fire occurred during the loading process of MV TAI SPRING located in Muara Jawa, Kutai Kartanegara, East Kalimantan, causing delays in scheduled loading and causing losses to several parties involved. The research was conducted using a descriptive qualitative method with primary and secondary data collection through observation, interviews, documentation, and literature studies. Data analysis used the Miles and Huberman technique, then supplemented with the Fishbone technique and data validity by triangulation. The results of the study showed that the fire in the cargo was caused by the cargo owner who during loading on the MV TAI SPRING had not implemented periodic cargo temperature checks, environmental conditions that had weather according to tropical conditions were balanced by open coal loading conditions that allowed the cargo to be exposed to direct sunlight. The impact of loading delays due to fires in the cargo includes delays in the loading process due to efforts to extinguish the fire, additional costs to the PBM, delays in processing administrative documents due to late loading, and additional logistics costs for large vessels. Therefore, efforts to extinguish fires in the cargo are necessary by using a bulldozer to cool down the cargo.

**Keywords:** *Delay, Loading, Coal, Fire in the Cargo*

**Abstrak:** Kebakaran muatan batu bara dalam proses pemuatan merupakan hal yang sangat berbahaya serta merugikan berbagai pihak yang bersangkutan. Di Indonesia, salah satu peristiwa terjadinya kebakaran pada muatan batu bara pernah terjadi di proses pemuatan MV TAI SPRING yang berlokasi di Muara Jawa, Kutai Kartanegara, Kalimantan Timur sehingga menyebabkan keterlambatan pemuatan yang sudah terjadwal serta memberikan dampak kerugian kepada beberapa pihak yang bersangkutan. Penelitian yang dilakukan menggunakan metode kualitatif deskriptif dengan pengumpulan data primer dan sekunder melalui proses observasi, wawancara, dokumentasi, dan studi pustaka. Analisis data menggunakan teknik Miles dan Huberman kemudian dilengkapi dengan teknik Fishbone dan validitas data dengan cara triangulasi. Hasil penelitian menunjukkan bahwa kebakaran pada muatan diakibatkan oleh pihak pemilik muatan yang pada saat pemuatan di MV TAI SPRING belum menerapkan cek suhu muatan secara berkala, kondisi lingkungan yang memiliki cuaca sesuai dengan keadaan daerah yang tropis diimbangi dengan kondisi pemuatan batu bara yang terbuka sehingga memungkinkan untuk muatan terkena sinar matahari secara langsung. Dampak dari keterlambatan pemuatan dikarenakan kebakaran pada muatan adalah terlambatnya proses pemuatan

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dikarenakan terdapatnya upaya untuk mengatasi kebakaran pada muatan, terdapatnya biaya penambahan kepada pihak PBM, terhambatnya kepengurusan dokumen administratif dikarenakan keterlambatan muatan, dan terdapat tambahan biaya logistik untuk pihak kapal besar. Oleh karena itu perlu dilakukan upaya mengatasi kebakaran pada muatan dengan melakukan *cooling down cargo* menggunakan *bulldozer*.

**Kata kunci:** *Keterlambatan, Pemuatan, Batu Bara, Kebakaran Pada Muatan*

## INTRODUCTION

As an archipelago, sea transportation in Indonesia plays a very important role. Most of the industrial goods and commodities produced are distributed by sea. To connect between islands with the conditions of this vast country, it requires transportation that must be adequate. Transportation is needed to connect between regions that function to move people (passengers) goods and services from one place to another. Transportation itself is divided into 3 lines, there are air transportation, land transportation and sea transportation (Andi Prasetyawan, 2018).

According to (Tanggara & Kristiana, 2020), coal is a promising and profitable export commodity currently, due to its long-term availability, so its availability will not be lost or exhausted in the next decades. This is because coal is highly needed as a fuel for power plants and industry because coal can be the main fuel that produces heat or steam. Coal has flammable properties that can be an advantage for those who can process it properly, but can be very dangerous if not careful in handling it. Due to the nature of coal itself, which is to absorb acidic substances and compress, there will be an increase in temperature. Coal can be said to be burning when the temperature of the coal has reached 50°C.

Ships are one of the means of sea transportation is one of the facilities that are needed and many users to support the needs of moving people (passengers), goods or services from one area to another, this can be a race in domestic economic development for international trade, so this needs to be realized that sea transportation facilities are needed in the process of supporting economic development. To meet the domestic needs of a country is not only done by producing or producing its own needs but also by buying the needs of other countries (Rangkuty, 2023).

The use of coal as a biofuel is one form of renewable energy. This represents a tangible manifestation of development and progress in energy use. Therefore, the need for coal exports is fundamental to a country's economic development (Pada et al., 2023).

The MV TAI SPRING is a ship that transports bulk coal. Coal itself is a rock formed from the remains of animals and plants that have settled underground and been heated for thousands of years. Coal is highly sought after today, as it is used as fuel for power plants, industrial materials, cement, and for producing chemical fertilizers. Coal cargo is very dangerous if each ship's crew and operational personnel do not understand the dangers that can be caused (Buah et al., 2017).

Exporting is the activity of selling goods or services to other countries. Coal is one of the materials that makes it possible to export to other countries. Coal is categorized as a Dangerous Good due to its flammability. Therefore, safe coal transportation facilities are required that meet the standards set by the International Maritime Organization (IMO).

A coal cargo fire occurred on the MV TAI SPRING during loading in Muara Jawa, East Kalimantan. The fire occurred because the cargo had been at sea for too long, and the weather in the area had entered the dry season. The cargo had a high temperature and hot weather conditions, causing it to ignite and burn. Therefore, the burning cargo needed to be disposed of, and the surrounding coal also had a high risk of catching fire.

Based on this background, the author has formulated the following research questions:

1. What are the factors that cause cargo fires during the coal loading process on the MV TAI SPRING?
2. What are the impacts of cargo fires during the coal loading process on the MV TAI SPRING?
3. What efforts are being made to address cargo fires during the coal loading process on the MV TAI SPRING?

The objectives of this research question are as follows:

1. Understand the factors that caused the cargo fire during the coal loading process on the MV TAI SPRING.

2. Understand the impacts of the cargo fire during the coal loading process on the MV TAI SPRING.
3. Understand the efforts taken to address the occurrence of the cargo fire during the coal loading process on the MV TAI SPRING.

## METHODS

Data collection techniques are the most strategic step in research (Sugiyono, 2021). In this study, the author used a descriptive qualitative research method. The author's rationale for using a descriptive qualitative research method was to explain, describe, and elaborate more clearly and easily understand the factors that contributed to the delay in coal loading on the MV TAI SPRING due to a fire in the cargo.

The author selected the location for data collection at PT IDT Trans Agency, Samarinda Branch, specifically at Muara Jawa Anchorage, East Kalimantan, when the delay in coal loading on the MV Tai Spring occurred due to a fire in the cargo. This research was conducted during an onshore internship (Prada) from August 1, 2023, to July 23, 2024, at PT IDT Trans Agency, Samarinda Branch, located at Jl. Kedondong Dalam II No. 41 Gunung Kelua, Samarinda Ulu District, Samarinda City, East Kalimantan, with postal code 75243.

To facilitate and broaden the author's knowledge and understanding of the research, the author also conducted a literature review using sources from the Semarang Maritime Polytechnic library and references from various media, especially the internet, as supporting sources appropriate and in line with the author's research.

In this study, the author obtained primary data through interviews. He asked foremen, cargo owner representatives, and the crew of the MV TAI SPRING to obtain information and analyze it according to the research. For observations, the author conducted direct observations on-site. In this study, the author also collected secondary data from several articles on the internet and journals that had conducted similar research at different times. The author used a descriptive qualitative research method with purposive sampling to obtain an objective and informative sample in line with the research objectives.

In qualitative research, the processes of data collection, data reduction and classification, data presentation, and conclusion drawing are prioritized. All activities, including data collection, data reduction, data presentation, and conclusion drawing, are part of qualitative data analysis. Following this process, the author completed the data analysis using the fishbone analysis technique, dividing the previously obtained data into several factors contributing to the problem: human factors, methods, materials, machines, and the environment.

In this study, the author used source triangulation to test the validity and consistency of the data sourced from informants obtained through interviews and observations. The author conducted a data authenticity test to ensure the data obtained was authentic and in accordance with its validity. Data obtained through observation was compared with data obtained through interviews, thus ensuring accurate and reliable data.

## RESULT AND DISCUSSION

Coal loading activities on the MV Tai Spring began on March 7, 2024, at 09:15 using a ship crane. When the loading activities began, all processes of loading coal from the barge to the ship were smooth and without any obstacles or problems. The loading activities received intense attention on March 7, 2024, at 23:55 WITA when it was discovered that the coal cargo on the barge was emitting smoke, indicating that the coal cargo had a high temperature and was a sign that the cargo was burning.



Figure 1. A load of coal that emits smoke

Source: researcher documentation

Following up on this incident and in accordance with the SOP (Worker Operational Standards) implemented by the ship and agreed to by the cargo owner and forwarded by the barge party, the following instructions were given,

1. Identify hazards before operation by checking the temperature of the load.
2. Inspect the area and equipment, ensuring complete PPE.
3. Use an excavator or bulldozer to open and remove any coal piles that are hot or emitting smoke.
4. Separate the burning material, spread it in a safe area, and extinguish it by pressing it with the excavator or bulldozer bucket.
5. Mix the material to eliminate air pockets and compact it to prevent the fire from rekindling.
6. Once the fire is confirmed to be extinguished, report it to the supervisor.

Based on the results of the temperature check, the ship's party gave instructions to carry out cooling down of the cargo using a bulldozer, considering that the ship has the responsibility to deliver the cargo to the destination port safely.



Figure 2. The process of cooling down cargo using a bulldozer

Source: researcher documentation

During the cargo cooling down process, the ship's crew continuously monitors and supervises the process. Every few hours during the process, the ship's crew also checks the temperature of the cargo.

In an effort to cool down the burned cargo, the cargo owner and the ship's management halted cargo operations for 9 hours and 5 minutes, focusing on cooling the cargo. This was recorded in the agent's daily report or time sheet, from 11:55 PM on March 7, 2024, to 9:00 AM on March 8, 2024. Lack of supervision or regular temperature checks by the cargo owner. This was not fully recognized by the cargo owner because this was the first time they had experienced this.



Figure 3. The process of checking the cargo by the ship's crew  
Source: researcher documentation

Coal loading is the process of transferring hazardous cargo from a port or barge to a ship. Therefore, thorough preparation is essential to ensure the desired outcome and a safe outcome. A cargo fire is a serious situation that requires special attention from both the ship's operator, the carrier, and the cargo owner. Such incidents require special attention, resulting in the cessation of loading operations while the focus is on cooling down the cargo. The primary focus of this research is how cargo fires occur during the coal loading process on the MV Tai Spring. Based on this primary focus, the authors identified several factors, as follows.

#### 1. Humans

Based on the author's interviews with cargo owners, during coal loading activities, cargo owners did not conduct regular temperature checks.

#### 2. Materials

Coal itself is susceptible to oxidation reactions, especially when stored in the open and in hot weather.

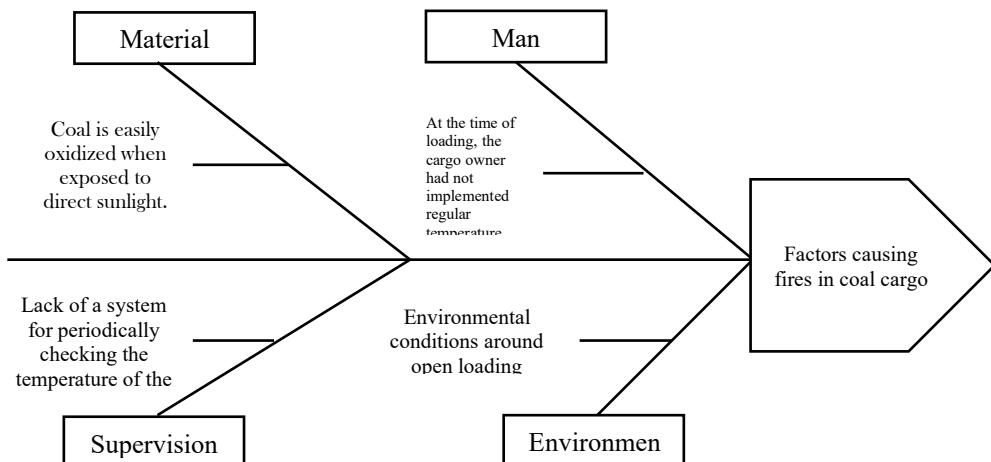
#### 3. Environment

Environmental conditions around coal loading areas and direct exposure to sunlight can accelerate chemical reactions in coal, especially if not balanced with proper cargo handling.

#### 4. Supervision

A weak cargo monitoring system results in delays in detecting increases in cargo temperature. The lack of a regular cargo temperature checking system slows down the early detection and response to fire threats.

Table 1. Factors causing cargo fires during the coal loading process on the MV TAI SPRING



From the incident that occurred, namely the burning of coal cargo during the loading process on the **MV TAI SPRING**, additional activities were required, namely the cargo cooling down process which required a total of 9 hours and 5 minutes starting from March 7, 2024 to March 8, 2024 at 09.00. Therefore, there were several impacts experienced by several parties, namely

1. For Cargo Owners

For the cargo owner, the impact is that the loading process on the **MV TAI SPRING** is hampered due to the need for additional activities, namely the cargo cooling down process, so that the scheduled loading is delayed.

2. For Loading and Unloading Companies

Loading and unloading companies face financial burdens when loading delays occur. They must bear additional costs, such as heavy equipment rental fees exceeding the specified timeframe and overtime labor costs due to loading activities not meeting the specified timeframe.

3. For Agencies

Due to the delays that occur, agencies are also burdened with additional operational costs, such as longer mooring times.

4. For the **MV TAI SPRING**

As a primary means of transport, the **MV TAI SPRING** faces losses due to loading delays, such as increased idle time due to the length of the loading process, resulting in longer ship stays at the loading point. This situation results in operational losses for the ship, such as additional logistics costs for the crew, which must be borne while the ship is at the loading point.

Based on the author's interview with the cargo owner's representative, he explained that the availability of water mixed with chemicals (chemical present) was not yet available, and to make the liquid required supplies from the port and needed to find a large amount of materials. In accordance with the actual situation, the cargo owner's representative coordinated with the ship's captain to reach an agreement that the cooling process would only require using a bulldozer. This was taken into account because the loading time was feared to exceed the specified time limit (laycan) if it was intended to find materials to make water mixed with chemicals (chemical present).

## **CONCLUSION**

Based on the analysis, the fire that occurred in the coal cargo during the loading process on the **MV TAI SPRING** was caused by several main factors, namely human, material, environmental, and supervision aspects. The lack of regular temperature monitoring was a significant initial cause. Furthermore, coal, as a dangerous cargo, is flammable and requires special handling. The open environment and direct exposure to sunlight accelerate the self-heating reaction, which becomes even more risky if not balanced with adequate safety measures. The lack of monitoring of the cargo temperature also exacerbated the situation, so an evaluation of the monitoring system is needed to prevent similar incidents in the future.

The fire that broke out in a coal cargo during the loading process on the **MV TAI SPRING** had a significant impact on various parties in the logistics chain, both operationally and financially. For the cargo owner, this incident disrupted the smooth loading process because the workforce was diverted to handling cooling, resulting in delays that resulted in demurrage fines. Stevedoring companies (PBM) also experienced decreased work efficiency, additional logistics costs, and disruptions to operational schedules. A similar impact was felt by PT IDT Trans Agency, Samarinda Branch, as a shipping agent, which had to adjust shipping documents and faced the risk of disrupting its image of professionalism. As for the **MV TAI SPRING**, this incident caused prolonged waiting times, disruption to shipping schedules, and increased operational costs due to additional logistics requirements while the ship was at the loading location.

The action taken was to implement a cargo cooling method (cooling down the cargo). However, this could only be accomplished with the assistance of heavy equipment, such as a bulldozer. This was due to limited conditions in the field, where facilities for dousing the cargo using a mixture of water and chemical suppressants, ideal for extinguishing high-risk cargo such as coal, were not available.

Cargo owners would be better off if they implemented routine cargo temperature checks. This step plays a crucial role in early detection of potential fires, thus preventing disruptions to the loading process and preventing unwanted losses.

Cargo owners should always be prepared for the worst-case scenario during loading operations. Having water mixed with a chemical fire suppressant is vital in combating cargo fires. With this facility, the cargo cooling down process can be more efficient, faster, and minimizes the risk of excessive delays.

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