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Risk Management Process to Reduce Closing Time Delays in Export Shipments: A Case Study of PT XYZ Semarang

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ABSTRACT

Objective: *The logistics industry plays a strategic role in international trade, particularly in export shipment delivery through freight forwarding companies. PT XYZ Semarang, an EMKL and freight forwarding company, faces a persistent closing time delay problem, recorded at 34 incidents in 2024 and rising to 43 incidents in 2025, incurring an open closing fee of IDR 832,500 per container. This condition arises from the absence of a structured risk management system, leaving the company with a purely reactive approach to risk handling.* ***Methods:*** *This study employs a descriptive qualitative approach with data collected through in-depth interviews with four informants, field observation, and documentation review. The risk management process follows the ISO 31000 framework, encompassing four stages: risk identification, analysis, evaluation, and treatment. A Fishbone Diagram with 5M categorization was applied for risk identification, while a 5×5 Risk Matrix was used for risk analysis and evaluation.* ***Results:*** *Fifteen risk factors were identified across five 5M categories. Insufficient truck fleet (R-07) and stuffing delays (R-10) were rated Very High (score 16), while lack of inter-divisional coordination (R-03), CEISA and TPKS system downtime (R-09), and port congestion (R-15) were rated High. Four obstacles to risk management implementation were also identified: resource limitations, technology constraints, absence of standardized guidelines, and low risk culture awareness.* ***Novelty:*** *This study lies in the integrated application of the Fishbone Diagram and 5×5 Risk Matrix within an ISO 31000 framework to address closing time delays specifically in an Indonesian EMKL company, a context underrepresented in existing literature. The findings confirm that this combination can serve as an accessible and structured risk governance tool for mid-scale freight forwarding companies that have not yet established formal risk management systems.*

INTRODUCTION

The logistics industry plays a strategic role in supporting international trade, particularly in export shipment delivery through freight forwarding companies. Timely delivery is a fundamental pillar of international supply chain integrity, and operational disruptions that lead to delays can threaten financial stability and damage customer trust [1]. In the context of export logistics, one of the most critical operational requirements is compliance with closing time, the deadline set by shipping lines or container terminals for receiving export containers before vessel departure.

According to Pelindo TPKS [2], closing time is defined as the latest acceptance time for containers to enter the container yard, approximately six hours before the Estimated Time of Berthing (ETB). Failure to meet this deadline triggers an open closing fee, an additional charge imposed on freight forwarders that directly increases operational costs. Containers arriving after the closing time threshold are subject to penalties and may face rejection at the terminal gate [3].

Indonesia's export value has shown consistent growth, increasing from USD 258,774 million in 2023 to USD 282,910 million in 2025 [4]. This growth has intensified operational pressure on Ekspedisi Muatan Kapal Laut (EMKL) companies, which coordinate cargo transport from exporters' warehouses to seaports while handling customs documentation. PT XYZ Semarang is one such EMKL and freight forwarding company serving the Port of Tanjung Mas, Semarang.

The company recorded a significant increase in closing time delay incidents: 34 cases in 2024 (2.29% of total shipments) rising to 43 cases in 2025 (2.30%), despite growth in total shipment volume from 1,484 to 1,871 job orders respectively. Each delay incident incurs an open closing fee of IDR 832,500 per container. Field investigations revealed that the company has not yet implemented a structured risk management system; risk handling remains reactive and ad hoc.

Table 1. Frequency of Closing Time Delays at PT XYZ in 2024 – 2025

Month	Closing Time Delay Frequency (Per Container)	
	2024	**2025**
January	3	8
February	2	3
March	4	1
April	2	5
May	2	4
June	3	3
July	3	2
August	2	3
September	1	2
October	5	5
November	4	3
December	3	4
Total	**34**	**43**
Percentage	**2, 29%**	**2,30%**
Target	**0%**	**0%**
Gap	**2, 29%**	**2, 30%**

This study aims to: (1) analyze the risk management process to reduce closing time delays in export shipments; and (2) identify obstacles in the implementation of risk management at the company. The findings are expected to provide a structured risk management framework applicable to mid-scale EMKL companies in Indonesia.

RESEARCH METHOD

This study employed a descriptive qualitative approach to explore phenomena in their natural setting, emphasizing meaning and context over statistical generalization [5]. The descriptive design was chosen to provide a comprehensive account of the risk management process and implementation obstacles at the company [6].

The research was conducted at PT XYZ Semarang, Central Java, an EMKL company active in export forwarding and customs services. Data were collected through three methods: (1) in-depth semi-structured interviews, (2) direct field observation, and (3) company documentation review. Four informants were selected via purposive sampling based on their direct involvement in the export shipping process.

Data analysis followed the interactive model comprising four stages: data collection, data reduction, data presentation, and conclusion drawing [5]. Data credibility was ensured through source triangulation (cross-checking across four informants) and technique triangulation (comparing interview, observation, and documentation results).

RESULTS AND DISCUSSION

Results

The risk management process at PT XYZ Semarang begins with the risk identification stage. Risk identification was conducted through a Fishbone Diagram analysis using the 5M framework. Fifteen risk factors were identified across five categories.

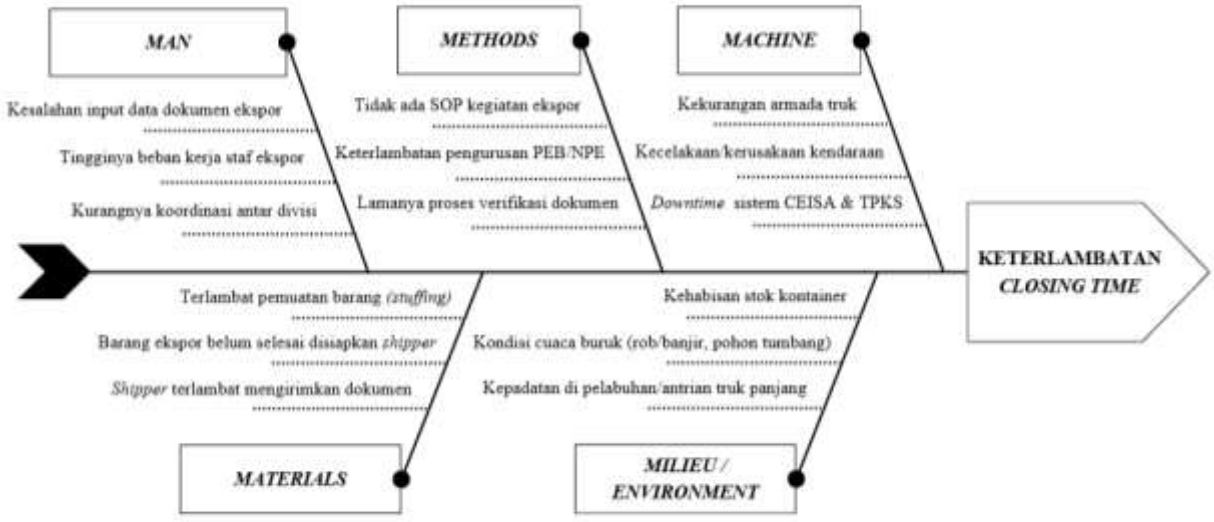

Figure 1. Fishbone Diagram of Closing Time Delays

From the results of risk identification, a risk analysis is carried out, where the risk analysis was performed by assessing the Likelihood (L) and Consequence (C) using the formula Risk Score = L × C, with both dimensions rated on a scale of 1 to 5. Risk levels were then categorized into five bands: Small (1–4), Moderate (5–8), High (9–14), Very High (15–19), and Extreme (20–25) [7]. The scale of possibilities and consequences used by PT XYZ Semarang is as presented in the following table:

Table 2. Risk Probability Level Criteria

Rating	Risk Probability Exposure Level	Indicator
1	Very rare	Very unlikely to occur, < once a year
2	Rarely	Has occurred but not regularly, once every 6-12 months
3	Moderately	Occasionally occurs periodically, once every 1-6 months
4	Often	Occurs regularly monthly, once a month
5	Very often	Occurs repeatedly in a month, > once a month

Based on Table 2, the risk probability scale is determined with a value range of 1 to 5, starting from risks that occur very rarely to those that occur repeatedly in one month. Apart from the possibility, risk analysis also considers the level of impact that will arise when a risk actually occurs, as presented in Table 3 below.

Table 3. Risk Consequence Level Criteria

Rating	Risk Impact Exposure Level	Operational & Financial Indicators
1	Very low	Does not disrupt operations, losses ≤ Rp 5 million/year
2	Low	Minor disruptions that can be handled quickly, losses > Rp 5 million to Rp 10 million/year
3	Currently	Disrupts some operational processes, losses > Rp 10 million to Rp 50 million/year
4	High	Disrupts most operational processes, losses > Rp 50 million/year
5	Very high	Significantly halts/damages operations, losses > Rp 100 million/year

Based on Table 3, the risk consequence scale is determined based on the magnitude of operational disruption and financial losses incurred, with a value range of 1 to 5. The combination of the likelihood and consequence values then produces a risk value that is

mapped into the risk register from the previous identification results, as presented in the following table.

Table 4. Risk Register and Analysis Results (L = Likelihood, C = Consequence)

No.	Risk	Category	Source	L	C	LxC	Risk Level
R-01	Data entry errors in export documents	Man	Internal	3	2	6	Moderate
R-02	High workload of export staff	Man	Internal	3	2	6	Moderate
R-03	Lack of inter-divisional coordination	Man	Internal	3	3	9	**High**
R-04	Absence of export SOP	Methods	Internal	4	2	8	Moderate
R-05	Delay in PEB/NPE customs documentation	Methods	Internal	2	1	2	Small
R-06	Lengthy document verification process	Methods	Int/Ext	3	2	6	Moderate
R-07	Insufficient truck fleet	Machine	Internal	4	4	16	**Very High**
R-08	Vehicle breakdown/accident	Machine	Internal	2	4	8	Moderate
R-09	CEISA & TPKS system downtime	Machine	External	4	3	12	**High**
R-10	Stuffing delay	Materials	Internal	4	4	16	**Very High**
R-11	Shipper goods not ready	Materials	External	2	3	6	Moderate
R-12	Late document submission by shipper	Materials	External	4	2	8	Moderate
R-13	Container stock shortage	Milieu	External	1	4	4	Small
R-14	Adverse weather (flooding, fallen trees)	Milieu	External	3	2	6	Moderate
R-15	Port congestion / long queue at gate	Milieu	External	3	3	9	**High**

The analysis reveals two Very High risks: R-07 and R-10. Three High risks were also identified: R-03, R-09, and R-15. The remaining ten risks fell within Moderate (8 risks)

and Small (2 risks) categories. The distribution of risk levels is then visually mapped into a 5×5 risk matrix to facilitate the identification of handling priorities, as shown in the following table.

Table 5. Risk Matrix 5x5

Likelihood \ Consequence	*Very low 1*	*Low 2*	*Currently 3*	*High 4*	*Very high 5*
Very often 5					
Often 4		R-04, R-12	R-09	R-07, R-10	
Moderately 3		R-01, R-02, R-06, R-14	R-03, R-15		
Rarely 2	R-05		R-11	R-08	
Very rare 1				R-13	

From the risk matrix, risk evaluation compared analysis results against the risk tolerance criteria adapted from AS/NZS 4360:2004 [8], adjusted to the operational context of PT XYZ Semarang through informant consultation. The evaluation established that Small and Moderate risks remain within acceptable tolerance (accept and monitor), while High and Very High risks are unacceptable and require immediate treatment action.

Table 6. Risk Tolerance Criteria of PT XYZ Semarang

Risk Level	Description
Extreme	Intolerable and requires immediate treatment
Very High	Intolerable and requires immediate treatment
High	Unwanted and requires special attention
Moderate	Accepted with high approval and responsibility
Small	Accepted with approval by the management team

Source: AS/NZS 4360, 2004

Based on this evaluation framework, five risk priorities requiring immediate action have been identified: R-07 and R-10 as the most critical (Very High, score 16), followed by R-03, R-09, and R-15 (High). These priorities provide a structured basis for PT XYZ Semarang to allocate limited resources to the most impactful risk factors in the risk treatment. Risk treatment was designed according to the risk level of each identified risk, following the treatment criteria presented in Table 7.

Table 7. Risk Treatment Criteria of PT XYZ Semarang

Risk Level	Risk Treatment Options
Small	Receive/Monitor
Moderate	Receive/Monitor
High	Turunkan/Mitigasi
Very high	Reduce/Mitigation or Transfer/Share
Extreme	Reduce/Mitigation or Reject/Avoid

Source: Ministry of State-Owned Enterprises Risk Management, 2023 [9]

Very High and High risks received a "Reduce/Mitigate" treatment, while Moderate and Small risks received an "Accept and Monitor" treatment. Table 8 presents the treatment plan for the five priority risks.

Table 8. Risk Treatment Plan for Priority Risks (High and Very High)

No.	Risk	Level	Treatment	Key Mitigation Strategies
R-07	Insufficient truck fleet	**Very High**	Reduce	(1) Gradual fleet expansion based on monthly shipment projections; (2) Integrated daily truck scheduling between Truck Coordinator and Export CSO; (3) Partnership with external trucking vendors as backup fleet
R-10	Stuffing delay	**Very High**	Reduce	(1) Set stuffing duration standards (20ft: max 2 hrs; 40ft: max 4 hrs); (2) Ensure goods, labor, and equipment readiness H-1 before stuffing; (3) Confirm shipper goods readiness before setting stuffing schedule
R-03	Lack of inter-divisional coordination	**High**	Reduce	(1) Daily morning briefing on job order updates; (2) Dedicated WhatsApp group per job order (CSO, field staff, truck coordinator); (3) SOP for inter-divisional information flow with clear handover deadlines
R-09	CEISA & TPKS system downtime	**High**	Reduce	(1) Routine CEISA system status monitoring before PEB submission; (2) Emergency manual PEB submission procedure with Customs direct coordination; (3) Submit PEB minimum 1 day before closing time
R-15	Port congestion	**High**	Reduce	(1) Monitor TPKS gate queue via official PELINDO channels before truck dispatch; (2) Schedule truck departure 1–2 hours earlier to arrive at TPKS well before

No.	Risk	Level	Treatment	Key Mitigation Strategies
				closing time; (3) Active coordination with shipping line and TPKS for early congestion alerts

The treatment strategies focus on five interconnected areas: (1) fleet capacity strengthening through incremental truck acquisition and vendor partnerships; (2) stuffing process standardization with clear time targets and H-1 goods-readiness confirmation protocols; (3) inter-divisional coordination improvement through daily briefings and per-job-order communication groups; (4) CEISA system contingency planning with emergency manual submission procedures; and (5) proactive port congestion management through earlier departure scheduling and real-time queue monitoring.

Four key obstacles were identified in implementing risk management at PT XYZ Semarang: First, Resource Limitations. The company lacks a dedicated risk management division, budget allocation for risk-related activities, and internal audit functions. Second, Technology Constraints. All risk recording is conducted manually, primarily via WhatsApp messages or verbal reports. There is no integrated digital system for risk logging, which prevents systematic historical data analysis and hampers early warning capability. Third, Absence of Standardized Guidelines. No written SOP exists for risk management or export operations. Each division handles incidents based on individual supervisors' discretion. Fourth, Low Risk Culture Awareness. While all informants acknowledged the importance of risk management, none practiced proactive risk identification as a routine. The organizational mindset remains reactive, with action triggered only after problems emerge.

Discussion

PT XYZ Semarang's reactive risk handling departs from the systematic identification-analysis-response process emphasized in risk management theory [10]. The Fishbone Diagram with 5M categorization proved effective in organizing the fifteen risk factors found, consistent with its established use for tracing root causes in delivery operations [11], [12]. The dominant factors found, document delays, stuffing duration, shipper readiness, and port congestion, align with prior closing time and container shipping disruption research [13], [14].

Prioritizing truck fleet and stuffing delay as Very High risks reinforces prior findings on these two as dominant export delay factors [15], [16]. Mapping risks onto a 5×5 matrix before treatment planning follows established priority-mapping logic [17], and the resulting scheduling-based treatment strategies align with recommendations in related closing-time studies [12], [18].

The four implementation obstacles indicate that a sound identification tool alone is insufficient for effective risk governance. Resource limitations, manual recording, and the

absence of an SOP reflect barriers and gaps documented in prior organizational risk management research [19], [20]. This suggests the Fishbone Diagram and Risk Matrix need to be paired with organizational change, such as SOP development and routine monitoring, for lasting improvement. As a single-case study, findings cannot be generalized directly; future research could pursue comparative, multi-company designs.

CONCLUSION

Fundamental Finding: This study finds that PT XYZ Semarang previously had no structured risk management system, with risk handling carried out reactively. Applying a Fishbone Diagram with 5M categorization identified 15 risk factors: insufficient truck fleet (R-07) and stuffing delay (R-10) were rated Very High, while inter-divisional coordination (R-03), CEISA/TPKS system downtime (R-09), and port congestion (R-15) were rated High. Treatment plans were formulated for all five priority risks, alongside four implementation obstacles: resource limitations, technology constraints, absence of standardized guidelines, and low risk culture awareness. **Implication:** The Fishbone Diagram combined with a 5×5 Risk Matrix can serve as a cost-effective starting point for structured risk governance in mid-scale EMKL companies without formal risk systems. PT XYZ Semarang would benefit from formalizing the five treatment plans, prioritizing fleet strengthening and stuffing standardization first, while embedding the risk register into a routinely updated monitoring tool. **Limitation:** This study is constrained by its single-case qualitative design, which limits generalizability, and by risk scores derived from informant judgment rather than quantitative records. **Future Research:** Future research should validate the proposed treatment plans post-implementation and conduct comparative studies across multiple EMKL companies to test the framework's replicability.

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