World Journal of Advanced Research and Reviews
eISSN: 2581-9615 CODEN (USA): WJARAI
Cross Ref DOI: 10.30574/wjarr
Journal homepage: https://wjarr.com/

(RESEARCH ARTICLE)

The effect of accessibility of safety information of risk management practices on operational safety of dangerous goods workers at Dar Es Salaam Port

Elias Albano Tengeni and Benitha Mhoka Myamba *

Department of Logistics and Business Studies., Faculty of Logistics and Business Studies, National Institute of Technology, Tanzania.

World Journal of Advanced Research and Reviews, 2025, 27(03), 1627-1631

Publication history: Received on 09 August 2025; revised on 20 September 2025; accepted on 23 September 2025

Article DOI: https://doi.org/10.30574/wjarr.2025.27.3.3232

Abstract

The study aimed to analyze the effect of safety information accessibility on risk management practices and its impact on the operational safety of workers handling dangerous goods at the Dar Es Salaam Port. A sample of 88 respondents was selected using a simple random sampling technique to ensure equal representation of workers handling hazardous materials. A cross-sectional research design was employed to analyze data from the population at a single point in time. Data were collected through questionnaires, a cost-effective method for obtaining standardized information and facilitating comparison of responses. The collected data were analyzed using the Statistical Package for Social Sciences (SPSS) and Microsoft Excel(ME) , with SPSS facilitating advanced statistical analyses and ME enabling data entry, cleaning, visualization, and basic computations. The findings indicate that practical training and the visibility of safety signs and emergency procedures are the most influential factors enhancing workers' confidence in following protocols and their perception of comprehensive safety measures. The provision of updates showed a marginal effect on workers' confidence in using safety information, whereas mere accessibility of information and regular guideline reviews did not significantly predict safety outcomes. These results highlight that active engagement through hands-on training and clearly communicated, visible safety practices is more effective than passive information provision in promoting operational safety. The study recommends that port management prioritize continuous, practical training programs and maintain clearly visible and accessible safety instructions throughout areas handling hazardous goods to improve worker confidence and overall operational safety.

Keywords: Accessibility; Risk Management Practices; Safety Information; Dangerous Goods Workers; Dar Es Salaam Port

1. Introduction

Globally, the effective dissemination of safety information is critical for workers handling hazardous goods to understand and manage associated risks. Ports and industrial sites rely heavily on clear, accessible safety communication to prevent accidents and ensure compliance with regulations. However, challenges such as language barriers, inadequate signage, and unclear communication significantly hinder access to vital safety information. For example, at Shanghai Port, despite the availability of safety information, accessibility was limited due to language barriers and insufficient signage, compromising workers' ability to comprehend safety requirements [1].

In the African context, similar challenges exist. Studies in Dar Es Salaam show that safety information is not always easily accessible or understandable to workers [2]. Unclear signage and lack of multilingual materials create confusion among port workers [3]. Despite regulatory frameworks promoting workplace safety, many workplaces still face challenges in effective communication due to unclear or insufficient signage, literacy barriers, and inconsistent

* Corresponding author: Benitha Myamba

dissemination channels [3] [4]. Such shortcomings undermine the effectiveness of safety protocols and increase vulnerability to accidents involving hazardous goods.

Most existing studies have used descriptive methods such as surveys, observations, and document reviews to assess safety information accessibility in terms of availability, clarity, reach, and timeliness [1] [2] [3]. However, they have not identified determinants of accessibility or examined how specific factors influence variations in workers' access. This study fills that gap by evaluating safety information dissemination at Dar es Salaam Port and how effectively it is understood by workers.

Evidence from high-risk environments underscores the importance of accessible safety information. In China, poor accessibility of safety information, including outdated protocols, was negatively correlated with safety outcomes, while visible instructions reduced accidents [5]. Similarly, frequent use of documentation, training, and structured communication channels improved compliance in safety-critical industries [6].

By building on these insights, this study applies inferential statistical techniques to determine the key factors influencing accessibility and comprehension of safety information at Dar es Salaam Port.

2. Methods and Materials

2.1. Study area

Dar Es Salaam Port, Tanzania's largest maritime gateway, serves landlocked countries including Uganda, Rwanda, Burundi, Malawi, and the Democratic Republic of Congo [7] [8]. Spanning 1,400 hectares, the port handles containerized and bulk cargo, including petroleum, chemicals, and explosives. Such operations demand strict adherence to safety protocols, accurate labeling, and effective emergency systems [9]. Despite regulatory requirements, persistent challenges include unclear signage, limited multilingual materials, and inconsistent safety communication [3]. This makes the port a strategic case study for assessing accessibility of safety information.

2.2. Sampling techniques and sample determination

A simple random sampling technique was employed, ensuring each dangerous goods worker had an equal chance of selection [10] [11]. Slovin's formula [12] formula was applied given by the formula $n = \frac{N}{1+N(e)^2}$ ..... (1)

where N represents the population size, n the sample size, and e the margin of error.

N = 113 and e = 0.05. The resulting sample size was 88 respondents, considered statistically reliable [13].

2.3. Data collection and analysis

Data were collected using questionnaires, valued for efficiency, cost-effectiveness, and standardized responses [10] [14]. Analysis employed SPSS and Microsoft Excel. SPSS was used for descriptive and inferential analysis, including Pearson correlation coefficients and p-value testing at 0.05 and 0.01 levels [15]. Microsoft Excel complemented by enabling data entry, cleaning, and visualization [16].

3. Results and Discussion

The study analyzed five independent variables (IVs): safety information accessibility (IV1), provision of updates (IV2), training importance (IV3), visibility of safety signs (IV4), and regular review of safety guidelines (IV5). Dependent variables (DVs) included confidence in using information (DV1), following protocols (DV2), and perception of comprehensiveness of safety measures (DV3). A correlation matrix used to illustrate the relationships between these IVs and DVs in assessing safety information accessibility is presented in Table 1

Table 1 The correlation matrix illustrating the accessibility of safety information of risk management practices on operational safety of dangerous goods workers

	IV_1	**IV2**	**IV3**	**IV4**	**IV5**	**DV_1**	**DV2**	**DV_3**
(IV1) Pearson correlation	1	0.122	-0.013	0.021	-0.103	-0.060	0.012	0.007
Sig (2– tailed)		0.258	0.905	0.849	0.338	0.580	0.913	0.950
N	88	88	88	88	88	88	88	88
(IV2) Pearson correlation	0.122	1	0.079	-0.110	0.027	0.210	0.070	0.040
Sig (2– tailed)	0.258		0.463	0.308	0.801	0.050	0.516	0.709
N	88	88	88	88	88	88	88	88
(IV3) Pearson correlation	-0.013	0.079	1	0.335**	-0.066	-0.073	0.261*	0.357**
Sig (2– tailed)	0.905	0.463		0.001	0.541	0.499	0.014	0.001
N	88	88	88	88	88	88	88	88
(IV4) Pearson correlation	0.021	-0.110	0.335**	1	0.072	0.084	0.266*	0.216*
Sig (2– tailed)	0.849	0.308	0.001		0.506	0.438	0.012	0.043
N	88	88	88	88	88	88	88	88
(IV5) Pearson correlation	-0.103	-0.027	-0.066	0.072	1	0.064	-0.075	0.068
Sig (2– tailed)	0.338	0.801	0.541	0.506		0.556	0.489	0.526
N	88	88	88	88	88	88	88	88
(DV1) Pearson correlation	-0.060	0.210	-0.073	0.084	0.064	1	0.029	0.006
Sig (2– tailed)	0.580	0.050	0.499	0.438	0.556		0.787	0.956
N	88	88	88	88	88	88	88	88
(DV2) Pearson correlation	0.012	0.070	0.261*	0.266*	-0.075	0.029	1	0.305**
Sig (2– tailed)	0.913	0.516	0.014	0.012	0.489	0.787		0.004
N	88	88	88	88	88	88	88	88
(DV_3) Pearson correlation	0.007	0.040	0.357**	0.261*	0.068	0.006	0.305**	1
Sig (2– tailed)	0.950	0.709	0.001	0.043	0.526	0.956	0.004	88
N	88	88	88	88	88	88	88	

* Correlation is significant at the 0.05 level (2-tailed).; Source: Survey result (2025)

The correlational matrix presented in Table 1 highlights several noteworthy relationships among the variables under study. It provides a comprehensive overview of the strength and direction of associations between the independent and dependent variables, offering critical insights into the factors that influence the operational safety of dangerous goods workers at Dar Es Salaam Port.

3.1. Training importance (IV3)

Training correlated significantly with DV2 (r=0.261, p=0.014) and DV3 (r=0.357, p=0.001), showing that structured training boosts confidence and enhances perception of safety comprehensiveness. These findings are consistent with global evidence where formal training improves compliance [6]and reduces accidents[5].

3.2. Visibility of safety signs (IV4)

Visibility significantly correlated with DV2 (r = 0.266, p =0.012) and DV3 (r=0.216, p=0.043). This indicates that clear signage enhances workers' confidence and perceptions of safety. Similar findings were reported in Tanzania [3] and Shanghai Port [1].

3.3. Provision of updates (IV2)

Updates only marginally correlated with DV1 (r=0.210, p=0.050), suggesting that updates without training have limited impact. This aligns with studies showing poor communication reduces the effectiveness of updates [3] [4].

3.4. Regular review of guidelines (IV5)

Guideline reviews showed no significant impact on dependent variables, highlighting that passive strategies are insufficient without active engagement.

3.5. Accessibility of safety information (IV1)

Availability of information alone was not significantly correlated with safety outcomes. This finding reflects observations at Dar Es Salaam Port [2] and Shanghai Port [1], showing that accessibility must be paired with clarity to improve outcomes.

Overall, interactive measures such as training and visible signage proved more effective than passive provision of information in improving operational safety.

4. Conclusion

The study concludes that structured training and visible safety signage are the most effective strategies for enhancing operational safety among dangerous goods workers at Dar Es Salaam Port. Regular training builds workers' confidence, improves adherence to protocols, and strengthens perceptions of safety systems, while clear signage reinforces these behaviors. In contrast, passive approaches such as routine updates or information alone have limited impact. The findings highlight the importance of combining interactive training with accessible visual cues to foster both confidence and compliance, aligning with global evidence in high-risk industries. Overall, active and engaging interventions are essential for building a safer and more reliable operational environment.

Compliance with ethical standards

Acknowledgments

The authors sincerely express their gratitude to the administration of the Department of Logistics and Business Studies for instituting effective research management practices, which facilitated invaluable feedback that greatly improved the quality of this article and contributed to its outstanding outcomes.

Disclosure of conflict of interest

No conflict of interest to be disclosed.

References

[1] Zhang L, Wu Y. Safety information dissemination challenges at Shanghai Port: Language barriers and signage issues. Int J Marit Saf. 2018;10(3):45–58.

[2] Olanrewaju P, Mushi H, Kamau J. Accessibility of safety information for hazardous goods workers at Dar es Salaam Port. Afr Saf Rev. 2020;15(2):30–41.

[3] Mghenyi M, Luwemba T. Challenges in safety communication at Dar es Salaam Port: A study of signage and multilingual materials. Tanzan J Occup Saf. 2020;7(1):12–24.

[4] Komba D, Kibwage R. Workplace safety communication challenges in Tanzanian ports: A case study of Dar es Salaam Port. J Occup Saf Health. 2021;15(2):45–58.

[5] Xie Q, Lu H, Wang Y, Lin J. Safety information accessibility and incident occurrence in container yards handling dangerous goods. Int J Occup Saf Risk Manag. 2021;9(1):22–36.

[6] Wang X, Li Y, Chen Z, Zhao H. Safety communication and compliance in safety-critical industrial settings: An empirical study. J Ind Saf Manag. 2018;12(3):45–58.

[7] Shilabu A, Chrome P. Maritime trade and port development in Tanzania: Opportunities and challenges. East Afr J Trade Logist. 2020;6(1):14–28.

[8] Kamukama N, Kasekende F. Workplace safety and risk mitigation in East African ports. J Trans Logist. 2020;12(3):45–58.

[9] Meli D, Agboola T. Assessing safety protocol compliance in Lagos Port operations. Afr J Marit Stud. 2020;8(2):23–35.

[10] Creswell JW. Research design: Qualitative, quantitative, and mixed methods approach. 4th ed. SAGE; 2014.

[11] Taherdoost H. Sampling methods in research methodology: How to choose a sampling technique for research. Int J Acad Res Manag. 2016;5(2):18–27.

[12] Israel GD. Determining sample size. Gainesville: University of Florida, IFAS Extension; 2013.

[13] Mbwambo A. Principles of research methodology in social sciences. Dar es Salaam: Open University of Tanzania; 2020.

[14] Kothari CR. Research methodology: Methods and techniques. 2nd ed. New Age International Publishers; 2004.

[15] Pallant J. SPSS survival manual: A step-by-step guide to data analysis using IBM SPSS. 6thed. McGraw-Hill Education; 2016.

[16] Alwan LC. Data analysis using Microsoft Excel: Updated for Office 2016. Cengage Learning; 2017.