



Research Paper

Occupational Risks of Firefighters in Jakarta: Job Safety Analysis Approach

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ARTICLE INFO	ABSTRACT
<p>Received: 03 July 2022</p> <p>Reviewed: 24 July 2022</p> <p>Revised: 04 August 2022</p> <p>Accepted: 17 August 2022</p> <p>Keywords:</p> <p><i>Firefighter duties, Job Safety Analysis, Occupational Health and Safety, Unsafe Actions and Conditions.</i></p>	<p>City Administration Fire and Rescue Service sub-department East Jakarta. It is one of the public organizations which, in carrying out its duties, is very wide with high risk. If this is not handled properly, events caused by unsafe actions and unsafe conditions can harm officers, organizations, and environmental safety. This study aims to analyze and determine the work risks of firefighters at the City Administration Fire and Rescue Service sub-department East Jakarta. The method in this study uses qualitative analysis and quantitative combining methods (numerical data) as well as the facts presented by research informants and then analyzed using the Job Safety Analysis (JSA) method based on the theory of use techniques JSA. The results of this study show that there are four types of work identified as risks in the field assignment section. The conclusion stipulates that the work of firefighters has many potential fire hazards with high severity and a risk rating of 40% in the High-Risk category, 50% in the Moderate Risk category, and as much as 10% risk in the Low-Risk category. Organizations are recommended to evaluate the work process of firefighters by increasing the completeness of PPE and increasing the competence of officers.</p>

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1. Introduction

Data from the Jakarta Fire and Rescue Service (JFRS) for the 2020 period recorded 1,505 disasters, with 461 houses being burned in an area of 328,202 m². The number of families who became victims was 3,082 or 10,034 people, with an estimated total loss of fire accidents reaching Rp. 252.1 billion (JFRS-Jakarta, 2020). Fire disasters throughout 2020 were in all areas of Jakarta, covering East Jakarta (349 cases), West Jakarta (333 cases), South Jakarta (397 cases), North Jakarta (266 cases), and Central Jakarta (160 cases). Firefighters' data for 2020 reported no reports of fatalities from the firefighters, while five people were injured. As for the residents, it was recorded that there were 79 injured people and 18 people died.

To handle fire disasters, firefighters cannot be separated from all risks of work accidents. Especially fire handling has a high level of risk. Based on data from the Jakarta Fire and Rescue Service, from 2017 to 2020, there were 38 cases of work accidents experienced by firefighters. In this effort, a Job Safety Analysis (JSA) is urgently needed, which can later be used as material for policy making by policymakers in making organizational improvements, both human resources and supporting data sources (Septian et al., 2021; Wildan et al., 2022). JSA is a hazard analysis on a job that focuses on job duties to identify hazards before an incident or accident occurs. Focuses on the relationship between workers, tasks, tools, and the work environment (OSHA, 2002). Ideally, after identifying hazards that cannot be controlled, actions or steps will be taken to eliminate or reduce them to a level of risk acceptable to workers. This study aims to analyze the work risk of firefighters at the East Jakarta city administration of Fire and Rescue.

2. Research Method Typology

This qualitative research design uses an in-depth interview method to dig up information (Sugiyono, 2015). This study focuses on operational officers' work risks in the East Jakarta Fire and Rescue Service Sub-dept, which JSA will analyze. When making a JSA, a job needs a sequence of steps or activities to complete the work based on the most important priority. In determining jobs or tasks based on priorities based on the frequency of accidents, accidents that result in injuries, jobs with high potential losses, and new jobs (Tarwaka, 2014; Friend and Kohn, 2018; Ramli, 2019).

The object research focuses on the risk of carrying out the duties of firefighters at the East Jakarta City Administration of Fire and Rescue. The location is chosen because it is a dense area with a high rate of fire. The condition of the dense and large area becomes a challenge for operational officers in minimizing the occurrence of injuries and disabilities. The technique of collecting data is through interviews with informants who are considered to know the risks associated with the work of firefighters in East Jakarta. The informants used were five people consisting of leadership and task executor elements from the Fire and Rescue Service sub-dept., as well as stakeholders from the community.

3. Results and Discussions

Hazard identification, generally using HIRARC (hazard identification, risk assessment, and risk control), is a systematic effort to determine potential hazards at work and the risks they pose. Identifying hazards clarifies and controls the hazards and risks of each operational activity, both routine and non-routine activities. Accidents to firefighters will cause losses to the organization, so safety efforts are needed as a control against the occurrence of losses due to accidents (Afandi et al., 2015; Salami & Rachmatiah, 2015; Anthony, 2020; Lazuardi et al., 2022; Pranata, and Sukwika, 2022; Wildan et al., 2022).

Potential hazards that can be identified are useful for vigilance and caution in work. Organizations that carry out hazard identification should have an OHSAS 18001 certificate, ISO 14001: 2004 for the management of

occupational health and safety (K3) management systems and have good competence in the field of OHS (Agwu, 2012; Kartikasari & Sukwika, 2021; Lazuardi et al., 2022; Pranata, and Sukwika, 2022).

The results of the study presented in Table 1 show the occupational hazards experienced by firefighters, including exposure to heat or burning, inhalation of combustion fumes, exposure to chemical combustion products, electric shock, exposure to debris, high pressure or bouncing, and wild animals exposed to fire. Venomous, swept away by strong currents, hit by sharp tools, and accidents at high speed. These potential hazards provide various risks, ranging from minor and serious injuries to death. The risk most often experienced by firefighters is exposure to smoke from the fire, which causes shortness of breath for firefighters. Generally, the availability of self-contained breathing apparatus (SCBA), also known as compressed air breathing apparatus, could be much higher. According to Kartikasari & Sukwika, 2021; and Sulistyowati & Sukwika (2022) the provision of personal protective equipment (PPE) for operational or production officers will positively impact worker performance.

Table 1. Hazards in Firefighters' Work and Risks

No	Stages of the Work Process	Hazard Identification	Risk
1	Fire fighting	Exposure to heat/burn	Scalded skin to death
		Burning smoke	Respiratory disorders
		Exposure to chemical combustion products	Eye and skin irritation
		Electricity	Minor physical injury to death
		Ruins/Wreckage	Minor injuries to death
2	Evacuation and rescue	High pressure/bouncing	Minor injuries to severe
		Wild and venomous animals	Minor injuries to death
		Flow of water	Minor injuries to death
3	Journey to incident location	Mechanics/sharp tools	Minor injuries to moderate
		High speed crash	Minor injuries to severe

Table 2 shows the frequency of occurrence of hazards in the work of firefighters caused by potential hazards. The impact of risks posed by the type of work is also illustrated in this Table 2. During the work of the fire-fighting process, the most common potential danger experienced by firefighters is being crushed by rubble due to being burned by fire. The risks experienced by firefighters in Jakarta vary from minor injuries to death. The risks most often experienced by firefighters are bouncing and electric shock, which can cause injury and death. At the stage of rescue evacuation work, the most dominant cases experienced by firefighters were being bitten or stung by an animal. The resulting risk can have an impact on minor injuries to death.

Table 2. Hazards in the Work of Firefighters

Type of Work	Type of Work Potential Hazard	Impact Risk	Frequency
Fire fighting	Exposure to heat or burning	Minor injuries to death	0 case
	Smoke Exposure	Lung damage	3 case
	Exposure to chemical combustion products	Eye and skin irritation	0 case
	Electric shock	Minor injuries to death	4 case
	Fallen by the rubble	Minor injuries to death	7 case
	Highway accident	Minor injuries to severe	1 case
	Bouncing	Minor injuries to moderate	6 case
	Cut or punctured by a sharp object	Minor injuries to severe	4 case
Evacuation and Rescue	Flow of water	Minor injuries to death	0 case
	Bitten or stung by an animal	Minor injuries to death	8 case
	Cut off	Minor injuries to severe	0 case

Hazard identification results record the frequency of incident cases that pose a risk to firefighters. Therefore, K3 risk management within the Jakarta Fire and Rescue Service is necessary. The use of HIRARC (hazard identification, risk assessment, and risk control) helps organizations control the occurrence of losses due to accidents faced by Jakarta Fire and Rescue personnel (Afandi et al., 2015; Salami & Rachmatiah, 2015; Anthony, 2020; Lazuardi et al., 2022; Pranata, and Sukwika, 2022; Wildan et al., 2022).

Table 3 shows that the work risk of firefighters in the East Jakarta City Administration of Fire and Rescue with the High-Risk category is 4, the Moderate Risk category is 5, and the risk in the Low-Risk category is 1. Firefighters are often exposed to exposure while on duty. It is for several reasons. Namely, firefighters still use inappropriate or damaged PPE; officers still need to be provided with complete and adequate PPE equipment, such as PPE for wasp evacuation, and the availability of SCBA is not proportional to the number of officers when carrying out fire-fighting. Only some officers are provided with gloves; the coordination process with related agencies is slow, such as the power cut when there is a fire by PLN; the physical endurance of operational officers still needs to improve. In the long term, the above conditions can negatively affect the performance of firefighters and ultimately affect the organization's productivity.

Table 3. Risk Analysis in the Work of Firefighters

Job Description	Hazard Identification	Risk	Risk Assessment			Risk Control
			Frequency	Severity	Risk Level	
Fire fighting	Exposure to heat/burn	Scalded/ Burned	Low	High	Moderate	Using heat-resistant PPE
	Toxic smoke	Respiratory disorders	High	High	High	Using a mask or SCBA
	B3 Exposure	Poisoning, irritation, burning	Low	High	Moderate	Use heat-resistant PPE and breathing apparatus
	Electricity	Electric shock	High	High	High	-
	Ruins/Wreckage	Fallen by the ruins of the building	High	High	High	Using a Safety Helmet
	High pressure/ bouncing	Bouncing	Moderate	Moderate	Moderate	Technical education and training
Evacuation and rescue	Wild and venomous animals	Bitten or stung	High	High	High	Using evacuation PPE
	Flow of water	Dragged by the rushing water	Low	High	Moderate	Using a float
	Mechanics/ sharp tools	Cut off	Low	Moderate	Low	Using evacuation PPE
Journey to incident location	High speed crash	Traffic accident	Moderate	Moderate	Moderate	-

In this situation, leadership commitment to firefighter safety becomes important and strategic. According to Sutrisno and Sukwika (2021), that job satisfaction and the safety performance of task implementers are largely determined by the leadership's commitment to the safety of members while carrying out their duties. The formation of a team for developing occupational safety and health programs can help organizations oversee the operational goals of firefighters' work (Purba & Sukwika, 2021) which is to maintain work productivity in the organization of the East Jakarta City Administration of Fire Management and Rescue.

4. Conclusion

The work of firefighters in the East Jakarta administrative city is dominated by the moderate to potential high-risk category. The risk level for the High-Risk category is 40%, the risk for the Moderate Risk category is 50%, and the Low-Risk category is 10%. Factors causing work accidents on firefighters' work include: Officers do not use complete PPE when carrying out fire-fighting, evacuation, or rescue. It is recommended to empower the supervisory team to check officers' equipment, especially PPE, every time they will and have carried out their duties at the fire location.

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