

NEEDS ANALYSIS OF FIRE MANAGEMENT SYSTEM IN CAMPUS (CASE STUDY IN SPORT SCIENCE FACULTY, SEMARANG STATE UNIVERSITY)

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Abstract

Fires can occur anywhere, including in the workplace. Faculty of Sport Science, State University of Semarang, consists of 4 main buildings, namely building as Dean building (F1), F2 as the lecture building, F3 as the Multipurpose Building, library and lecture and F4 as laboratory building exercise and health. In the building F1, F2 and F3 are potential fire hazards caused by the material combustible fuel (such as paper, wood and plastic), the heat source coming from an open flame (the kitchen stove) and electrical installations which may experience a surge as well of course there is oxygen in the room. These three factors are part of the fire triangle.

The study design used is descriptive comparative case study research design. This study used a comparative descriptive research design for this study with the primary objective to create a picture or a description of a situation objectively and compare the real conditions in the field with the various rules relating to fire management systems.

From this study it can be concluded that in the Faculty of Sport Science only has a fire protection system of passive compliance with the standards because the major components of building structures in accordance with the standards of material quality level I, while at other points all not in accordance with the standards that are used, these points are: planning (emergency warning systems, evacuation management systems, emergency communications, medical teams, termination procedures and the security operations); organization (the role of fire officers, fire fighter team, fire prevention coordinator unit, a fire prevention OSH expert); Evacuation means (exits, emergency stairs, emergency lighting, directional and emergency signs, corridors, point gather); Active fire protection systems; inspection and supervision; and training.

Advice given include: forming an emergency response team at the Faculty of Sport Sciences or emergency response team (ERT) which will handle all aspects of safety in the Faculty of Sport Sciences, prepare ERT became operational teams which there is consist a fire fighter team also, giving capacity building to ERT team designated safety related aspects of either theoretically also practically and certifications in OSH aspects, hereinafter designated ERT team to construct a system of prevention and control of fire hazards in the Faculty of Sport Sciences comprehensively.

Keywords : fire, management, prevention.

A. Introduction

Aspects of Occupational Health and Safety (OSH) is generally considered a low priority in a government agency. In the sector of government agencies, there are many sources of potential hazards that can lead to accidents, including a fire hazard. Fire contains a good variety of potential dangers to humans, property and the environment. Fire is an uncontrolled incident,

that can cause material and soul losses also the environment damage (Ramli, 2010:16).

The Central Bureau of Statistics Central Java (2013), explains that the number of fires in Central Java from 2010 to 2013 intend to a fluctuating rise. In 2010 a fire occurred 758 cases, in 2011 a fire occurred 1,282 cases, 1,800 cases occurred in 2012 and 2013 fires occurred 1,586 cases of fire. While the number of cases of fires in the city of Semarang from 2011 to 2013

the number is a fluctuating increase (Semarang City Fire Department, 2013). In 2011, a fire occurred 214 cases, 255 cases in 2012, in 2013 occurred 211 cases.

In the Journal of the NFPA Fire Analysis and Research said that the fire cases in the building of houses and buildings of homes in the United States from 2006 to 2010, US Fire Department expects a 5230 fire incidents with a total of 220 victims. Of the total 5230 fire cases, 3140 cases of fires (60%) occurred in the building in addition to the home, while 2090 cases of fires (40%) occurred in the house. Of the total 3140 cases of fires in buildings other than houses, as many as 1225 cases (39%) caused by a welding torch, a total of 1319 cases (42%) were caused by scissors torch, as many as 345 cases (11%) due to the burner, and as many as 251 cases (8%) are caused by soldering equipment (Evarts, 2012: 1).

Official data from the United States National Fire Protection Association (US NFPA), published in 2008 describes losses resulting from catastrophic fires. From an average of 350,000 times the catastrophic fires in residential areas and offices that occur in a year, 15,300 times the incidence of fires in high-rise buildings across the United States with an average of 60 died, 930 were injured and 52 million dollars losses burned catastrophic fires in that high rise buildings (Arief S, Endo W.K., 2008).

Fires also occurred in Indonesia, including of building a college campus, there are at least data about fires at two campuses in Jakarta. The first on campus Perbanas in the Kuningan area although no fatalities have been devouring the seventh floor. Archive room, meeting room and study room burned. In 2001, seminars and research room in the building Dean Faculty of Engineering University of Indonesia, Depok messy due to fires. Although there were no casualties but the incident has disrupted the operation of the campus. Both known to be caused by an electrical problem in the electrical installation (Arief S, Endo WK, 2008). Fires also take place on the campus of University of Indonesia in Depok on January 7, 2014, resulting in Building C FISIP burn and scorch sociology book collection of about 3,000 pieces (Ferdinand

Waskita, Tribunnews.com, 2014). Later fires also happen on Polytechnic Ujung Pandang, Makassar. Kebakaran occurred on March 22, 2015, there were no casualties. (Imran Samsad, Tribunnews.com, 2015).

Fires can occur anywhere, including in the workplace. Faculty of Sport Science, Semarang State University, consists of 4 main buildings, namely building as Dean F1, F2 as the lecture building, F3 as the Multipurpose Building, library and lecture and F4 as laboratory building for exercise and health. In the building F1, F2 and F3 are potential fire hazards caused by the material combustible fuel (such as paper, wood and plastic), the heat source coming from an open flame (the kitchen stove) and electrical installations which may cause friction as well of course there is oxygen in the room. These three factors are part of the fire triangle. According to the theory of the fire triangle, a fire occurred due to three factors, namely fuel, heat source, oxygen (Ramli, 2010: 16). While the building F4, besides having the same potential by building fires F1, F2 and F3, F4 on the building there is an additional source of fire danger in the form of chemicals such as alcohol and methanol are flammable and potentially cause an explosion.

According to Law No. 1 1970 Article 3 of the Safety, noted that the work required to prevent, reduce and extinguish the fire. To prevent fires management must controlled any potential of fire. Management of potential fire hazard is not enough just to provide fire-fighting equipment to extinguish the fire or do exercises that are conducted regularly, but requires a well-planned program in a system. Therefore, the fire must be properly managed and planned to implement a fire management system in accordance with applicable regulations. Fire management system is a concerted effort to manage the risk of fire through the planning, implementation, monitoring and follow-up (Ramli, 2010:140). From that background made the Occupational Safety and Health department on Semarang State University propose the research proposals Needs analysis of fire management system in campus (Case study in Sport Science Faculty, Semarang State University).

1. Formulation of the problem
Based on this background, it can be formulated problem in this research is: needs analysis of fire management system in campus (Case study in Sport Science Faculty, Semarang State University)."
2. Research purposes
The aim of this study is to describe the needs in the application of fire management system for prevention of fires in campus (Case study in Sport Science Faculty, Semarang State University).
3. Benefits of research
This research could provide theoretical benefits that can enrich the scientific field of Public Health, especially the Occupational Safety and Health (OSH) department at the Semarang State University. On the other hand provide the opportunity for students to participate actively involved in OSH research between lecturer and college student.
4. Theoretical Overview
Fire is an uncontrolled event, that can cause material and soul losses, also cause the environment damage (Ramli, 2010:16). Meanwhile, according to Anizar, fire is an event that is very fast and not desired (Anizar, 2012:14).

1) Causes Fire

Fires can be caused by human factors and technical factors (Ramli, 2010: 6). According Anizar (2012: 24) the cause of the fire caused by two factors, namely human error/unsafe action and unsafe condition. Unsafe action occurred because of human negligence and lack of professionalism in work. While unsafe condition is more directed to the object and the environment from human work that is unsafe or equipment that does not meet the standards. According to B. Boedi Rijanto (2011: 83) there are 7 factors that are able to trigger the cause of the fire are: electrical equipment, smoke, friction, open fire, spontaneous ignition, domesticity home (housekeeping), and air is explosive.

2) Triangle Fire

According Anizar (2012:22), Fire is an exothermic chemical reaction accompanied

by heat generation or heat, light (flame), fumes, gases, and the burning material. The combustion reaction requires three elements, namely the fuel as a material or substance which is wholly or partly undergo chemical and physical changes when it burns, heat early as the energy levels of the material to burn at temperatures of fuel (the lowest temperature when the substance started to burn), and oxygen as a chemical element burner.

Fires can occur due to three factors which are forming elements that fuel fire (fuel), the heat source (heat), and oxygen. The third element is known as the Triangle Fire theory. Without any one of these elements, the fire could not occur (Ramli, 2010:16).

B. Method

This research uses descriptive research design with a comparative case study research design. This research uses descriptive research design comparative because this study with the primary objective to create a picture or a description of a situation objectively and compare the real conditions in the field with the various rules relating to the system of fire management, the goal of this research is to understand something behind the phenomena to obtain something new insight (Anselm Strauss & Juliet corbin, 2009:4). Also to create a picture of the situation or event (Nazir, 2009:55). Using a case study design because the design is used to analyze an event/certain cases that occur in the community.

C. Results and Discussion

From interviews and observations that have been made it can be seen that faculty has only a passive fire protection system in accordance with the standards because the major components of building structures made of brick and iron frame (material quality level I); cover layer materials for the building is cement; material columns/beams made of bricks and cement, brick roofs of tile, flooring and stairs of brick, cement and ceramic (material quality level I); floors and stairs are made of brick, cement

and ceramics and the distance between buildings of approximately 5-10 meters.

But in general the faculty has not have fire prevention and control system that is comprehensive, and standards were:

1. Planning {emergency warning systems, evacuation management system (for example: evacuator team, SOP evacuation, evacuation maps, exit directions, and a assembly point), emergency communications, medical teams, discontinued operations and the security procedures}.

In the absence of a comprehensive emergency warning system it is possible to turn up to a fire and casualties or material because there is no system that can identify potential fire, preventing fire to overcome the danger of fire. Emergency warning is done by shouting, and even then made spontaneously from residents who do not clear SOPs and command system.

On the other hand the communication is done with outside agencies only use the phone, it does not conform with the standards because if people only use a mobile phone they have very high possibility of failure of communication such as: on "busy" mode, low battery, lagging or other reasons, too unavailability number relevant agencies on the mobile phone. Emergency communications so desperately need special communication tool with special teams and SOPs

2. Organizational (fire fighter officers, fire fighter team, coordinator of fire fighting, OSH fire prevention expert).

In sport science faculty have not formed organizations or units of fire-fighting which include: the fire fighter officers, fire fighter team, coordinator of fire fighting, OSH fire prevention expert) at faculty, so there is no division of roles during a fire.

In the absence of fire-fighting organization or unit in case of fire disaster then it is possible will appear casualties and significant material losses due to the lack of personnel who will perform fire fighting and rescue the occupants.

3. Evacuation means {means of rescue: the exit, emergency stairs, emergency lighting, directional and emergency signs, maps, corridors, assembly point}.

The absence of evacuation system makes building occupants will potentially become victims because besides they do not know the evacuation routes, they also do not know what should they do, where they would get together and who will ensure there are personnel who will help rescue their souls including calculating the occupants in assembly point for make sure there are no occupants remain inside the building.

On the other hand the absence of evacuation facilities such as: emergency exits, emergency stairs emergency lighting, directions and maps of evacuation make high probability of fatalities because of the high complication factor for the occupants to get out of the building in a relatively short time.

4. Fire protection system {active protection system}.

In sport science faculty has not had an active fire protection in the form: alarms, fire extinguishers, hydrants and sprinkler. Fire extinguisher available in the laboratory it is only for instructional materials not as active protection efforts. In the absence of active protection system fire then certainly there are no adequate facilities that can be used internally at faculty to extinguish a fire, so if fire happen could potentially lead disaster at faculty remember faculty has some potential danger of causing a fire for example: materials fuels (such as: paper, wood, furniture, etc.), oxygen is definitely available naturally, and heat (derived from: an open fire/stove, electrical or heating chemicals in a laboratory that has a low level on their flash point).

5. Inspection and supervision

In the Faculty of Sport Science is not done check/inspections and maintenance on all components of the fire protection system and means rescue periodically so that nobody can be certain that the personnel responsive and capable of performing rescue and fire fighting, or make sure the facilities

and infrastructure that exist today is it still worth used or not.

6. Drilling

In the Faculty of Sport Science there has been no fire prevention exercise program or simulation (drill) systematically and periodically. So if there is a fire disaster no personnel capable of performing rescue efforts outage or occupants because they are not trained intensively. Similarly, the inhabitants of buildings, they have not trained to perform self-rescue efforts in the fire disasters because they do not know both theoretically and practically related things to do during a fire disaster occurred.

D. Conclusion

In the study entitled "**Needs analysis of fire management system in campus (Case study in Sport Science Faculty, Semarang State University)**" can be concluded that faculty has only had a passive fire protection system as a major component structure building in accordance with the standards of material quality level I, while on other points such as:

1. Planning (emergency warning systems, evacuation management systems, emergency communications, medical teams, discontinued operations and the security procedures);
2. Organization (fire fighter officers, fire fighter team, coordinator of fire fighting, OSH fire prevention expert);
3. Means of Evacuation (exits, emergency stairs, emergency lighting, directional and emergency signs, corridors, assembly point);
4. Active Fire Protection Systems;
5. Inspection and supervision;
6. Training/drilling.

All of them have not meet the standards used, among others: Kepmen PU No.02/KPTS/1985; Permenaker No.Per 04/Men/1980; Kepmen PU 02/KPTS/ 1980; Kepmenaker 04/1986; Kepmenaker 186/Men/1999; Kepmen PU 10/KPTS/2000; SNI-03-1746-2000; Permen PU 26/Prt/M/2008; NFPA 10, 13, 14, 72; OSHA because in general, faculty does not have fire prevention and control system as the requirements.

Recommendations

Advice can be given in the study entitled "**Needs analysis of fire management system in campus (Case study in Sport Science Faculty, Semarang State University)**", among others:

1. Formed emergency response teams as the first step, because the emergency response team (ERT) will handle all aspects of safety aspects in the faculty.
2. Develop ERT be operational teams which has high capacity as a fire fighter team.
3. Provide capacity building to the ERT team designated safety related aspects of either theoretically or practically and certifications in OSH.
4. Designated ERT further develop systems of prevention and control of fire hazards in faculty comprehensively manner in accordance with the standards, among others: Kepmen PU No.02/KPTS/1985; Permenaker No.Per 04/Men/1980; Kepmen PU 02/KPTS/ 1980; Kepmenaker 04/1986; Kepmenaker 186/Men/1999; Kepmen PU 10/KPTS/2000; SNI-03-1746-2000; Permen PU 26/Prt/M/2008; NFPA 10, 13, 14, 72; OSHA. Prepared system includes:
 - a. Planning (emergency warning system, evacuation management systems, emergency communications, medical teams, discontinued operations and the security procedures);
 - b. Organization (fire fighter officers, fire fighter team, coordinator of fire fighting, OSH fire prevention expert);
 - c. Means of evacuation (exits, emergency stairs, emergency lighting, directional and emergency signs, corridors, assembly point);
 - d. Active fire protection systems;
 - e. Inspection and supervision;
 - f. Training/drilling.

E. References

1. Arief Setyawan, Endo W.K., 2008, Studi Eksploratif Tingkat Kesadaran Penghuni Gedung Bertingkat Terhadap Bahaya Kebakaran: Studi Kasus di Universitas Kristen Petra Surabaya

2. Badan Pusat Statistik, 2014, Jawa Tengah Dalam Angka 2014, diakses tanggal pada 4 Agustus 2015, (http://jateng.bps.go.id/publikasiterbit/2014/jawa_tengah_dalam_angka_2014/index.html).
3. Bidang Seksi Pendataan, 2013, Data Kasus Kebakaran, Dinas Kebakaran Kota Semarang, Semarang.
4. Budiono, S, 2003, Bunga Rampai HIPERKES dan KK, Universitas Diponegoro, Semarang.
5. California Employer Advisor, 2012, Featured Resource: This Is a Fire Drill Checklist, diakses tanggal 4 Agustus 2015, (http://www.ca-safety.com/public/Featured_Resource_This_Is_a_Fire_Drill_Checklist.cfm).
6. Evarts, B, 2012, Home and Non-Home Fires Involving Torches, Burners and Soldering Equipment, NFPA Fire Analysis and Research, Quincy, Massachusetts, diakses tanggal 23 Februari 2014, (<http://www.nfpa.org/research/reports-and-statistics/fire-causes/appliances-and-equipment/home-and-non-home-fires-involving-torches-and-burners>).
7. Hudoyono, KS, 2010, Pedoman Kesiapsiagaan Tanggap Darurat di Gedung Perkantoran, diakses tanggal 4 Agustus 2015, (<http://www.gizikia.depkes.go.id/wpcontent/uploads/2011/05/Tanggap-Darurat-di-Gedung-Perkantoran.pdf>).
8. Imran Samsad, 2015, Kebakaran di Kampus Politeknik Ujungpandang, diakses tanggal 4 Agustus 2015, (<http://makassar.tribunnews.com/2015/03/22/kebakaran-di-kampus-politeknik-ujungpandang>).
9. Keputusan Menteri Negara Pekerjaan Umum No:10/KPTS/2000 tentang Ketentuan Teknis Pengamanan terhadap Bahaya Kebakaran pada Bangunan Gedung dan Lingkungan.
10. Keputusan Menteri Tenaga Kerja No:Kep.186/Men/1999 tentang Unit Penanggulangan Kebakaran di Tempat Kerja.
11. Kepmen PU No.10/KPTS/2000).
12. Kepmen PU 02/KPTS/1980.
13. Kepmenaker 04/1986.
14. Keputusan Menteri Negara Pekerjaan Umum Nomor: 10/Kpts/2000 tentang Ketentuan Teknis Pengamanan terhadap Bahaya Kebakaran pada Bangunan Gedung dan Lingkungan Menteri Negara Pekerjaan Umum.
15. Keputusan Menteri Pekerjaan Umum Nomor 02/Kpts/1985 tentang Ketentuan Pencegahan Dan Penanggulangan Kebakaran Pada Bangunan Gedung.
16. NFPA, Life Safety Code Handbook Eleventh Edition 2009.
17. NFPA 10, 13, 14, 72.
18. Occupational Safety and Health Administration, 2001, Evacuation Elements, diakses tanggal 26 Januari 2014, (<https://www.osha.gov/SLTC/etools/evacuation/evac.html>).
19. Occupational Safety and Health Administration, 2001, How to Plan for Workplace Emergencies and Evacuations, diakses tanggal 4 Agustus 2015, (https://www.osha.gov/Publications/osha3088.pdf?utm_source=Publicaster&utm_medium=email&utm_campaign=52_Tips_Week_26&utm_content=How+to+Plan+for+Workplace+Emergencies+and+Evacuations).
20. Pat Perry, 2003, Fire Safety: Question and Answer: A Practical approach, diakses tanggal 4 Agustus 2015, (<http://books.google.co.id/books?id=yu5P41LTO88C&printsec=frontcover&hl=id#v=onepage&q=fire20safety%20checklist&f=false>).
21. Peraturan Menteri Pekerjaan Umum Nomor : 26/Prt/M/2008 tentang Persyaratan Teknis Sistem Proteksi Kebakaran pada Bangunan Gedung dan Lingkungan.
22. Peraturan Menteri Tenaga Kerja dan Transmigrasi Republik Indonesia No:Per.04/MEN/1980 tentang Syarat-syarat Pemasangan dan Pemeliharaan Alat Pemadam Api Ringan
23. Permenaker No.Per 04/Men/1980.
24. Ramli, S, 2010, Petunjuk Praktis Manajemen Kebakaran, Dian Rakyat, Jakarta.
25. SNI-03-1746-2000 tentang Tata Cara Perencanaan dan Pemasangan Sarana Jalan Keluar untuk Penyelamatan terhadap Bahaya Kebakaran pada Bangunan Gedung.