**ANALYSIS OF FIRE PROTECTION AND COUNTERMEASURES SYSTEM AT LIMO CAMPUS OF UPNVJ IN 2020**

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**ABSTRACT**

Background: The aim of this study was to analyze active and passive fire protection systems along with countermeasures in each building at Limo Campus, compare to applicable regulations (Minister of Public Workers Regulation No.26 / PRT / M / 2008 and the National Fire Protection Association). This research used an observational descriptive study designThis study found that an element of the passive fire protection system at Limo Campus which was door, did not meet the requirement standards. In addition, no fire emergency response and training has been conducted. The building had no emergency respone procedure as well. A fire protection and control system that is in accordance with standards is needed to reduce fire hazards, such as changing doors, adding fire alarms and conducting training on fire.

**Keyword:** fire, fire protection system

1. **INTRODUCTION**

Fires can occur anywhere, including at universities. The fire case on Tuesday (7/1/2014) in building C, Faculty of Political and Social Sciences, Universitas Indonesia, was caused by an electric short circuit [1]. The fire case on the IISIP campus that occurred on Saturday (24/8/2019) caused the canteen on fire, although there were no fatalities but the loss was estimated at IDR 220 million [2].

A fire broke out at the Institut Teknologi Bandung (ITB), a fire that occurred in the School of Business and Management building on Sunday, January 30, 2018, the cause of the fire has not been found, but there is no mental newspaper [3]. A fire at ITB also occurred in the Development Studies Master Program building, a fire occurred on December 30, 2018, the fire was caused by an electrical short circuit [4]. A fire occur at laboratory of Universitas Sumatra Utara, the fire broke out on Saturday, November 9, 2019, the cause of the fire was unknown and there were no fatalities [5].

Hade (2013) stated that there are still many unfulfilled fire protection system requirements at the Inderalaya campus, Sriwijaya University [6].

Ambar's research (2012) concluded that the fire disaster management system in the Rectorate Building, Universitas Brawijaya needed improvisation [7]. The high number of fire cases that occurred at the university, as well as researchers'

observations of the fire protection and control system on the UPNVJ campus, were supported by studies that

concluded the lack of university compliance to implement adequate fire protection and control systems, encouraging researchers to conduct research on fire systems in the UPNVJ lecture building

1. **METHOD**

This research is a qualitative study with a descriptive observational study design with direct observation methods. Data in the field will be analyzed and compared with applicable standards such as Perda DKI Jakarta Nomor 8 Tahun 2008. PerMenPU Nomor26/ PRT/M/2008, KepMenNeg PU Nomor 10/KPTS/2000, SNI 03-4360-1996. *National Fire Protection Association* 10, 12, 13, 16, 72, 80, 101 dan *American Society for Testing and Materials* E119.

1. **RESULT**

According to Keputusan Menteri Pekerja Umum No: 10/KTSP/2000, there are two fire protection systems, passive and active

**Passive Fire Protection Systems**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Building** | **Standard** | **Condition** | **Remarks** | |
| **Applicable** | **Inapplicable** |
| Gedung FIKES | SNI 1739 : 2008 SNI 1740 : 2008 SNI 1741 : 2008 | Beton |  |  |
| Gedung Teknik | Hebel | ✓ |  |
| Gedung Perkuliahan Teknik | Hebel | ✓ |  |

**Table 1.** Building Structur

**Table 2.** Compartment

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Building** | **Standard** | **Condition** | **Remarks** | |
| **Applicable** | **Inapplicable** |
| Gedung FIKES | ASTM C 1396  SNI 03-2156-1991 | Gipsum | ✓ |  |
| Gedung Teknik | Hebel | ✓ |  |
| Gedung Perkuliahan Teknik | Hebel | ✓ |  |

**Table 3**. Door

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Building** | **Standard** | **Condition** | **Remarks** | |
| **Applicable** | **Inapplicable** |
| Gedung FIKES | SNI 03-4360-1996 NFPA 80 | Wood |  | ✓ |
| Gedung Teknik |  | ✓ |
| Gedung Perkuliahan Teknik |  | ✓ |

**Active Fire Protection System**

**Table 4.** Sprinkler

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Building** | **Standard** | **Condition** | **Remarks** | |
| **Applicable** | **Inapplicable** |
| Gedung FIKES | SNI 03-3989- 2000 NFPA 13 | Not Provided |  | ✓ |
| Gedung Teknik |  | ✓ |
| Gedung Perkuliahan Teknik |  | ✓ |

**Table 5.** Fire Exthingusher

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Building** | **Standard** | **Condition (Each Level)** | **Remarks** | |
| **Applicable** | **Inapplicable** |
| Gedung FIKES | NFPA 10 | 4 Fire Extinguisher | ✓ |  |
| Gedung Teknik | 4 Fire Extinguisher | ✓ |  |
| Gedung Perkuliahan Teknik | 2 Fire Extinguisher | ✓ |  |

1. **DISCUSSIONS**

**Passive Fire Protection System**

The structure of the building will pass the burn test, path test, and fire resistance test as referred in SNI 1739: 2008, SNI 1740: 2008, and SNI 1741: 2008. Building materials such as bricks and cement have made the building fire resistant. Bricks are used to strengthen buildings so when a fire occurs the building is not easily collapsed due to fire, and cement prevents the fire from spreading to other areas.

Building divider such as wall designed to protect resident and prevent the fire to spread. The FIKES building itself uses gypsum as a wall covering. Based on ASTM C1369, gypsum can withstand the spread of fire for no more than 1 hour. Fakultas Teknik and Gedung Perkuliahan Teknik building use a hebel. Based on American Standard Testing and Material C1693 [8] the main materials for hebel formation are portland cement, gypsum, quartz sand and water. These materials have passed the fire resistance test. Supported by research by Aries [9] said that hebel bricks are heat and fire resistant

Of the passive protection systems that exist in every building, only the doors do not comply with existing standards. NFPA 80 and SNI 03-4360-1996 recommend that each door be designed with steel door

**Active Fire Protection System**

The active protection system consists of a sprinkle and fire extinguisher. This protection system follows standards such as SNI 03-3989-2000, NFPA 10 and 13. In each Limo building, no building has a sprinkle system.

Research conducted by Rahesa [10] that the number of sprinkles depends on the desired area, with one sprinkle to cover of ​​12m2 area. With an area of ​​the study room of the FIKES building 64m2, it takes 5 sprinkles. Meanwhile, Gedung Teknik requires 2 sprinkles

In each building the placement of fire extinguisher is opposite to one another. Based on PerMen 04-1980, the distance of each fire extinguisher is not more than 15 meters, and the. The number of fire extinguisher placements according to (Parera, Nugroho, & Rachmat, 2018) for the FIKES building

Fire Extingusher (Area of ​​space) / (Area of ​​protected building)

=

=

=

= 1,6

It can be concluded that each floor requires 1-2 fire extinguisher.

**Fire Suppression System**

Based of interviews conducted with the Dean and Deputy Dean of FIKES and Engineering, the faculty has not conducted fire training for students and workers on campus. The students themselves received fire training from Matra, but these activities were carried out by the university, not from the faculty. Lack of training and education about fires can be devastating for the readiness of students and workers in the campus environment when a fire occurs.

It was concluded that each informant did not know the emergency response procedures. Technical informants said that the procedure was in the public bureau, but when asked they did not know the contents of the procedure.

1. **CONCLUSION**

The implementation of passive fire protection systems such as doors is not yet up to standard in every building. For the structure of the building and the building separator is suitable. As for the active fire protection system, each building does not have a sprinkler, the number of fire extinguishers is appropriate, but the placement of fire extinguisher is not according to the standard. And every faculty don’t have any fire. Researchers recommend the faculty to replace the door with steel door, provide fire alarm, and prepare fire drill

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