ABSTRAK

ANALISIS KEBUTUHAN DEBIT AIR DAN INSTALASI PIPA SISTEM PROTEKSI KEBAKARAN AKTIF

Studi Kasus : Gedung Rektorat Kampus Universitas Katolik Indonesia (UNIKA) Santu Paulus Ruteng

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Kebakaran merupakan kondisi darurat yang dapat mengancam keselamatan manusia dan bangunan. Gedung Rektorat Universitas Katolik Indonesia (UNIKA) Santu Paulus Ruteng merupakan bangunan 6 lantai dengan luas 740 m² setiap lantai yang belum dilengkapi sistem proteksi kebakaran aktif secara menyeluruh. Penelitian ini bertujuan menganalisis kebutuhan debit air dan instalasi pipa sistem proteksi kebakaran berupa hydrant dan sprinkler. Metode penelitian yang digunakan adalah deskriptif kuantitatif dengan data primer hasil survei lapangan dan data sekunder berupa denah serta karakteristik bangunan. Analisis mengacu pada Permen PUPR, SNI, NFPA 13, dan NFPA 14. Hasil penelitian kebutuhan debit untuk hydrant pilar sebesar 38 liter/detik dengan asumsi pengoperasian 1 unit, hydrant box sebesar 13,32 liter/detik dengan asumsi 2 secara bersamaan, sedangkan kebutuhan debit untuk sistem sprinkler sebesar 20,131 liter/detik dengan asumsi 12 unit beroperasi secara bersamaan. Hasil perencanaan instalasi menunjukkan Diameter pipa yang digunakan: pipa vertikal spinkler (4 inch), pipa vertikal hydrant box (21/2 inch), pipa horizontal hidran pilar (5 inch), pipa horizontal hydrant box (2 inch), pipa horizontal spinkler (2 inch), pipa ke kepala spinkler (1 inch). Hasil penelitian ini diharapkan menjadi dasar perencanaan sistem proteksi kebakaran yang efektif untuk meningkatkan keselamatan penghuni dan perlindungan bangunan.

Kata kunci *:* Hydrant, Sprinkler, Debit Air, Instalasi Pipa, Proteksi Kebakaran.

ABSTRACT

Fire is an emergency condition that can threaten human safety and buildings. The Rectorate Building of Universitas Katolik Indonesia (UNIKA) Santu Paulus Ruteng is a six-story building with an area of 740 m² per floor, which is not yet fully equipped with an active fire protection system. This study aims to analyze the water flow requirements and pipe installation for fire protection systems, including hydrants and sprinklers. The research method used was descriptive quantitative, utilizing primary data obtained from field surveys and secondary data consisting of building plans and building characteristics. The analysis was conducted with reference to the Indonesian Ministry of Public Works and Housing (PUPR) regulations, SNI standards, NFPA 13, and NFPA 14. The results showed that the required flow rate for the yard hydrant was 38 liters per second, assuming the operation of one unit; the required flow rate for the hydrant box was 13.32 liters per second, assuming two units operating simultaneously; while the required flow rate for the sprinkler system was 20.131 liters per second, assuming twelve sprinkler heads operating simultaneously. The planned installation consists of the following pipe diameters: 4-inch vertical sprinkler pipes, 2½-inch vertical hydrant box pipes, 5-inch horizontal yard hydrant pipes, 2-inch horizontal hydrant box pipes, 2-inch horizontal sprinkler pipes, and 1-inch pipes connected to sprinkler heads. The results of this study are expected to serve as a basis for designing an effective fire protection system to improve occupant safety and building protection.

Keywords *: Hydrant, Sprinkler, Water Flow Rate, Pipe Installation, Fire Protection.*