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Fire Prevention in Buses Using Water Head and AWO System

T. Kiranmayee[1], B. Purushotham[2], C.Vyshnavi[3], KA.Pavan Kumar[4], Md. Syprion Prameeth[5], B.Raju Kumar[6].
[1]*Assistant professor,* [2, 3 4, 5, 6]*Students Department of Mechanical Engineering, Srinivasa Ramanujan Institute of Technology, Anathapur, Andhra Pradesh*

Abstract: ***Buses can be designed to carry many passengers ,and in public places, incidents such as bus fires impose a relatively high threats to assets and lives. Hence, it is common to witness substainal casualties when a bus fire occurs .Fire diaster is common threat to lives and property . An IOT based automatic window opening system when smoke is detected by sensors is efficient one but ,this paper represents with a doubt if any one is struck on the bus ,this project helps to save their lives that keeping the steel pipes inside and outside of the bus and providing sprinkles and holes to the pipe In and Out side of the side of the bus in respectively. When some amount of fire/flame and smoke is detected by the sensors the water and foam mixture pass through the pipes and spreads over the bus.The rectangular water and foam storage tank is kept on the roof of the bus .The equipment here is the foam that can resists the fire so, Silicon Foam is the flame-retardant, self-extinguishing and can withstand 2100℃ flame .This project helps minimizing and delaying the spread of fire***

Keywords: Fire Accidents, Internet of things (IoT), IR flame sensor,MQ-2 gas sensor.

I. INTRODUCTION

India is country that standards 2nd highest position in population in the thecoming year the population goes on increasing. Public transportation is the main mode of transport to maximum people in the country. The development of transportation facilities is done by government as well private tours and travel operators. The roadtransport is mainly by buses which require regular maintenance, lack of paying attention by many of the bus mangers or the operators toward the regular maintenance of the vehicle which leads to accidents in the running bus or vehicles [1]. The vehicle manufacturing industry follows many rules and specification for the designing which reduces the accident rate and increases protection or safety of the people.

In Ghazipur five people are dead and ten others injured after a bus came in contact with a live wire and went up in flames ,turning a joyous wedding procession into a scene of sorrow in ghazipur district of uttar pradesh. The bus report says had at least 30 passengers on board when it was moving towards temple-the wedding venue. Attempts are now being made to douse the fire. The Schoking visuals from the spot showed tall flames raging as local residents struggle to put out the fire.

22 people are buried in this fire accident.On 31stoctober 2017 a private bus caught fire near Dhaula kuan in South Delhi which is carrying 33 students of Kendriva Vidalaya narina branch ,it was a narrow escape.

II. OBJECTIVE

The main objective of these project we are using Sprinklers, water head ,automatic window system, To reduce the human loss and property loss will be minimized.

III. PROPOSED METHOD

The silicon foam is the best material which is the resist the fire. By using the water and foam mixture we are going to resist the fire accidents by spreading it within and outside of the bus.In this project were designing the bus having fire and smoke sensors includes Automatic window opening system ,Sprinklers fixed to the pipes which is mounted inside and outside of the bus .The water will passes to the sprinklers from the water head which is placed in the top of the bus used to store the water and foam mixture.

The bus is already designed that whenever the sensors recogines some amount of smoke near to the bus then all the windows will be opened for the same sensors we are adding our idea that when ever some amount of fire/flame is recognized then the window and also water and foam mixture are going to pass through the steel pipes .On the roof side of the pipe there are some holes to that pipe and it simply flows through all sides if the bus. By flowing the water and foam mixture the fire which is spreading outside and inside of the bus having the automatic window opening system.

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At the same time the water and foam mixture is flowing through the steel pipes inside and outside and the sprinklers are already placed ,so the mixture will be sprayed by the sprinklers with some force.then the mixture will be spread to the entire bus. when ever a foam will be falls upon the fire can be resisted and the spreading of the fire will be decreased. Silicon foam is a synthetic rubber product used in gasketing, sheets are firestops .It is available in solid cured form as well as in individual liquid components for field installation.class B foams like AFFF,FP can also be used

Fig: Busses caught fire and burning

IV. LITERATURE OF EXISTING METHODS

It is used as a several methods to avoid fire accidents and to reduce theseverity of loss in case of fire accidents in public transport system.The existing method consists of fire extinguishers, alarms, and when fire was detected humans must use fire extinguishers shown below in figure 2 and must break glass and must ring the alarm and break the glass of emergency door. And people must informto police stations and fire stations and hospitals.

Fig. 2: Fire Extinguisher

Information could not reach at right time due to improper communication. Preventive measures are to be implemented by human intervention only. It Takes more time to implement preventive measures manually. Automotive industry has designed a standard Fire Detection and Alarm System (FDAS) &Fire Detection and Suppression Systems (FDSS) for Buses of Type III.Whenever the fire is detected it activated the alarm.

V. COMPONENTS

When the sensors detect a fire or heat beyond a certain threshold they trigger the sprinkler system to activate. The system includes sensors detectors strategically placed throughout the bus to detect signs of fire such as smoke ,heat and flames. In addition to activating the sprinklers,the system may also sound alarms and alert the driver and passengers to evacuate the bus safely, Some systems can operate automatically once a fire is detected,while others may have manual overrides that allows the driver or emergency personal to activate sprinklers if needed. Overall ,sprinkle system is in busses play a crucial role in enhancing passenger safety by quickly responding to fire emergencies to helping to minimize the damage and potential injuries.

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A. Fire Sensor

A fire sensor is a specialized device designed to detect the presence of fire or the conditions that typically precede a fire,such as smoke heat or flames. Fire sensors are essential components of detection and alarm systems,as they provide early warning of potential fire a hazards, allowing for prompt response and evecution procedures to be implemented .These sensors work by monitoring changes in the surroundings environment and triggering alarms or activating in a suppression systems whwn specific thresholds are exceeded . Fire sensors are crucial for protecting lives and property by alerting by occupants and authorities to the presence of the fire ,enabling timely intervention to minimize damage and ensure safety. Fire sensors are play a critical role in the fire detection and safety systems ,providing early warning of potential fire hazards and helping to minimize the risk property damage and injuries.Here are 100 lines about sensors. Fire sensors are specialized devices designed to detect the presence Fire or conditions associated with fire.

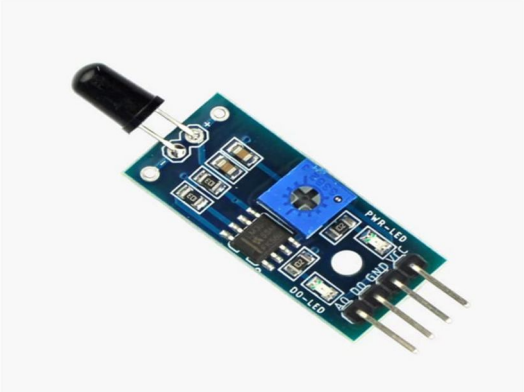

fig:Fire Sensor

B. Water Pump

To operate a water pump that requires 6 volts ,you need a power Source capable of supplying the voltage and an appropriate by a Switch or control mechanism. Here a basic circuit setup operate a 6-volts water pump. Connect a positive terminal to the 6-volts by a power source to the positive terminals of the water pump

fig:Water pump

Connect the negative terminal of the water pump to the ground by (GND) of the power source. Optionally ,you can add a switch in the series with the positive terminal to control the operation of the water pump.

C. Drip Pipes

Drip irrigation systems utilze drip pipes(also known as drip tubing or drip lines) as a key component for delivering water directly to the Root zone of plants . These pipes are designed with small holes or emitters spaced along their length,allowing water to drip out slowly And efficiency irrigate the soil around plants.Drip pipes are commonly made from polyethylene or polyvinyl chloride material a Which are durable and resistant to degradation from uv radiation and Chemicals commonly found in soil and water.These emitters regulate the flow rate of water, ensuring a consistent and controlled distrubtion to the plants.Emitters can vary in design, including pressure-compensating emitters that maintain a uniform flow rate regardless of pressure flucutions

fig;Drip pipes

VI. RESULT

In this paper we designing the bus having fire and smoke sensors includes Automatic windows opening system,sprinklers fixed to the pipes which is mounted inside of the bus. The water will passes through the sprinklers from the water head which is placed in the top of the bus used to store the water and foam mixture.To reduce the human losses and property losses will be minimized.Silicon foam is the synthetic rubber product used in the gasketing,sheets and fire stops.And also used foams like AFFF,FP can also be used.

Fig:bus

VII. CONCLUSION

In conclusion, the integration of fire resistance systems employing water heads and automatic window opening mechanisms represents a significant advancement in the bus safety measures. By proactively detecting and addressing fire emergencies, these system offer a crucial layer of protection for passengers and property with ongoing technological advancements about collaborative efforts among industry stakeholders, the future looks promising for futher enhancing the effectiveness and efficiency of these safety soluctions As public transportion networks continue to prioritize passengers safety and regulatory compliance ,the implementation of the fire resistance systems on buses will undoubtedly play a vital role in ensuring safe journeys for all.

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VIII. FUTURE SCOPE

In the real of bus safety, the integration of the fire resistance systems using water heads and automatic window opening system holds immense promise for the future. These innovation soluctions represent a proactive approach to mitigating the risks associated with the fire emergency on buses ,aiming to safeguard passengers actively Property alike.By strategically installing water heads throughout the bus interior ,coupled with sophisticated automatic window opening mechanisms ,these systems can rapidly detect signs of fire and active preemptive measures to surprise flames and facilitate passengers avacuation. Looking head ,advancements in technology ,such as smart sensors and artificial intelligence ,are poised to enchance the effictiveness and efficiency of these systems,enabling quicker response stakeholders ,including bus manufactures ,safety experts,and regulatory agencies . The future scope of fire resistance systems in the buses using water heads and automatic window opening system to usher in a new era of enhanced safety standards and peace of mind for passengers and operates alike.

REFERENCES

[1] Bentama, A.Khatory,M.Millot, “spatial analysis of bus accidentin the France “,International Colloquium on logistics and supply chain management (LOGISTIQUA),2107.
[2] P.Gopi krishna et.al “ Implementation of bi-directional blue -fi gateway in IOT environment” in International journal of Engineering & technology ,7(2.8) (2018) 97-102.
[3] K. Okamoto , N.Watanabe and Y.Hagimoto , “Burning behaviour of sedan passenger cars”, Fire journals ,vol,3,pp.301-310,2009.
[4] K.Okomato ,T.Otake and H.Miyamoto , “Burning behaviour of minivan passengers cars”,Fire safety journal,vol.62,pp.272-280,2013.
[5] M. J. A. KHAN ,M. R. Iman ,J.Uddin,and M.Sankar , “Automated fire fighting system with temperature detection,” in 2012 7th International Conference on electical &Computer Engineering (ICECE),2012,pp.232-235.
[6] [2]K. Li, R. Huo,J,Ji, and B.Ren. “Experimental investigation on drag effect of sprinkler spray to adjacent horizontal natural smoke venting ,” Journal of hazardous materials ,vol.174,pp,512-521,2010.
[7] NASA. “National Eronauticsand space Administration.” Reference Manual,2008.

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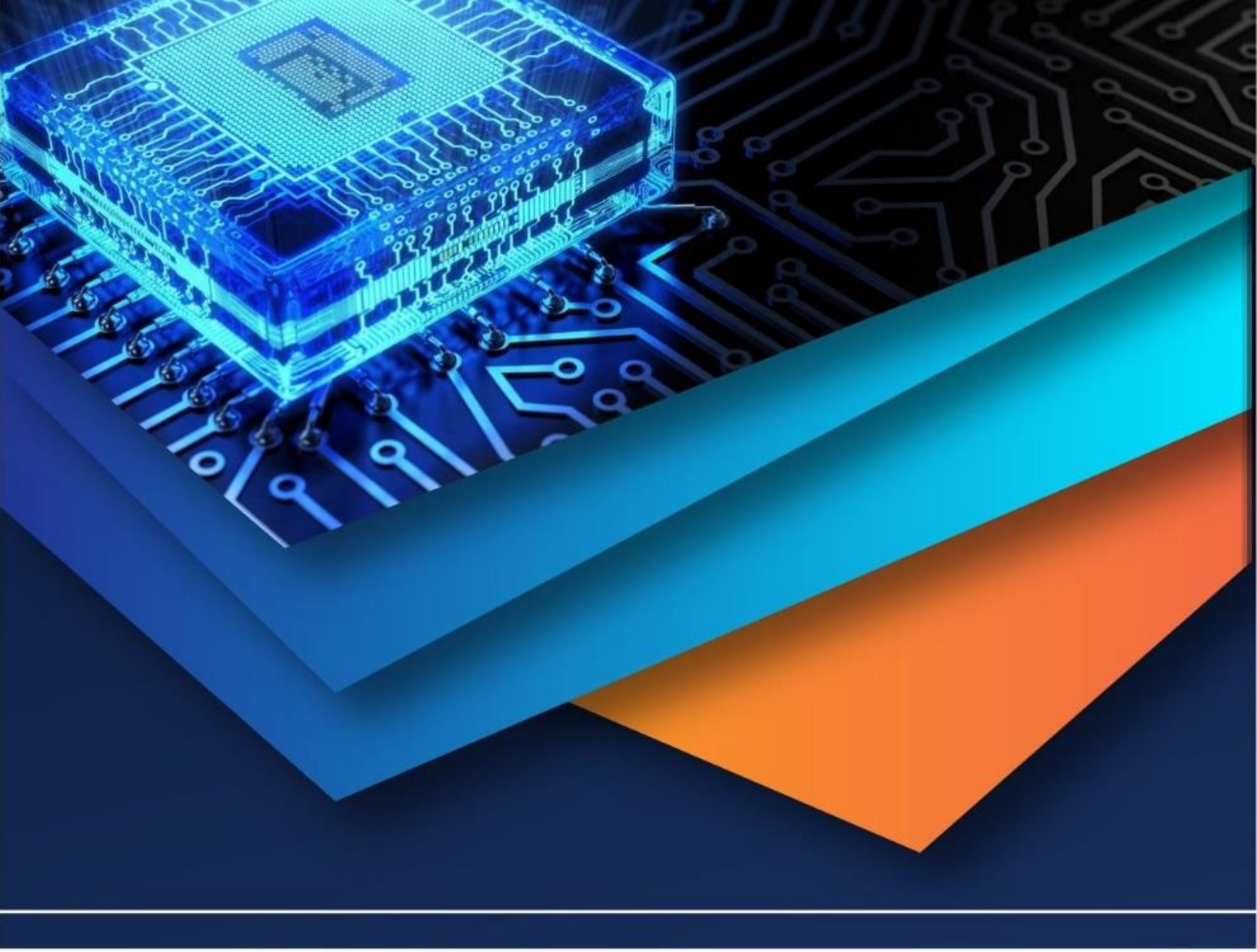

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