

# SPARKLE

## 2020...

Glimpse of fire







*PEOPLE ARE ALWAYS ASKING ME HOW IS IT THAT FIREFIGHTERS RUN INTO A BURNING BUILDING WHEN EVERYONE ELSE IS RUNNING OUT.*

### **COURAGE IS THE ANSWER**

*A FIRE AND SAFETYMAN IS THE MEMBER OF THAT UNSELFISH ORGANIZATION OF MEN WHO HOLD DEVOTION OF DUTY ABOVE PERSONAL RISK, WHO COUNT SINCERITY OF SERVICE ABOVE PERSONAL COMFORT AND CONVENIENCE, WHO STRIVE, UNCEASINGLY TO FIND BETTER WAYS OF PROTECTING THE HOMES OF FELLOW CITIZENS AND PROPERTY OF THE NATION FROM THE RAVAGES OF FIRE AND OTHER DISASTERS. THIS JOURNAL IS DEDICATED TO ALL THOSE WHO HAVE SACRIFICED THEIR LIVES IN ACHIEVING THIS NOBLE CAUSE.*



## STUDENT CHAPTER

Department of Fire Technology & Safety Engineering established student chapter under Fire & Security Association of India (FSAI) in year 2016. Fire & Security Association of India (FSAI) is a non-profit organization representing the Fire Protection, Life Safety, Security, Building Automation, Loss Prevention and Risk Management domains. FSAI aims to work closely with the Government and all other stakeholders to enable the Indian fire and security industry to reach global pre-eminence with better regulatory framework. Since its establishment the department has been running engineering career oriented Quality Improvement Programme (Q.I.P.) to render the best Fire & Safety professionals to the corporate world. These programmes includes basic fire-fighting training, first aid paramedics training, design of fixed fire-fighting installations and national seminar/workshops that impart best training to our students.





## PRESIDENT'S MESSAGE



I have always believed that no doubt it is important to start new projects, undertake novel ventures, but more important is to insure that they do not remain one time wonders but become a continuous process, a habit, a tradition. Therefore it gives me great pleasure to see the periodic issue "SPARKLE". I congratulate the editorial team of SPARKLE and wish them to success.

**Achal k Choudhary**

**President IPS Academy Indore (MP) India**



## PRINCIPAL'S MESSAGE



Technical Education is the most potential instrument for socio-economic change. Presently, the engineer is seen as a high-tech player in the global market. Distinct separation is visible in our education between concepts and applications. Most areas of technology now change so rapidly that there is a need for professional institutes to update the knowledge and competence.

Institute of Engineering and Science, IPS Academy is a leading, premium institution devoted to imparting quality engineering education since 1999. The sustained growth with constant academic brilliance achieved by IES is due to a greater commitment from management, dynamic leadership of the president, academically distinctive and experienced faculty, disciplined students and service oriented supporting staff.

The Institute is playing a key role in creating an ambiance for the creation of novel ideas, knowledge, and graduates who will be the leaders of tomorrow. The Institute is convinced that in order to achieve this objective, we will need to pursue a strategy that fosters creativity, supports interdisciplinary research and education. This will also provide the students with an understanding and appreciation not only of the process of knowledge creation, but also of the process by which technology and knowledge may be used to create wealth as well as achieve social economic goals.

I am delighted to note that the engineering graduates of this institute have been able to demonstrate their capable identities in different spheres of life and occupied prestigious position within the country and abroad. The excellence of any institute is a measure of achievements made by the students and faculty.

**All the Best.**

**Dr. Archana Keerti Chowdhary**  
**Principal**

## HOD'S MESSAGE



In order to achieve the aims and objectives of the society we plan to undertake some useful activities like organizing seminars, workshops and conferences at national and international level and publication of relevant technical literature. In this process it has been decided to publish a technical magazine entitled "Sparkle". The magazine is covering area relating to Fire, Safety and Occupational health/ hygiene. The article and research paper being contributed by the student writers with a mission of spreading awareness about Fire Prevention and Protection, Industrial Safety and Occupational health/hygiene. This will also help in generating awareness and educating the common people, which in turn will help in reducing loss of life and property. The society will provide the National Forum to meet and discuss the various issues and developments in the field of fire protection and industrial safety. The technical magazine will have a wider circulation among leading consultants, organizations concerned with the Fire, Safety and Environment protection.

**Dr. Praveen Patel**  
**Head of Department**



# EDITORIAL BOARD



## ADVISORY BOARD

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- Student 4<sup>th</sup> Year

- Student 3<sup>rd</sup> Year

- Student 2<sup>nd</sup> Year

- Student 2<sup>nd</sup> Year



## PUBLISHED BY

IPS Academy, Indore Institute of Engineering and Science  
Fire Technology and Safety Engineering Department







## FIRE TECHNOLOGY & SAFETY ENGINEERING DEPARTMENT

O Agni! Help us to gain prosperity by leading us on the righteous path as you know all our thoughts and actions, redeem us from all our sins and evil ways so that we bow before you with gratitude: **RIGVEDA**

### SAFETY OATH

I take oath that I will abide by all the rules of safety, Health and Environment and I am bound to obey them. I will put my effort to prevent and protect accidents, occupational diseases, disaster and environment. I will promote the awareness among my family, organization and the society at large.



### सुरक्षा शपथ

मैं शपथ लेता हूँ कि मैं सुरक्षा, स्वास्थ्य और पर्यावरण के सभी नियमों का पालन करूँगा और उनका पालन करने के लिए बाध्य हूँ। मैं दुर्घटनाओं, व्यावसायिक रोगों, आपदा और पर्यावरण को रोकने और उनकी रक्षा करने के लिए अपना प्रयास करूँगा। मैं अपने परिवार, संगठन और समाज में व्यापक रूप से जागरूकता को बढ़ावा दूँगा।



## VISION & MISSION OF THE DEPARTMENT

### Vision

To generate, develop and sustain a voluntary movement on Fire & Safety Engineering at the National Level aimed at educating and influencing society to adopt appropriate policies, practices and procedures that prevent and mitigate human suffering and economic loss arising from all types of accidents.

### Mission

To create and sustain a community of learning in which students acquire knowledge in fire, safety and hazard management and learn to apply it professionally with due consideration for ethical, human life & property safety issues. To pursue research and development in fire safety engineering, hazard management and disseminate its findings. To meet the challenges of today and tomorrow in the most effective, efficient and contemporary educational manner to help in building national capabilities in fire safety engineering, disaster management, hazard management, industrial safety education through practical training to ensure a fire safe action.





## PROGRAM EDUCATIONAL OBJECTIVES

**PEO 1:** To provide student with an academic environment aware of excellence, outstanding leadership, written, ethical codes and guidelines with moral values, and the life-long learning needed for a successful professional career.

**PEO 2:** To prepare students for job profile of Fire/Safety Officer with professional advancement in fire technology and safety engineering field through global education.

**PEO 3:** To provide students with basic foundation in mathematical, scientific and engineering fundamentals for solving complex problem in fire technology and safety engineering and to pursue higher studies.

**PEO 4:** To train students with good scientific, engineering and life safety breadth so as to comprehend, analyze, design and create novel products and solutions for the real life problem.

**PEO 5:** To inculcate in students professional and ethical attitude, effective communication skills, team work skills, multidisciplinary approach and ability to relate fire and safety engineering issues to broader and social context.

## PROGRAM OUTCOMES (POS)

The POs as recommended in National Board of Accreditation (NBA), New Delhi manual are as follows:

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis:** Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. to engage in independent and life-long learning in the broadest context of technological change.



**10. Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

**11. Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

**12. Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

**Life-long learning:** Recognize the need for, and have the preparation and ability





## **DEPARTMENT INFORMATION**

Department of Fire Technology & Safety Engineering was established in the year 1999. The Department became the first AICTE Approved Engineering Department for providing four years Bachelor degree of Engineering in Fire Technology & Safety Engineering.

Since its establishment the department has been running engineering career oriented Quality Improvement Programme (Q.I.P.) to render the best Fire & Safety professionals to the corporate world. These programmes include basic fire-fighting training, first aid paramedics training, design of fixed fire-fighting installations and national seminar/workshops that impart best training to employee of Industries to gain skills.

Department of Fire Technology & Safety Engineering is a leading department devoted to imparting quality Fire & Safety Engineering education. Apart from AICTE New Delhi, approval and affiliation with the Rajiv Gandhi Proudyogiki Vishwavidyalaya, Bhopal, department has also got approval from the Chief Factory Inspectorate Labor Department, Govt. of M.P. as per Gazette notification dated 29.05.2009.

### **COURSES OFFERED:-**

1. UG – B.E. in Fire Technology & Safety Engineering
2. UG – B.E. in Safety and Fire Engineering
3. PG – M.Tech. in Industrial Safety Engineering

## **Sparkle**

1. Ability to design solution for the complex major hazardous industries in terms of fixed fire-fighting installations and fire prevention that meet the specified needs.
2. Ability to describe the impact of safety engineering solutions in environmental, economic and societal context.



## DEPARTMENT FACULTY DETAILS





**Mr. Praveen Patel, Professor and Head, FT&SE**

Telephone: 731-4014615

Email ID: [praveenpatel@ipsacademy.org](mailto:praveenpatel@ipsacademy.org)

Date of joining: 02-08-2004

Academic Experience: 17 years



Qualifications: Ph.D. in Mechanical Engineering “System Safety Assessment and Hazard Evaluation Oil Refinery” SGV University, Jaipur, Rajasthan. M.E. in Industrial Engineering & Management, IET, DAVV University, Indore, MP. B.E. in Fire & Safety Engineering, RGPV Bhopal.

Research Area: Fire Dynamics, System Safety, Fire Fighting Installation and Disaster Management.

Subject Taught: Industrial Fire Protection, Fundamentals of Fire Engineering, and Fixed Fire Fighting Installation

Career Achievements: Chairman of Board of Studies IPS Academy, Institute Of Engineering & Science , Indore for Fire Technology & Safety Engineering. Programme Coordinator for B.Tech. Fire Technology & Safety Engineering in NBA New Delhi Process. Head Of The Department Fire Technology & Safety Engineering at IES,IPS Academy IES Indore.



**Dr. Sumit Bhatia, Associate Professor, FT&SE**

Mobile No: 9407120997

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Date of Joining: 12-09-2016

Academic Experience: 10+ Years

Qualifications: Ph.D. in Organometallic Chemistry, School of Chemical Science, DAVV, Indore

Research Area: Chemical Safety and Inorganic Synthesis

Subject Taught: Engineering Chemistry, EEES, Industrial Psychology, Safety In Petrochemical Industry, and Safety in Nuclear Power Plant.

Department Responsibility: Institution Research Community, Department Research Community Member, Class Coordinator, Planning & Evaluation Faculty Coordinator.

Career Achievement: UGC Major Research Project Fellow, NPTEL Motivated Learner





**Dr. Aditya Tiwary, Associate Professor, FT&SE**

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Date of Joining: 08-08-2019

Academic Experience: 14 Years

Qualifications: Ph.D. Reliability Evaluation of Distribution System With Random Repair Time And Optimization, Electrical Engineering, SGSITS

Research Area: Reliability Engineering, Electrical Fire Safety, Optimization, Artificial Intelligence, and Internet of Things and Power System.

Subject Taught: Electrical Fire Safety, System Safety & Reliability, Basic electrical & electronics engineering, probability and data analysis, Mat-lab Programming, Fire Prevention & Protection Measures, Safety in Electrical Systems, and Research Methodology & IPR.

Department Responsibility: Departmental Research Committee, Planning and Evaluation Committee, Faculty development committee, Research paper writing and its publication committee, Higher education and value addition courses committee, Class coordinator First year, Mentor, Refresher Course Coordinator, Project Review Committee member, Lab Incharge, PRC Coordinator, and In-charge Administrator.





**Mr. Manish Dubey, Assistant Professor, FT&SE**

Email: [manishdubey@ipsacademy.org](mailto:manishdubey@ipsacademy.org)

Date of Joining: 14/06/2014

Industrial Experience: 3 Years

Academic Experience: 13 years

Qualifications: M.Tech. Energy & Environment, DAVV Indore, B.E. FT&SE, IPS Academy IES Indore.

Research Area: Fire & Safety Engineering.

Subject Taught: Computer Aided Risk Analysis, and Fire Fighting Installation

Department Responsibility: Department NBA Coordinator, Lab In-charge CARA, Project Review Committee Member, and Class Coordinator.



**Mr. Veerendra Suryawanshi, Assistant Professor, FT&SE**

Mobile: 9713503998

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Date of Joining: 01-01-2013

Academic Experience: 8Years

Qualifications: M. Tech. Industrial Safety Engineering IPS Academy IES, Indore. B.E. Mechanical Engineering.

Research Area: Industrial Safety Engineering.

Subject Taught: Fire Fighting & Safety Equipment, Safety Engineering & Its Industrial application, Disaster Management, Material Science, and Town Planning & Construction Safety.

Department Responsibility: Academic Activity Coordinator, CMS Coordinator, Class Coordinator, and Department Library Coordinator.





**Mr. Aashish Yadav, Assistant Professor, FT&SE**

Mobile No: 9630482050

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Date of joining: 1 July 2011

Academic Experience: 10 years

Qualifications: M. Tech. Industrial Safety (Honors), IPS Academy IES Indore. B. Tech. Fire Technology & Safety Engineering IPS Academy IES Indore.

Research Area: Evacuation Strategies, Fire Intensity, and Vulnerability Assessment.

Subject Taught: Town Planning & Safety in Construction, Fire Fighting Codes & Standardization, Fire Prevention & Protection Measures, Salvage Evaluation in Fire Situation, Fire Fighting & Safety Equipment.

Department Responsibility: Fire Extinguisher Maintenance, Training Placement Coordinator, Project Review Committee, Fire Research Lab and Fire Technology Park In-charge.



**Mr. Yashwant Buke, Assistant Professor, FT&SE**

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Date of Joining: 08-10-2010

Academic Experience: 11Years



Qualifications: M. Tech. Industrial Safety Engineering IPS Academy IES Indore. B.E. Mechanical Engineering from JIT Borawan.

Research Area: Industrial Safety Engineering, Design Engineering and Thermal & Fluid Mechanics.

Subject Taught: Strength of Material, Fluid Mechanics, and Industrial Hygiene and Occupational Health.

Department Responsibility: NAAC Departmental Coordinator, Lab In-charge, Class Coordinator, and NBA Co coordinator.



**Mr. Vineet Banodha, Assistant Professor, FT&SE**

Mobile No: 9893470157|

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Date of Joining: 17-08-2010

Academic Experience: 10Years



Qualifications: M. Tech. Industrial Safety Engineering IPS Academy IES Indore. B.E.Fire Technology & Safety Engineering IPS Academy IES Indore.

Research Area: Evacuation planning, On-Site Emergency Planning, Risk assessment tools HAZOP, and Job Safety Analysis.

Subject Taught: Fire Fighting Installation, and Rescue Equipment

Department Responsibility: Department Training & Placement Coordinator, Lab In-charge, and Class Coordinator.

**Mr.Vijay Shankul, Assistant Professor, FT&SE**

Mobile No: 9893602604

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Date of Joining: 13-03-2013

Industrial Experience: 2 Years

Academic Experience: 8+ Years



Qualifications: M.E. Computer Integrated Manufacturing from Shri G.S. Institute of Technology and Science, Indore. B.E. Industrial Production Engineering from Jabalpur Engineering College Jabalpur.

Research Area: Lean & Green Manufacturing, Industrial Safety Engineering, Product End of Life Management, E-Waste Management, Product life Cycle Engineering, Total Productive Maintenance, Safety Management Systems, and Entrepreneurship.

Subject Taught: Production Process, Pumping Machinery & Fluid mechanics, Work Study & Ergonomics, Heavy Vehicle Automobile Engineering & Safety, Safety Engineering, Machine Design & Drawing, Entrepreneurship and Management Concept.

Department Responsibility: Faculty Class Coordinator, Lab In-charge, Department E-Magazine Editor, NAAC Co- Coordinator, Department Social Activity Coordinator, Department NPTEL Course Faculty Mentor, M. Tech. Research Supervisor and Mentor Mentee Scheme Tutor Guardian Coordinator.



**Mr.Vijay Kahar, Asst. Professor, FT&SE**

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Date of Joining: 01-08-2013

Industrial Experience: 02 Years

Academic Experience: 08 Years



Qualifications: M.Tech. Environmental Management from Ujjain Engineering College.  
B.E. Chemical Engineering Ujjain Engineering College Ujjain.

Research Area: Dairy Wastewater, Solid Waste Management and Noise Control.

Subject Taught: Heat Transfer, EEES and Hazardous Material Management.

Department Responsibility: Class Coordinator, Project Review Committee Member and  
Department Research Committee Member.

**Mr. Praveen Kumar Badodia, Assistant Professor, FT&SE**

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Date of Joining: 04-03-2011

Industrial Experience: 01 Year

Academic Experience: 11 Year

Qualifications: M. Tech. Environmental Management from Ujjain Engineering College, B.E. Chemical Engineering from Ujjain Engineering College Ujjain.

Research Area: Environment Air Pollution & Chemical Process Safety.

Subject Taught: Chemical Process Safety, Industrial Safety Engineering Safety in

Chemical Industries, Environment & Pollution Control, Environment Protection and Waste Management, Safety in Petrochemical Industry, Energy Environment Ecology & Society

Department Responsibility: Class Coordinator, Departmental Exam Coordinator.





**Mr. Gaurav R Anthony, Assistant Professor, FT&SE**

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Email: gauravanthony@ipsacademy.org

Date of Joining: 1-08-2018

Industrial Experience: 1 year

Academic Experience: 5 years



Qualifications: Master's in Disaster Management IMS, DAVV University Indore. B.E Fire Technology & Safety Engineering IPS Academy Indore.

Research Area: Disaster Management, and Disaster Risk Reduction, Fire Protection, Fire Science & Dynamics, Human Psychology, and Disaster Vulnerability.

Subject Taught: Fire Protection & Prevention Measure, Machine Drawing & Design, Entrepreneurship & Management Concept, Computer Aided Risk Analysis, Insurance & Risk Management, and Nuclear Safety & Radio-active Material.

Department Responsibility: Training & Placement Committee Member, Career & Guidance Committee Member, Safety Committee Member, Class Coordinator, Project Review Committee Member.

**Mr. Pravin Tathod, Assistant Professor, FT&SE**

Mobile No: 9425954240

Email: [pravintathod@ipsacademy.org](mailto:pravintathod@ipsacademy.org)

Date of Joining: 08-10-2019

Industrial Experience: 2 Years

Academic Experience: 13 Years

Qualifications: M. Tech. Industrial Safety Engineering RGPV Bhopal. B.E Mechanical Engineering.

Research Area: Industrial Safety Engineering

Subject Taught: Building Drawing & Design, Paramedics, Safety in Construction, IH&OH, and Safety in Mechanical Industries.

Department Responsibility: Department Exam Coordinator, Time Table In-charge.





**Mr. Sourabh Jain, Assistant Professor, FT&SE**

Mobile No: 9424810013

Email: [sourabhjainft@ipsacademy.org](mailto:sourabhjainft@ipsacademy.org)

Date of Joining: 4-12-2017

Academic Experience: 9 Year



Qualifications: M. E. VLSI Embedded System form SVITS Indore. B.E. Electronics & Instrumentation from RIT Indore.

Research Area: Intelligent System, Robotics & Control, VLSI System Design, Electrical Fire Safety.

Subject Taught: Electrical Fire Safety, Paramedics.

Department Responsibility: Department Time Table Coordinator, Exam Coordinator, and Result Analysis.

**Mr. Hemendra Patil, Assistant Professor, FT&SE**

Mobile No: 8269373691

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Date of Joining: 26-11-2018

Academic Experience: 3 Years



Qualifications: M. Tech Industrial Design from NANIT Bhopal. B.E. Mechanical BUIT, Bhopal.

Research Area: Industrial Design and Manufacturing.

Subject Taught: Product Design, Work Study & Ergonomics, SOM, Fluid Mechanics, and Manufacturing Industrial Automation.

Department Responsibility: Department Library Coordinator, CMS Coordinator, Digital Learning Monitoring, and Press Release.



**Mr. Kamal Shukla, Assistant Professor, FT&SE**

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Date of Joining: 20-08-201

Industrial Experience: 1 Year

Academic Experience: 6 Years

Qualifications: M. Tech Industrial Safety Engineering from IPS Academy IES Indore. B.E Fire Technology and Safety Engineering IPS Academy IES Indore, NEBOSH, IOSH. Internal Audit Certificate Course IPSA IES, Indore.

Research Area: Fire & Safety Engineering, and Occupational Health and Safety.

Subject Taught: Nuclear Safety & Radioactive material, Rescue Equipment Technique, Safety Petroleum Industry, Fire Protection Prevention Measures.

Department Responsibility: Department Scholarship Coordinator, Class Coordinator, Sports Coordinator, Alumina Meet Coordinator.



**Mr. Mustakim Khan, Assistant Professor, FT&SE**

Mobile No: 96170 05005

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Date of Joining: 20-08-2018

Industrial Experience: 6 Years

Academic Experience: 3Years

Qualifications: M. Tech Industrial Safety Engineering IPS Academy IES Indore. B.E FT&SE IPS Academy IES Indore.

Research Area: Fire & Safety Engineering.

Subject Taught: Fire Fighting & Safety Equipment, Disaster Management, Safety Health & Environmental Laws.

Department Responsibility: Department Class Coordinator, Sports Coordinator, Alumina Meet Coordinator.





**Mrs. Shalini Dwivedi, Assistant Professor, FT&SE**

Mobile No: 9098327371

Email: [shalinibhardwaj@ipsacademy.org](mailto:shalinibhardwaj@ipsacademy.org)

Date of Joining: 08-08-2012

Academic Experience: 10 Years

Qualifications: M.E. Computer Integrated Manufacturing Medicaps University Indore. B.E Industrial Production Engineering.

Research Area: Safety Management, Industrial Safety Engineering Manufacturing Process.

Subject Taught: Manufacturing Process, Engineering Drawing, Work-study & Ergonomics, Salvage Evaluation of Fire situation, Fluid Mechanics, Industrial Psychology, Entrepreneurship & Management concept, and Workshop Practice.

Department Responsibility: Department Class Coordinator, NAAC Co Coordinator, Women's Grievances Cell Member, and Cultural Activity Coordinator, and Mentor Mentee Scheme Tutor Guardian Coordinator.



**Ramjee Singh Prajapati, Assistant Professor, FT&SE**

Mobile No: 9575538038

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Date of Joining: 26-Nov-2018

Academic Experience: 6 years



Qualifications: M. E. Thermal Engineering from RKDF IST Bhopal. B.E Indra Gandhi Engineering College Sagar.

Research Area: Thermal Engineering, and Safety in heat Exchanger.

Subject Taught: Heat Transfer, Fluid Mechanics, Hydraulic Machine, and Strength of Materials, Industrial Noise and Vibration Control.

Department Responsibility: Class Coordinator, Digital Learning Monitoring committee, Library committee, Press Release and Digital Media Committee



**Mr. Aamir Shaikh, Assistant Professor, FT&SE**

Mobile No: 7869055998

Email: eraamirali.shaikh@gmail.com

Date of Joining: 08-10-2021

Academic Experience: 14+ Years

Qualifications: M.Tech. Industrial Safety Engineering from IPS Academy IES Indore.  
B.E FT&SE IPS Academy IES Indore.

Research Area: Fire Engineering, Industrial Safety Engineering.

Subject Taught: Industrial Hygiene and occupational Health.

Department Responsibility: Tutor Guardian Mentor.



**Mr. Kapil Patel, Drill Instructor, FT&SE**

Mobile No: 7987891459

Date of joining: 27 January 2019

Academic Experience: 2 years



Professional Experience: Served In Army for 19 Years in Army Service Corps. Battle Field Nursing Assistance, St. Joseph Ambulance, New Delhi Fire Sub-officer

Qualifications: Diploma from National Institute of Security Management, Bangalore B Vehicle Course (Maintenance) ASC Centre, Bangalore Short Drill Course ASC Centre, Bangalore Short Course PCDA Allahabad.

Department Responsibility: Drill Instructor, NCC ANO, Lab In-charge.





















## TRAINING/INTERNSHIP ATTENDED BY OUR STUDENTS IN YEAR 2020:

Sl. No.	Name of the Industry	Name of the Student	Duration
1	Haldia Petrochemicals Ltd.	Himadri Sekhar Bera	43 Days
2	Hindustan Petroleum Corporation Limited, Mumbai Refinery	Krutika Avinash Sonawane	15 Days
3	Jaypee Bina Thermal Power Plant	Sobhag Singh Thakur	21 Days
4	Damodar Valley Corporation, Bokaro, Jharkhand	Sankalp Shree	30 Days
5	B.R. Oil Industries Pvt .Ltd.	Vishal Gupta	15 Days
6	Orient Paper Mills Caustic Soda Unit(Amlai)	Satyam Thapa	15 Days
7	Gail India Limited	Shivam Shukla	30 Days
8	Damodar Valley Corporation	Soumya Prakash	30 Days
9	Nexus Fire Safety Technologies Pvt Ltd	Tushar Singh	30 Days
10	Sunreeja Oil And Gas	Rupam Gadkari	30 Days
11	Khaitan Chemical And Fertilizers Ltd., Nimrani (M.P)	Yash Pawar	31 Days
12	Gail (India) Limited	Priyanka Singh	30 Days
13	Khaitan Chemical And Fertilizers Ltd., Nimrani (M.P)	Aashutosh Piplotiya	31 Days
14	Khaitan Chemical And Fertilizers Ltd., Nimrani (M.P)	Sameer Patidar	31 Days
15	Chambal Fertilizer And Chemicals Limited	Gajendra Singh Hada	31 Days
16	Adani Port And Special Economic	Vansh Rathod	30 Days



	Zone Limited, Mundra		
17	Satpura Thermal Power Generating Company Limited	Om Gawande	15 Days
18	Satpura Thermal Power Station Sarni	Ayush Baraskar	15 Days
19	Gail (India) Limited	Akhil Mohan	30 Days
20	Sunreeja Oil And Gas Pvt. Ltd , Delhi	Shivam Jhoda	30 Days
21	Satpura Thermal Power Station, M.P.P.G.C.L- Sarni (M.P)	Abhay Singh	15 Days
22	Adani Wilmar Limited, Nimrani , Dist-Khargone (Mp)	Sumit Raghuwanshi	22Days
23	Satpura Thermal Power Station, M.P.P.G.C.L., Sarni(Mp)	Madhura Edlabadkar	15Days
24	Satpura Thermal Power Station, M.P.P.G.C.L., Sarni (Mp)	Shruti Pawar	15Days
25	Commercial Syn Bags Ltd. Indore	Harshal Pawar	30 Days
26	Shree Singaji Thermal PowerPlant Project Khandwa (Mp)	Harshit Soni	15 Days
27	Commercial Syn Bags Ltd. Indore	Mayank Koparkar	30 Days
28	Rashtriya Chemical& Fertilizers Ltd. Raigad	Rawool TejasRamesh	15Days
29	Shree Singaji Thermal PowerPlant Project Khandwa (Mp)	DevanshGupta	15Days
30	Ongc Ltd. NewDelhi	KartikaySungh	30 Days
31	Indian Oil Corp. Ltd.,Bihar,	Ashif Ali	30 Days
32	Indian Oil Corp. Ltd.,Assam	Franshich Gogoi	30 Days
33	Shree Singaji Thermal PowerPlant Project Khandwa (Mp)	KrishnapalSingh Chouhan	15Days
34	Rashtriya Chemical	Tejas	15Days

	& Fertilizers Ltd. Raigad	Chavan	
35	Shree Singaji Thermal PowerPlant Project Khandwa (Mp)	Hansraj Singh Chouhan	15Days
36	Delhi Fire Service	Anubhav Kumar	30 Days
37	Indian Oil Corp. Ltd.,Bihar	R. Sashi Kumar	30 Days
38	Ipca Laboratories Ltd. Indore	Chirag Gupta	34 Days
39	Indian Oil Corp. Ltd.,Haryana	Akshay Paul	30 Days
40	Chambal Fertilizer &Chemical Ltd. New Delhi	DevanshPandey	30 Days
41	Pristine Enviromental Asso.Pvt. Ltd. Indore	AbhishekTiwari	46 Days
42	Pristine Enviromental Asso. Pvt. Ltd. Indore	Abheet ManiTripathi	46 Days
43	Indian Oil Corp. Ltd.,Haryana	Samerpit Prakash	30 Days
44	Srf Ltd. Haryana	Abhishek Saxena	43 Days
45	Balaji Wafers Pvt. Ltd. Rajkot	Dhaval Hala	31 Days



# VINDICATOR



**IPS Academy, Institute of Engineering & Science**  
(A UGC Autonomous Institute affiliated to RGPV)  
**Fire Technology & Safety Engineering Department**



## “VINDICATOR” EVENT HIGHLIGHTS

Day 1  
UG & PG Project Competition



Jury Member



Participants



Audience

Day 2  
Cogent Outdoor Fire Fighting Drills Competitions



Fire Extinguisher Drill



Rope Rescue Drill



Fire Tender Drill

Fire Technology & Safety Engineering Department annually organizes two days “VINDICATOR”. The objective of first day event is to groom and record quality project work among UG & PG students of Fire Technology & Safety Engineering domain. This activity also intends to publish research, review, and short article in this field. The objective of second day competitions is to perform and practice the available standard emergency drills with required/expected coordination and time limit in fire service.

**Co-Convener**  
Mr. Yashwant Buke

**Student Coordinator**  
President, Secretary, Treasurer  
Student Chapter (FSAI)

**Supported by**

**Fire & Security Association of India**  
**Madhya Pradesh Chapter**  
(Non-Profit Organization Representing Fire  
Protection in India)







# One Week National Tech-Fest 2020

MARCH  
16<sup>th</sup> to  
20<sup>th</sup>

## CONTEMPORARY SAFETY & FIRE FIGHTING MANAGEMENT AT MAH INDUSTRIES



Expert Lectures



Student Chapter  
Election



Innovative Ideas/Proto  
Type Models Competition



Panel Discussions  
Competition



Technical Quiz  
Competition



Business Modeling in  
Fire Safety Industries

### ORGANISED BY

IPS Academy  
Institute of Engineering & Science  
Fire Technology & Safety Engineering Department

### CO-CONVENER

Mr. Vineet Banodha -9893470157  
Mr. Veerndra Suryawanshi-9713503998

### STUDENT COORDINATOR

Rahul Mahajan-8982462391

### Supported by

FIRE & SECURITY ASSOCIATION OF INDIA Madhya Pradesh Chapter  
(Non-Profit Organization Representing Fire Protection in India)



**ONE WEEK NATIONAL TECH-FEST****“Advances in Fire Technology & Safety Engineering”**8<sup>TH</sup> DECEMBER TO 12<sup>TH</sup> DECEMBER, 2020

In Association with

**FIRE SECURITY ASSOCIATION OF INDIA**

(Non-Profit Organization Representing Fire Protection in India)

**ABOUT THE TECHFEST:**

Several types of manufacturing, storage and control processes are used in industry. In the context of large quantities of the potentially hazardous materials and processes handled on routine basis, effective measures are required to be developed to ensure adequate controls and safeguards to prevent accidents having serious consequences upon workers, community and property. It is therefore, a high priority that hazards are properly identified and assessed for their potential to cause serious consequences.

Occupiers of factories are statutorily required to ensure safety and health of workers and protection of the environment. The Factories Act, 1948, the Environment (Protection) Act, 1986 and Rules framed under these Acts have elaborate statutory provisions on safety, health and environment. The occupiers have an obligation to comply with these provisions. This seminar helps in standard, organizations should establish and maintain procedures to identify hazards and assessment & control risks related to their activities.

The Department of Fire Technology & Safety Engineering, IES-IPSA, Indore is organizing a five days tech-fest on “advances in Fire Technology & Safety Engineering”. This tech-fest will provide a united platform to enhance the technical skill and knowledge of individual.





**CASH PRIZE:**

Name of Competition	Prize Amount
Panel Discussion- I	Rs 5000.00
Panel Discussion- II	Rs 3000.00
Innovative Ideas/Proto Type Models-I	Rs 3500.00
Innovative Ideas/Proto Type Models -II	Rs 2000.00
Quiz Competition-I	Rs 3500.00
Quiz Competition-II	Rs 2000.00

**Panel Discussion Result:**

S.No.	Name of the Students	Topic	Panel In charge	Remark
1.	Tanishk Aggarwal	Is India ready for a Cashless Economy?	Mr. Kamal Shukla	Winner (Rs 5000 Cash Prize)
	Shivam Pathak			
	Dishant Bharade			
	Mitali Mangade			
	Siddharth Sharma			
	Ishita Shukla			
2.	Gaurav Barapatre	Statue of Unity-Symbol of Pride or Wastage of Public Money	Mr. Praveen Tathod	Runner-Up (Rs 3000 Cash Prize)
	Sarthak Phanse			
	Rawool Tejas Sharma			
	Pallav Bhute			
	Mehakpreet Singh			
	Hiimanshu Paradkar			

**Innovative Ideas/Proto Type Model Competition Result**

S.No.	Presented By	Title	Remark
1.	Varun Sharma	Snakebot Hyper Redundant Robot	Winner (Rs 3500 Cash Prize)
2.	Tejas Rawool Ramesh	Integrated Broken Rail Detection & Signaling System	Runner-Up (Rs 2000 Cash Prize)



### Quiz Competition Result

S.No.	Name of the Students	Activity	Remark
1.	Tanishk Aggarwal	Quiz Competition	Winner (Rs 3500 Cash Prize)
2.	Tejas Rawool Ramesh	Quiz Competition	Runner-Up (Rs 2000 Cash Prize)

### Discover the World of Business Modeling in Fire and Safety Industry

S.No.	Name of the Students	Activity	Remark
1.	Harsh Tiwari Ashutosh Rana Akhil Mohan	Business Model	Winner (Rs 3500 Cash Prize)
	Adityaraj Singh Chouhan		
2.	Mohd Zain Ul Aabdeen Qureshi	Business Model	Runner-Up (Rs 2000 Cash Prize)











# विंडिकेटर प्रोग्राम में स्टूडेंट्स ने सौखी फायर एंड सेफ्टी तकनीक



एसोसिएशन ऑफ इंडिया द्वारा दो दिवसीय कार्यक्रम 'विंडिकेटर-2019' का आयोजन किया गया। इस अवसर पर पेपर प्रेजेंटेशन व विभिन्न प्रकार की फायर सेफ्टी डील की गई। इस दौरान फायर प्रोटेक्शन सिस्टम,

हेल्थ एंड हाईजिन, इंडस्ट्रीयल सेफ्टी, रिस्क असेसमेंट व हेजाडियस पदार्थों के रख-रखाव जैसे विषयों पर स्टूडेंट्स ने शोधपत्र प्रस्तुत किए। विभागध्यक्ष डॉ. प्रवीण पटेल ने बताया विभिन्न प्रकार की डील जैसे

ट्रेलर पंप डील, बीए सेट डील, फायर एक्सटिंग्विशर डील व हाइड्रेन्ट डील प्रतियोगिताओं का आयोजन हुआ। प्रतियोगिता के विजेता व उपविजेता को आकर्षक नकद राशि प्रदान कर पुरस्कृत किया गया।



## Airport's transition to environmentally friendly firefighting foams



### ARFF: AIRPORT'S TRANSITION TO ENVIRONMENTALLY FRIENDLY FIREFIGHTING FOAMS

In case of fire emergency at airport, every second counts. Aircraft Rescue Fire Firefighters (ARFF) have to be effective in a short time to save people lives in a burning aircraft. The firefighting foam must be quickly efficient.

#### THE MOVE FROM AFFF TO FFF AT AIRPORTS

The world of firefighting is quickly moving toward fluorine-free foam products, getting away from PFAS-containing products (AFFF and AR-AFFF foams). The industry challenge was to provide efficient fluorine-free foams with same performance that fluorinated products.

Performing fluorine-free foams (FFF) that meet ICAO (International Civil Aviation Organization) specification are available in the aviation market. Some international airports are changing or have already changed for fluorine-free foam onboard fire trucks or in aircraft hangar fire safety systems.

**NEW FLUORINE-FREE FOAM DEDICATED TO AIRCRAFT FIRES: ECOPOL A+** Thanks to its long experience in environmentally-friendly foams and aircraft fire safety, BIOEX launched **ECOPOL A+** fluorine-free foam: an high-performance FFF dedicated to aircraft fire extinguishment.

This **fluorine-free foam** quickly extinguishes a wide range of hydrocarbon fuels fires faced at airports, such as kerosene, jet A1, gasoline and heptane. ECOPOL A+ meets International Civil Aviation Organization (ICAO) certification and European Standard EN1568 Part 3 v2018 certification.

ECOPOL A+ forms a stable and thick foam blanket which flows rapidly above burning fuel to seals vapours and cut off oxygen supply, to quickly extinguish fire and prevent from reignition. ECOPOL A+ is a viable alternative to AFFF foams and offers equal or better performance than traditional AFFF foams. The foam adheres to vertical surfaces to cool aircraft parts such as fuselage or body,

providing long thermal insulation and allowing passenger evacuation.

Formulated without PFAS-components, this fluorine-free foam is an environmentally friendly solution for airports fire protection. ECOPOL A+ meets environmental concerns balanced with high fire safety performances. ECOPOL A+ is fully biodegradable, fluorine-free and silicone-free.

#### ECOPOL A+ FOAM APPLICATION

ECOPOL A+ can be used in low or **medium expansion** depending on the fire scenario (landing gear, engine, fuel line fires...). Contained within ARFF vehicle, the foam concentrate can be applied on direct application by the airport fire truck monitor. For fires

that cannot be reached by the aircraft fire vehicle, it can be put out with fixed or mobile foam proportioning and foam discharge devices.

The foam concentrate is available in 3% and 6% version. Fire fighters can use it with fresh, brackish and sea water.

**BIOEX aviation foam concentrates** are tested and approved by many international airports such as Paris airports, Geneva airport and Ottawa airport.

#### ECOPOL A+ COMPATIBILITY WITH ARFF EQUIPMENT

In terms of viscosity, ECOPOL A+ is Newtonian, that is to say liquid. It facilitates the replacement of existing AFFF foam, without any setting or replacement.

This aviation foam concentrate is compatible with all fire trucks and fire suppression systems. ECOPOL A+ is non-corrosive and suitable to usual foam equipment materials.

BIOEX can help airports in their transition to FFF and for AFFF foam disposal. The fluorine-free foam concentrate can be tested in ARFF existing foam equipment proportioning and discharge equipment. BIOEX team of experts is available worldwide to **support airports in their transition to FFF**.

**Prateek Chauhan**



## How drones can help firefighters save lives



This summer, record-breaking heatwaves set off devastating wildfires across India, destroying homes, forests and vital infrastructure.

Far from an isolated incident, wildfires are a growing problem across the world. Climate change is disrupting traditional weather patterns, leading to an increased risk of fires — even here in India, as April's fire demonstrates.

Unfortunately, it can be difficult to suppress wildfires with traditional firefighting methods. In a hot, barren climate, tinder-dry brush and undergrowth are a potent fire risk that can quickly burn out of control. At the same time, tight budgets and falling staff levels mean that fire services are under more pressure than ever. One in five firefighter roles that existed in 2010 no longer exists.

To protect citizens, their teammates and the India's infrastructure, some firefighting units are looking to new tools to assist them — in the form of drones. While it might seem like an idea that belongs to the distant future, it is in fact much closer than you might think.

### **The future of fire detection, mitigation and suppression.**

With long-range control systems, light portable designs and autonomous capabilities, drones are the perfect surveyors of inhospitable landscapes and dangerous environments. They can provide real-time data on evolving, high-risk fires, which enables fire services to deploy tactical units successfully.

In turn, this increases safety for your fire service and minimize lost time. Fire services such as the West Midlands Fire Service are already using drones with thermal imaging cameras to improve situational awareness.

The potential of drones extends far beyond fire detection. In the near future, these vehicles will mitigate and suppress fires too. Pilot initiatives are already underway, we using multiple drones to suppress forest fires with water and fire suppressant drops. This creates a ‘swarm’ of drones that can function as a coordinated system.

In the event of a wildfire, the fire service could deploy the unmanned drone swarm from a remote location and send it to the impacted area to create a rain-effect over the fire. Because the drone swarm does not rely on human intervention, it has significant benefits over traditional firefighting methods. Firstly, it reduces the potential of harm to the unit, which would otherwise have to operate in perilous environments. As well as this, drones can operate in all visibility conditions — day or night — giving them significant advantages over helicopters.

**Prabhujee Upadhyay**



## UNSEEN KILLER FOR FIREFIGHTERS



Cancer is a hidden killer amongst the force. In fact, firefighters have a 68% higher risk of being diagnosed with cancer than the general population! Why? It's simple, exposure to cancer-causing particles is high. But, this hidden killer can be stopped in its tracks, with careful PPE inspection and maintenance.

Regular inspections of fire kits are just as important as laundering. A fire suit is only as good as its weakest seam, and therefore kit needs to be checked that it is fit for purpose before every use. Here are the steps that will help preserve the life of kit:

- Back to basics

It sounds simple, but check the surface of the fabric first and foremost. You should be looking for holes, rips, tears and scuffs – even just the smallest rip or graze can impact on a kit's protection. This should be conducted both prior to using kit and after each shift.

- Now you see me

Whether called out to a rescue in dark and hazardous conditions, battling through thick plumes of smoke, or attending a road incident amidst live traffic, being easily seen is vital to ensuring safety on the job. A kit with good visibility enhances not only your own safety, but also that of your team.

A torch test will check the reflective surfaces of a fire suit. Shine a torch over reflective surfaces to make sure they remain reflective. This also applies to non-fire kits, such as a rescue-wear set.

- Wet, wet, wet

Maintaining water repellence is crucial. Not only does it allow for more effective and comfortable working, it ensures that harmful chemicals and particulates are not able to infiltrate through the material.

And it's incredibly easy to check if a suit is still water tight – simply spray it with water. If the water pools in droplets on the surface, the durable water repellent (DWR) layer is working effectively. But if it soaks into the fabric, the DWR has failed and the garment needs re-treating.

- Safely sealed

Even the smallest amount of damage to a suit can compromise its ability to protect. And this includes fastenings, seals, zips and poppers.

These seals provide an important line of defence for firefighters – they ensure full body protection in extreme heat, and are designed to ensure corrosive liquids, carcinogenic particles and other harmful substances can't infiltrate kit.

No matter how well you maintain your kit, there will always come a time when it will need replacing. So, it's important to know when this time comes. Replacing kit at the right time keeps your team safe and comfortable, no matter what the call out is for.

**Mitali Mandage**



## \*ROLE OF YOUTH IN DEVELOPING NATIONS\*



A nation's culture resides in the hearts and soul of the people. "Youth" means we, right...! Youth are the building blocks for the economic and social development of the nation. They are the evolver of social economic and political and cultural transformation and the driving force for the change. The environment of youth in the nation building is a must or they place what are the most important role. Youths are ultimately the social actors of change to develop the nation. We should first developed the education system of India. The foundation of every state is the education of its youth. We should create a productive workforce. Firstly we should change the system of education in a country. Every child in a country should be literate. Downfall of literary is late is the main reason for country's backward. Every girl should be given equal importance and should be provided all those things which required to be educated. Unemployment should be eradicated. The skill development should be a main key for the success of the youth. The country should develop strong and healthy generation. The lifestyle of every student must be healthy and sanitized during this pandemic situation cleanliness should be the main aspect in the field of education. Every student should study physical education and know the real value of educating self and body.

Everyone should support youth at risk. Social justice should be given to everyone. National integration can be through medical purposes, art, culture and sports. Every field must be given equal emphasize so that no student should feel insecure and inferior. But overall character is the real foundation for all worthwhile success. The youth should learn to be job generator rather than job seeker. Doctors and scientist are the key to unlock the full potential of human body.

Hence in the conclusion, role of the youth in the nation building is crucial. They are the problem solver, have positive influence or the other youth people and the nation. They are extremely ambitious they have the ability to educate themselves and can create an identity of self. However they will not be able to do this without the support of government and fellow youth. So the youngsters can make their life beautiful and flourish and shine in success.

Hence to sum up a promise to self "we will make a nation strong one with universal image.

**Alisha Samal**



## ***Loneliness, the best companion***



ENOUGH is enough, I thought, how many times am I going to tell myself that loneliness kills. Yes it does, so what's the big deal. So many are alone in this world. Why feel so at all the many times. I make myself understand that many times the child in me surfaces up grinning at me jeering at me and once again throwing me into the unfathomable depths of a valley called akelapan. I think, I engage myself in a lot of activities. I teach, preach, talk, smile, laugh, read, sing, dance, meet people but this friend of mine called loneliness is always with me. I just cannot shrug him off. I just cannot say go away you frustrating soul. I cannot say go away come again another day. I just cannot say not today. He is with me everywhere as I say my prayers he beckons at me from a corner as he knows I am in the company of my good lord but in spite of that look how daring he is to reflect upon the very glass frame of the divinity whom we all say as omnipotent. Even He cannot shoo him away. He again comes back sitting glued to your mind. The radio FM thankfully plays the song that he rejoices- akela chala haan mein or my heart is beating and then again the same old song - loneliness.




Every problem has a solution we need to solve it. This is what all I remember<sup>5</sup> about maths in my school. I decided to shoo away this monster. I ran to my favourite haunt. My bedroom balcony and I saw a child in the opposite building sitting and wailing loudly, blood oozed out from the wound on his knee, his mother attended and dressed the wound as lovingly as any mother would. She caressed his chubby cheeks.

Next day the same scene, for a couple of days this mother son duo would enjoy the company of each other and mother would dress the wound. The wound healed. I could guess as I saw the bandage missing and also the mother. But this little one, one fine day, crept alone and sat at the same place looking cunningly at his brown maroonish coloured healing skin, he peeled it and enjoyed the oozing blood. He pinched it and enjoyed the pain. He was alone, he didn't cry neither did he seek any attention. Next day again the rest of the skin. He did this till he removed the entire dead skin and saw a white patch. He smiled to himself on his heroic act, looked here and there and started flying his kite again. What I saw was a very simple act that any this stage of my life I learnt something. I was doing the same. As soon as a tragic incident took place and my soulmate left me I was well attended by so many friends relatives. They all took care of me like that child's mother. Dressing my wounds and bandaging it. I started feeling better. Slowly one by one everyone had to leave and then I was alone like that boy.

Me and my wound. I could do anything with my wound as I knew it had partly dried up. I started pinching, peeling and wanted to feel the pain. I took out all the albums, pics, videos and enjoyed crying in loneliness


**Satyam D. Singh**






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**ACITE**  
All India Council of Technical Education



**INSTITUTION'S INNOVATION COUNCIL**  
(Secretary of IISC Initiative)



**Fire Technology and Safety Engineering Department**  
IIC Activity Lecture on  
**Prototype/Process Design and Development - Prototyping**

**Date:** 13.07.2021  
**Time:** 14.00  
**Online Platform:** Google Meet  
**Link:** [meet.google.com/xnz-bygv-oph](https://meet.google.com/xnz-bygv-oph)

**Activity In-charge: Dr. Aditya Tiwary**  
Asso. Prof. FT&SE

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# IPS ACADEMY

## INSTITUTE OF ENGINEERING & SCIENCE

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**Fire Technology and Safety Engineering Department**  
IIC Activity Session on  
**Business Model Canvas(BMC)**

**Date:** 14/07/2021  
**Time:** 10:30 AM  
**Online Platform:** Google Meet  
**Link:** <https://meet.google.com/esx-uyhk-uiz>

**Activity In-charge:**  
Kamal Shukla, Asst. Prof. FT&SE



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**Fire Technology and Safety Engineering Department**  
IIC Activity Lecture on  
**How to plan for Start-up and legal & Ethical Steps**

**Date:** 16/7/2021  
**Time:** 10:30  
**Online Platform:** Google Meet  
**Link:** <https://meet.google.com/rwd-vzup-bkq>

**Activity In-charge:**  
AASHISH YADAV , Asst. Prof. FT&SE







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## FSAI Student Chapter Election








Post	Candidate I	Candidate II	Candidate III	Candidate IV	Candidate V
President					
	Vijay Santani	Anuj Singh Rajput	Mohd ZainUIAabdeen	Pranshu Gangrade	Vaibhav Sharma
Secretary					
	Neha Pandey	Shezan Parvez	Vinayak Choudhary	Geeta Soni	Anurag Verma

Post	Candidate I	Candidate II	Candidate III	Candidate IV	Candidate V	Candidate VI
Treasurer						
	Tarun Mehlawat	Mayank Koparkar	Shakshi Doriya	Milan Bhatiya	Vishal Vishisth	Rishish Jain



Post	CandidateI	CandidateII	Candidate III	Candidate IV	CandidateV
Class Representative 3 <sup>rd</sup>					
	Mukul Mehlawat	R Shashi Kumar	Vineet Patidar	Shivam Pathak	Harshal Pawar

Post	Candidate I	Candidate II	CandidateIII	Candidate IV	Candidate V
Class Representative 4 <sup>th</sup> year					
	Sawan Jain	Pratham Rathore	Sagar Sharma	Abhishek Tiwari	Tushar Neelkhanth

Post	CandidateI	Candidate II	Candidate III	Candidate IV	Candidate V	Candidate VI
Class Representative						
	Abhay Singh	Anuj Kumar	Prateek Shehrawat	Mitali Mengde	Siddharth Sharma	Sourabh Singh Senger



# IPS ACADEMY

INSTITUTE OF ENGINEERING & SCIENCE  
(AN UGC AUTONOMOUS INSTITUTE, AFFILIATED TO RGPV BHOPAL)  
FIRE TECHNOLOGY AND SAFETY ENGINEERING DEPARTMENT



## ELECTION OF FSAI STUDENT CHAPTER (2020-2021)

### President

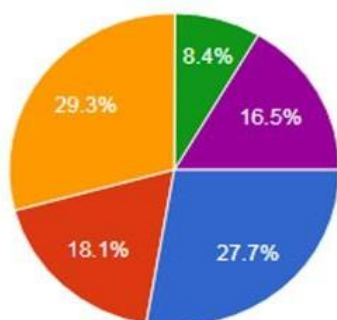
President: 321 responses

Sr. No	Candidates Name	Vote Received		Percentage	Remarks
		Accepted	Rejected		
1	Vijay Santani	89	Nil	27.7	
2	Anuj Singh Rajput	58	Nil	18.1	
3	Mohd ZainUIAabdeen	94	Nil	29.3	<b>President</b>
4	Pranshu Gangrade	27	Nil	8.4	
5	Vaibhav Sharma	53	Nil	16.5	
Total		321			

### President

The list of Candidates for the post of FSAI Student Chapter President is

321 responses



- Vijay Santani
- Anuj Singh Rajput
- Mohd ZainUIAabdeen
- Pranshu Gangrade
- Vaibhav Sharma



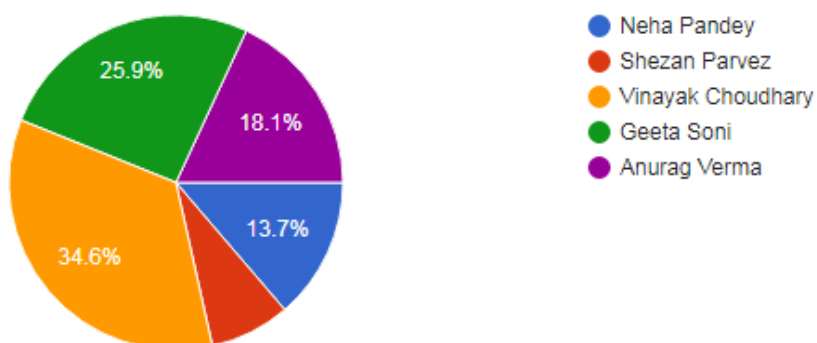
**SECRETARY**

Sr.	Candidates Name	Vote Received		Percentage	Remarks
No		Accepted	Rejected		
1	Neha Pandey	44	Nil	13.7	
2	Shezan Parvez	25	Nil	7.8	
3	Vinayak Choudhary	111	Nil	34.6	<b>Secretary</b>
4	Geeta Soni	83	Nil	25.9	
5	Anurag Verma	58	Nil	18.1	
Total		321			

**Secretary**

The list of Candidates for the post of FSAI Student Chapter Secretary is

321 responses



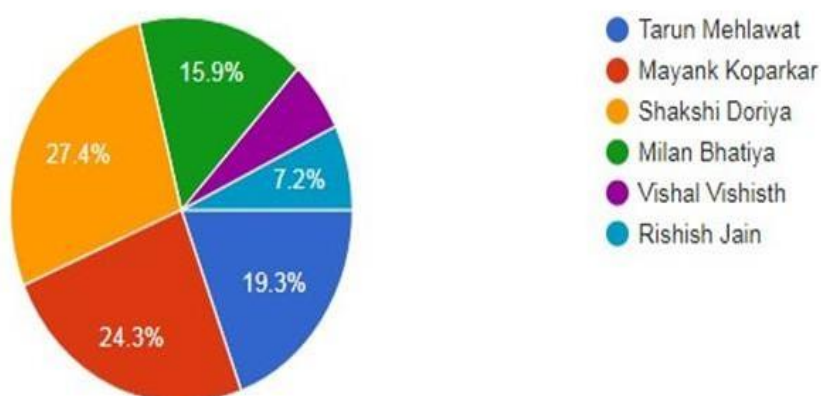
**TREASURER**

S. No	Candidates Name	Vote Received		Percentage	Remarks
		Accepted	Rejected		
	Tarun Mehlawat	62	Nil	19.3	
	Mayank Koparkar	78	Nil	24.3	
	Shakshi Doriya	88	Nil	27.4	<b>Treasurer</b>
	Milan Bhatiya	51	Nil	15.9	
	Vishal Vishisth	19	Nil	5.9	
	Rishish Jain	23	Nil	7.2	
	Total	321			

**Treasurer**

The list of Candidates for the post of FSAI Student Chapter Treasurer is

321 responses





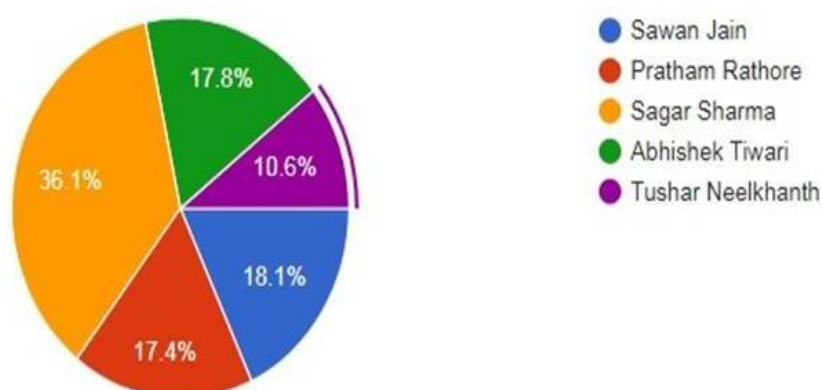
**CLASS REPRESENTATIVE 4TH YEAR**

Sr. No	Candidates Name	Vote Received		Percentage	Remarks
		Accepted	Rejected		
1	Sawan Jain	58	Nil	18.1	
2	Pratham Rathore	56	Nil	17.4	
3	Sagar Sharma	116	Nil	36.1	Class Representative 4 <sup>th</sup> Year
4	Abhishek Tiwari	57	Nil	17.8	
5	Tushar Neelkhanth	34	Nil	10.6	
Total		321			

**Class Representative 4th year**

The list of Candidates for the post of FSAI Student Chapter Class Representative 4th year is

321 responses



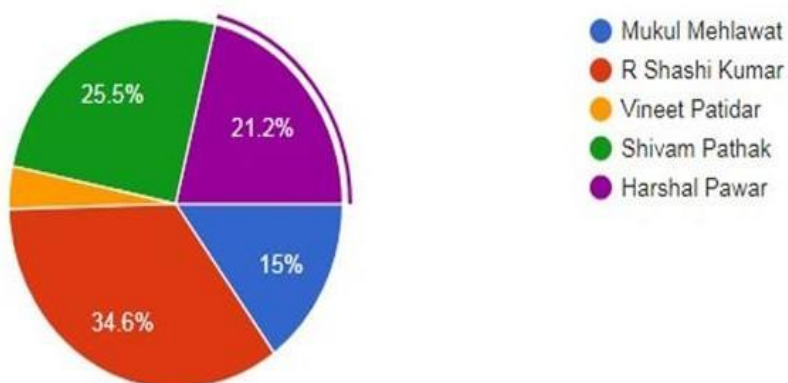
**CLASS REPRESENTATIVE 3RD YEAR**

Sr.No	Candidates Name	Vote Received		Percentage	Remarks
		Accepted	Rejected		
1	Mukul Mehlawat	48	Nil	15	
2	R Shashi Kumar	111	Nil	35.6	<b>Class Representative 3rd year</b>
3	Vineet Patidar	12	Nil	3.7	
4	Shivam Pathak	82	Nil	25.5	
5	Harshal Pawar	68	Nil	21.2	
Total		321			

**Class Representative 3rd year**

The list of Candidates for the post of FSAI Student Chapter Class Representative 3rd year is

321 responses





**SUMMARY**

<b>1</b>	Vinayak Choudhary	Secretary	111	34.6
<b>2</b>	Shakshi Doriya	Treasurer	88	27.4
<b>3</b>	Sagar Sharma	Class Representative 4th year	116	36.1
<b>4</b>	R Shashi Kumar	Class Representative 3rd year	111	35.6
<b>5</b>	Abhay Singh	Class Representative 2nd year	132	41.1

**FSAI INDORE CHAPTER****STUDENT CHAPTER****FIRE & SECURITY ASSOCIATION OF INDIA**



## PANEL DISCUSSION







## REGIONAL CONFERENCE ON

Safety Management in Industries ; Hazardous Waste Management  
Safe Storage & Transportation HAZCHEM & Hydrocarbons  
(November 07-08,2019)



## ORGANIZED BY

Federation of Indian Chambers of Commerce and Industry (FICCI)  
jointly with  
Directorate General Factory Advice Service & Labour Institutes (DGFASLI),  
Ministry of Labour, Government of India



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Ministry of Labour, Government of India**

## **An Innovative Safety Approach for Reliability Analysis of Hose Reel System**

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**Abstract:-** Reliability evaluation of an engineering system or component or element is very important in order to predict its availability or unavailability and other important indices. Reliability is the parameter which tells about the availability or unavailability of the system or component under proper working conditions for a given period of time. In this paper a study based on reliability analysis of a Hose Reel system installed for safety purpose is evaluated and different parameter are obtained. A Hose Reel system installed for fire fighting and safety purpose of the educational institute was taken for study.

**Keywords:-** Reliability, Availability, Hose Reel System, Fire Fighting, Safety

## INTRODUCTION

Reliability evaluation of a system or component or element is very important in order to predict its availability and other relevant indices. Reliability is the parameter which tells about the availability of the system under proper working conditions for a given period of time. A Markov cut-set composite approach to the reliability evaluation of transmission and distribution systems involving dependent failures was proposed by Singh et al. [1]. The reliability indices have been determined at any point of composite system by conditional probability approach by Billinton et al. [2]. Wojczynski et al. [3] discussed distribution system simulation studies which investigate the effect of interruption duration distributions and cost curve shapes on interruption cost estimates. New indices to reflect the integration of probabilistic models and fuzzy concepts was proposed by Verma et al. [4]. Zheng et al. [5] developed a model for a single unit and derived expression for availability of a component accounting tolerable repair time. Distributions of reliability indices resulting from two sampling techniques are presented and analyzed along with those from MCS by Jirutitijaroen and Singh [6]. Dzobe et al. [7] investigated the use of probability distribution function in reliability worth analysis of electric power system. Bae and Kim [8] presented an analytical technique to evaluate the reliability of customers in a microgrid including distribution generations. Reliability network equivalent approach to distribution system reliability assessment is proposed by Billinton and Wang [9]. Customer and energy based indices consideration for reliability enhancement of distribution system using Improved Teaching Learning based optimization is discussed [10]. An Innovative Self-Adaptive Multi-Population Jaya Algorithm based Technique for Evaluation and Improvement of Reliability Indices of Electrical Power



Distribution System, Tiwary et al. [11]. Jirutitijaroen et al. [12] developed a comparison of simulation methods for power system reliability indexes and their distribution. Determination of reliability indices for distribution system using a state transition sampling technique accounting random down time omission Tiwary et al. [13]. Tiwary et al. [14] proposed a methodology based on Inspection-Repair-Based Availability Optimization of Distribution System Using Bare Bones Particle Swarm Optimization. Bootstrapping based technique for evaluating reliability indices of RBTS distribution system neglecting random down time was evaluated [15]. Volkanavski et al. [16] proposed application of fault tree analysis for assessment of the power system reliability. Li et al. studies the impact of covered overhead conductors on distribution reliability and safety. Reliability enhancement of distribution system using Teaching Learning based optimization considering customer and energy based indices was obtained in Tiwary et al. [18]. Self-Adaptive Multi- Population Jaya Algorithm based Reactive Power Reserve Optimization Considering Voltage Stability Margin Constraints was obtained in Tiwary et al. [19]. A smooth bootstrapping based technique for evaluating distribution system reliability indices neglecting random interruption duration is developed [20]. Tiwary et al. [21] have developed an inspection maintenance based availability optimization methodology for feeder section using particle swarm optimization. The impact of covered overhead conductors on distribution reliability and safety is discussed [22]. Tiwary et al. [23] has discussed a methodology for reliability evaluation of an electrical power distribution system, which is radial in nature. Sarantakos et al. [24] introduced a method to include component condition and substation reliability into distribution system reconfiguration. Tiwary et al. [25] has discussed a methodology for evaluation of customer orientated indices and reliability of a meshed power distribution system. Reliability evaluation of engineering system is discussed [26]. Battu et al. [27] discussed a method for reliability compliant distribution system planning using Monte Carlo simulation. Application of non-parametric bootstrap technique for evaluating MTTF and reliability of a complex network with non-identical component failure laws is discussed [28]. Tiwary and Tiwary [29] have developed an innovative methodology for evaluation of customer orientated indices and reliability study of electrical feeder system.

Hose Reel system is very important in order to control fire at a particular place. In order to minimize the effect of fire at any location proper utilization along with the reliability of the system is very important aspect to look after. Therefore there is need for evaluation of reliability of the hose reel system. In



this paper reliability evaluation of a Hose Reel system installed at an educational institution is done and different reliability parameters are obtained.

## RELIABILITY EVALUATION OF THE SYSTEM AND ITS IMPLEMENTATION

If one assumes time independent reliability  $r_1, r_2, \dots, r_n$  of each and every component present in the system, then reliability of the combination of the components connected in a series configuration is given as

$$R_s = \prod_{i=1}^n r_i$$

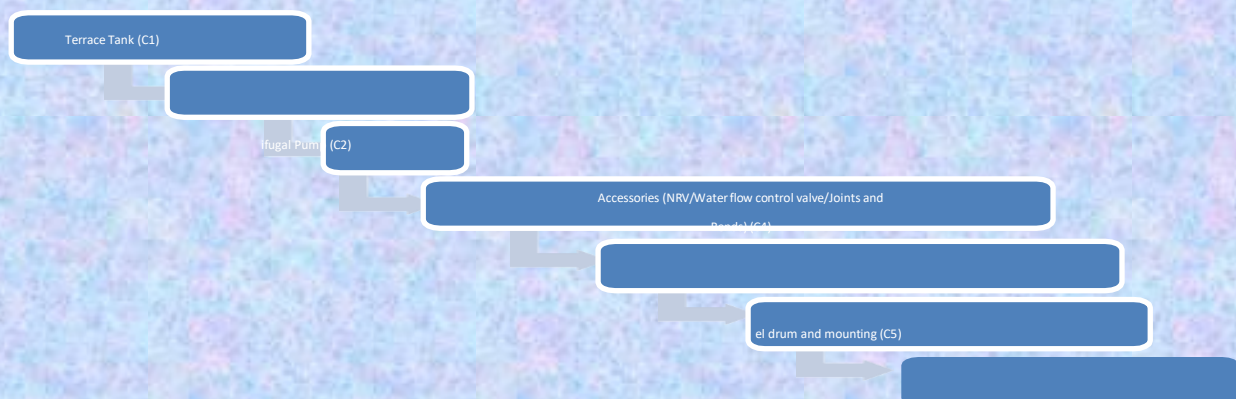
The above relation is important in order to evaluate the value of the reliability when the components or elements in any practical system are connected in series manner.

The reliability of the system having constant failure rate is evaluated by using the following relation.

$$R(t) = e^{(-\lambda t)}$$

Where  $R(t)$  represents the reliability of each component.  $\lambda$  represents the failure rate per year and  $t$  represents time period which is taken as one year.

Figure 1 provides the block diagram of the practical Hose Reel system taken for the evaluation purpose. It provides the detail of the different components which are a part of the hose reel system. The hose reel system consists of different components such as: Terrace Tank, Centrifugal Pump, Pipes, Accessories (NRV/Water flow control valve/Joints and Bends), Hose reel drum and mounting, Hose reel pipe and shut off nozzle and Electrical panel.



## I. RESULTS AND DISCUSSION

Table 1 shows the initial data for the hose reel system. There are seven components in the hose reel system and are shown in Fig. 1. Table 2 provides the evaluated reliability for each and every component of the hose reel system. For components 1 to 7 evaluated reliability value is 0.9948.

## CONCLUSION

Reliability evaluation of an engineering system or component or element is very important in order to predict its availability or unavailability and other important indices. In this paper reliability evaluation of a Hose Reel system installed at an educational institution is done and different reliability parameters are obtained. The reliability is evaluated based on the failure rate provided of each and every component. Reliability of each and every component is calculated and provided in the result section. Component level reliability is also evaluated and provided in result.

## REFERENCES

- [1]. C. Singh, "Markov cut-set approach for the reliability evaluation of transmission and distribution systems", IEEE Trans. on Power Apparatus and Systems, Vol. PAS- 100, No. 6, 1981, pp. 2719-2725.
- [2]. R. Billinton, "Composite system reliability evaluation", IEEE Trans. on Power Apparatus and Systems, Vol. PAS-88, No. 4, 1969, pp. 276-281.
- [3]. E. Wojczynski, R. Billinton, "Effects of distribution system reliability index distributions upon interruption cost/reliability worth estimates", IEEE Trans. on Power Apparatus and Systems, PAS-104, Vol. 11, 1985, pp. 3229-3235.
- [4]. A. K. Verma, A. Srividya, H. M. R. Kumar, "A framework using uncertainties in the composite power system reliability evaluation", Electric Power Components and Systems, Vol.30, No. 7, 2002, pp. 679-691.
- [5]. Z. Zheng, L. Cui, Alan G. Hawkes, "A study on a single-unit Markov repairable system with repair time omission", IEEE Trans. on Reliability, Vol. 55, No.2, 2006, pp. 182-188.
- [6]. P. Jirutitijaroen, C. singh, "Comparison of simulation methods for power system reliability indexes and their distributions", IEEE Trans. on Power



Systems, Vol.23, No.2, 2008, pp. 486-493.

- [7]. O. Dzobe, C. T. Gaunt, R. Herman, "Investigating the use of probability distribution functions in reliability- worth analysis of electric power

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- [8]. I. S. Bae, J. O. Kim, "Reliability evaluation of customers in a microgrid", IEEE Trans. on Power Systems, Vol. 23, No. 3, 2008, pp. 1416-1422.
- [9]. R. Billinton, P. Wang, "Reliability-network-equivalent approach to distribution- system-reliability evaluation", IEE Proc. generation, transmission and distribution, Vol. 145, No. 2, 1998, pp. 149-153.
- [10]. Aditya Tiwary, "Customer and energy based indices consideration for reliability enhancement of distribution system using Improved Teaching Learning based optimization", International Journal of Latest Trends in Engineering and Technology, Vol. 9, No. 1, Sept. 2017, pp. 254-258.

## **Reliability Assessment of Practical Hose Reel System a Contemporary Perspective**

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**Abstract:-** Reliability evaluation of an engineering system or component or element is very important in order to predict its availability or unavailability and other important indices. Reliability is the parameter which tells about the availability or unavailability of the system or component under proper working conditions for a given period of time. In this paper a analysis of reliability of a Hose Reel system installed for safety purpose is done and different parameter are obtained. For evaluating the reliability of the Hose Reel system a large number of events of different parameters have been taken into consideration. A Hose Reel system installed for fire fighting and safety purpose of the educational institute was taken for study.

**Keywords:-** Reliability, Availability, Hose Reel System, Fire Fighting, Safety.



## INTRODUCTION

Reliability evaluation of a system or component or element is very important in order to predict its availability and other relevant indices. Reliability is the parameter which tells about the availability of the system under proper working conditions for a given period of time. A Markov cut- set composite approach was proposed by Singh et al. [1]. The reliability indices have been determined at any point of composite system by conditional probability approach by Billinton et al. [2]. Wojczynski et al. [3] discussed DS simulation studies. New indices based on probabilistic models and fuzzy concepts were presented by Verma et al. [4]. Various reliability indices studies were presented [5-9]. Different methods for reliability of distribution system were discussed [10-15]. Studies based on fault tree, safety, DS reliability are presented [16-24]. Tiwary et al. [25] has discussed a methodology for evaluation of customer orientated indices and reliability of a meshed power distribution system. Reliability evaluation of engineering system is discussed [26]. Battu et al. [27] discussed a method using MCS. Various reliability assessment has been presented [28,29]. Hose Reel system is very important in order to control fire at a particular place. In order to minimize the effect of fire at any location proper utilization along with the reliability of the system is very important aspect to look after. Therefore there is need for evaluation of reliability of the hose reel system. In view of the above, reliability assessment of a complex engineering system installed at an educational institution is done and different reliability parameters are obtained. A large number of events consisting of the failure rate of each and every component of the hose reel system was taken into account for RELIABILITY EVALUATION OF THE ENGINEERING SYSTEM AND ITS

## ACCOMPLISHMENT

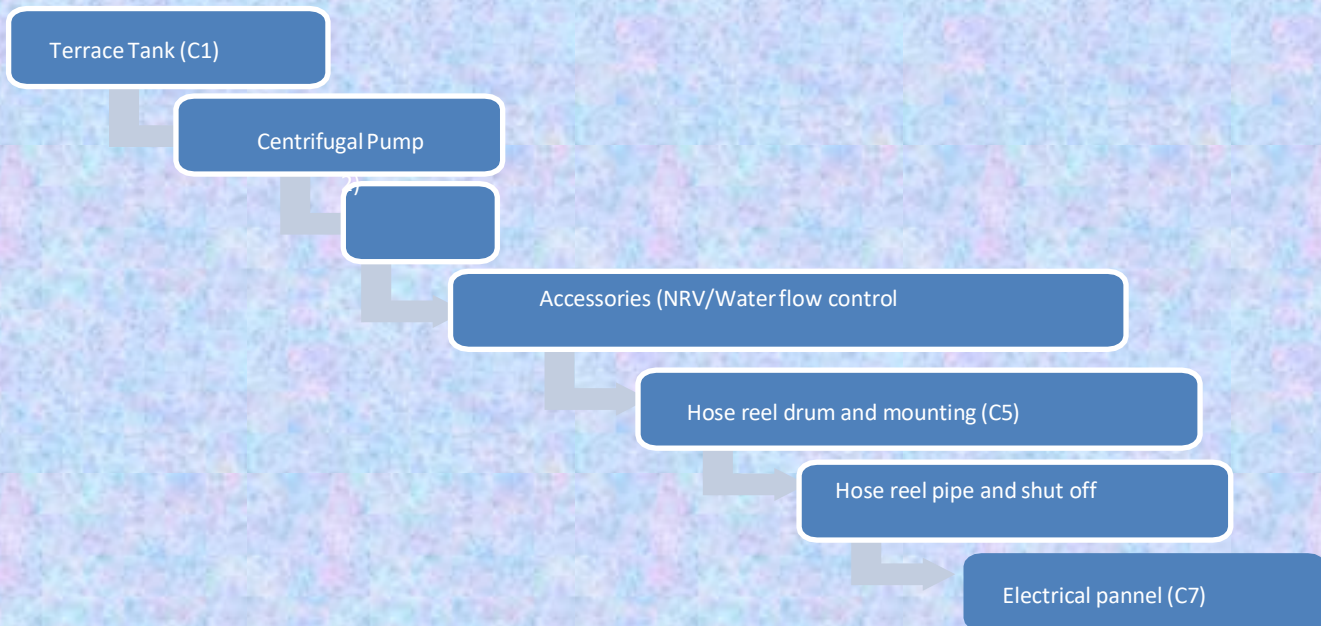
If one assumes time independent reliability  $r_1, r_2, \dots, r_n$  of each and every component present in the system, then reliability of the combination of the components connected in a series configuration is given as

$$R_s = \prod_{i=1}^n r_i \quad (1)$$

The above relation is important in order to evaluate the value of the reliability when the components or elements in any practical system are connected in series manner.

The reliability of the system having constant failure rate is evaluated by using the following relation.

Fig. 1 Block Diagram of the Hose Reel System [30]



$R(t) = e^{(-\lambda t)}$  evaluating different reliability parameter.

Where  $R(t)$  represents the reliability of each component.  $\lambda$  represents the failure rate per year and  $t$  represents time period which is taken as one year.

A large number of events were taken into account and therefore various samples of the failure rate for each and every seven components were taken for study purpose and then reliability of each and every component was evaluated separately. After evaluating the reliability of each component the mean reliability of each and every component was obtained.

Figure 1 provides the block diagram of the practical Hose Reel system taken for the evaluation purpose. It provides the detail of the different components which are a part of the hose reel system. The hose reel system consider consists of different components such as: Terrace Tank, Centrifugal Pump, Pipes, Accessories (NRV/Water flow control valve/Joints and Bends), Hose reel drum and mounting, Hose reel pipe and shut off nozzle and Electrical panel.



## RESULTS AND DISCUSSION

There are seven components in the hose reel system and are shown in Fig. 1. Table 1 provides the evaluated mean reliability for each and every component of the hose reel system. For components 1 to 7 evaluated mean reliability value is 0.9952, 0.9518, 0.9950, 0.9949, 0.9952, 0.9950 and 0.9511 respectively. Table 2 gives up the component level evaluated mean reliability for each component. Fig. 2 provides the magnitude of mean reliability of each and every component from 1 to 7. Fig. 3 gives magnitude of mean reliability at component level.

**Table 1:** Evaluated mean reliability for each and every component of the hose reel system.

component	1	2	3	4	5	6	7
Evaluated Mean Reliability	0.9952	0.9518	0.9950	0.9949	0.9952	0.9950	0.9511

**Table 2:** Component level evaluated mean reliability for each and every component of the hose reel system.

Component Level	C1	C2	C3	C4	C5	C6	C7
Evaluated Mean Reliability	.9952	.9472	.9424	.9376	.9331	.9285	.8831

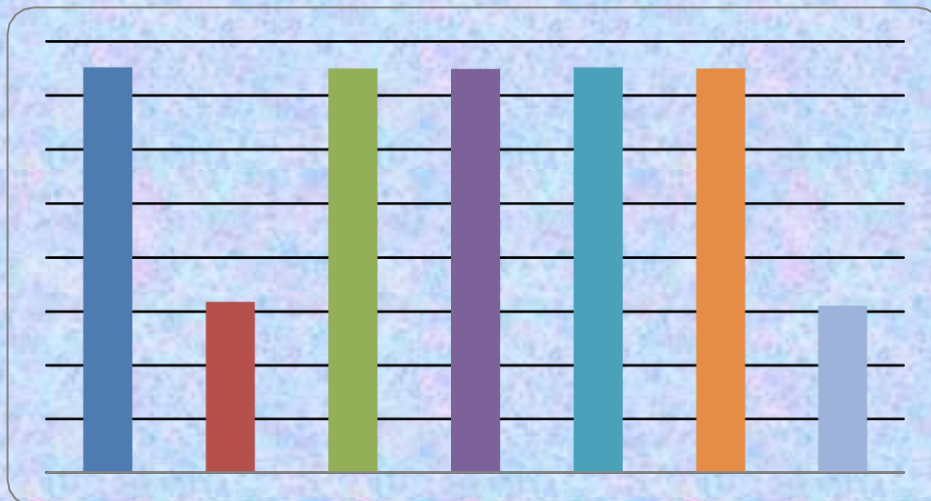


Figure 2: Magnitude of Mean Reliability of each and every component from 1 to 7

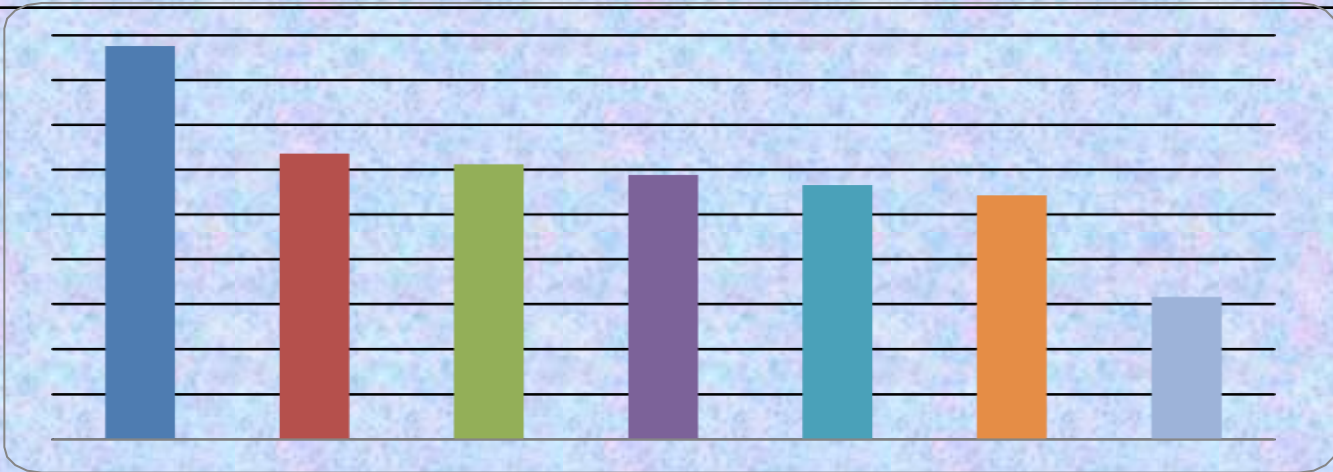


Figure 3: Magnitude of Mean Reliability at component level

## CONCLUSION

Reliability evaluation of an engineering system or component or element is very important in order to predict its availability or unavailability and other important indices. In this paper reliability evaluation of a Hose Reel system installed at an educational institution is done and different reliability parameters are obtained. A large sample size of the failure rate of each and every component of the hose reel system was taken into account for evaluating different reliability parameters. Mean Reliability of each and every component is calculated and provided in the result section. Component level mean reliability is also evaluated and provided in result.

## REFERENCES

- [1]. C. Singh, "Markov cut-set approach for the reliability evaluation of transmission and distribution systems", IEEE Trans. on Power Apparatus and Systems, Vol. PAS-100, No. 6, 1981, pp. 2719-2725.
- [2]. R. Billinton, "Composite system reliability evaluation", IEEE Trans. on Power Apparatus and Systems, Vol. PAS-88, No. 4, 1969, pp. 276-281.
- [3]. E. Wojczynski, R. Billinton, "Effects of distribution system reliability index distributions upon interruption cost/reliability worth estimates", IEEE Trans. on Power Apparatus and Systems, PAS-104, Vol. 11, 1985, pp. 3229-3235.
- [4]. A. K. Verma, A. Srividya, H. M. R. Kumar, "A framework using uncertainties in the composite power system reliability evaluation", Electric Power Components and Systems, Vol.30, No. 7, 2002, pp. 679-
- [5]. Z. Zheng, L. Cui, Alan G. Hawkes, "A study on a single-unit Markov repairable system with repair time omission", IEEE Trans. on Reliability, Vol. 55, No.2, 2006, pp. 182-188.
- [6]. P. Jirutitijaroen, C. Singh, "Comparison of simulation methods for power system reliability indexes and their distributions", IEEE Trans. on Power



Systems, Vol.23, No.2, 2008, pp. 486-493.

[7]. O. Dzobe, C. T. Gaunt, R. Herman, "Investigating the use of probability distribution functions in reliability- worth analysis of electric power systems", Int. J. of Electrical Power and Energy Systems, Vol. 37, 2012, pp. 110-116.

[8]. I. S. Bae, J. O. Kim, "Reliability evaluation of customers in a microgrid", IEEE Trans. on Power Systems, Vol. 23, No. 3, 2008, pp. 1416-1422.

[9]. R. Billinton, P. Wang, "Reliability-network-equivalent approach to distribution-system-reliability evaluation", IEE Proc. generation, transmission and distribution, Vol. 145, No. 2, 1998, pp. 149-153.

[10]. Aditya Tiwary, "Customer and energy based indices consideration for reliability enhancement of distribution system using Improved Teaching Learning based optimization", International Journal of Latest Trends in Engineering and Technology, Vol. 9, No. 1, Sept. 2017, pp. 254-258.

[11]. Aditya Tiwary, "An Innovative Self-Adaptive Multi- Population Jaya Algorithm based Technique for Evaluation and Improvement of Reliability Indices of Electrical Power Distribution System", International Journal on Future Revolution in Computer Science & Communication Engineering, Vol. 4, No. 2, Feb. 2018, pp. 299-302.

[12]. Jirutitijaroen P, Singh C. "Comparison of simulation methods for power system reliability indexes and their distribution", IEEE Trans Power Syst, 23(2), 2008, pp. 486-92.

[13]. Aditya Tiwary, R. Arya, S. C. Choube and L. D. Arya, "Determination of reliability indices for distribution system using a state transition sampling technique accounting random down time omission", Journal of The Institution of Engineers (India): series B (Springer), Vol. 94, No. 1, 2013, pp. 71-83.

[14]. Aditya Tiwary, "Inspection-Repair-Based Availability Optimization of Distribution System Using Bare Bones Particle Swarm Optimization", Chapter in Book Series Computational Intelligence: Theories, Applications and Future Directions – Volume II, Advances in Intelligent Systems and computing 799, Springer, 2019.

- [15]. Aditya Tiwary, R. Arya, L. D. Arya and S. C. Choube, "Bootstrapping based technique for evaluating reliability indices of RBTS distribution system neglecting random down time", The IUP Journal of Electrical and Electronics Engineering, Vol. X, No. 2, April 2017, pp. 48-57.
- [16]. Volkanavski, Cepin M, Mavko B. "Application of fault tree analysis for assessment of the power system reliability", Reliab Eng Syst Safety, 94(6), 2009, pp. 1116-27.
- [17]. Li BM, Su CT, Shen CL. "The impact of covered overhead conductors on distribution reliability and safety" Int J Electr Power Energy Syst, 32(4). 2010, pp. 281-9.
- [18]. Aditya Tiwary, "Reliability enhancement of distribution system using Teaching Learning based optimization considering customer and energy based indices", International Journal on Future Revolution in Computer Science & Communication Engineering, Vol. 3, No. 10, Oct. 2017, pp. 58-62.
- [19]. Aditya Tiwary, "Self-Adaptive Multi-Population Jaya Algorithm based Reactive Power Reserve Optimization Considering Voltage Stability Margin Constraints", International Journal on Future Revolution in Computer Science & Communication Engineering, Vol. 4, No. 1, Jan. 2018, pp. 341-345.
- [20]. R. Arya , Aditya Tiwary , S. C. Choube and L. D. Arya, "A smooth bootstrapping based technique for evaluating distribution system reliability indices neglecting random interruption duration", Int. J. of Electrical Power and Energy System, (ELSEVIER), Vol.51 , 2013, pp. 307- 310.
- [21]. A. Tiwary, "Inspection-Maintenance-Based Availability Optimization of Feeder Section Using Particle Swarm optimization", Soft Computing for Problem Solving-Advances in Intelligent Systems and Computing, 816, 2018, pp. 257-272.
- [22]. M. Bin Li, C. Tzong Su, C. Lung Shen, "The impact of covered overhead conductors on distribution reliability and safety", Int. J. of Electrical Power and Energy System, (ELSEVIER), Vol. 32, 2010, pp. 281-289.
- [23]. Aditya Tiwary, "Reliability evaluation of radial distribution system – A case study", Int. J. of Reliability: Theory and Applications, 14, 4(55), 2019, pp. 9-13.
- [24]. I. Sarantakos, D. M. Greenwood, J. Yi, S. R. Blake, P.C. Taylor, "A method to include component condition and substation reliability into distribution system reconfiguration", Int. J. of Electrical Power and Energy System, (ELSEVIER), Vol. 109, 2019, pp. 122-138.
- [25]. Aditya Tiwary, "Customer orientated indices and reliability evaluation of meshed power distribution system", Int. J. of Reliability: Theory and Applications, 15, 1(56), 2020, pp. 10-19.



- [26]. Aditya Tiwary and Praveen Patel, "Reliability Evaluation of Hose Reel System - A Practical Approach", Journal of Industrial Safety Engineering, Vol. 7, No. 2, September 2020, pp. 30-34.
- [27]. N. R. Battu, A. R. Abhyankar, N. Senroy, "Reliability Compliant Distribution System Planning Using Monte Carlo Simulation", Electric power components and systems, Vol. 47, 2019, pp. 985-997.
- [28]. Aditya Tiwary, "Application of Non-Parametric Bootstrap Technique for evaluating MTTF and Reliability of a Complex Network with Non-Identical Component Failure Laws", Reliability: Theory and Applications, Vol. 15, No. 3(58), September 2020, pp.62-69.
- [29]. Aditya Tiwary and Swati Tiwary, "Evaluation of Customer Orientated Indices and Reliability Study of Electrical Feeder System", Reliability: Theory and Applications, Vol. 15, No. 3(58), September 2020, pp.36-43.
- [30]. Aditya Tiwary, Ritik Yadav, Praveen R. Patel, PraveenK. Patel, Satish Patle, Rahul Gurjar, Shivam Dabli, "An Innovative Safety Approach for Reliability Analysis of Hose Reel System", International Journal of Innovative Science and Research Technology, Vol. 5, No. 10, Oct. 2020, pp. 870-873.

# Portable Sound Wave Fire Extinguisher

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**Abstract:-** Fire is a severe hazard that can cause catastrophic damage to life and property. The present fire extinguishing techniques comes with many drawbacks. Present extinguishers are also not eco- friendly so there is a need to develop an alternate method to extinguish a fire. Portable sound wave extinguisher can be used as alternate to primitive extinguisher. The most important challenge to develop a sound wave extinguisher is to identify the right frequency to extinguish a fire. This study focus is to design and develop a portable extinguisher based on sound wave and identify the right frequency to extinguish fire.

## I. INTRODUCTION

### 1.1 Introduction to Fire:-

Fire is an outcome of exothermic chemical reaction, usually the combustion of hydrocarbon with oxygen, resulting in release of huge energy in form of heat, light and sound. Three basic components must be present to produce fire they are-

- Heat
- Fuel
- Oxygen

If any one of the basic element is not presents the fire will not happen beside 3 elements there is also a forth.

element which is essential for continuation of fire once ignited this is known as "CHAIN REACTION". Once fire occur the burned substance produce lots of heat which tends to burn remaining fuel substance this reaction occurs again and again which is called "chain reaction".

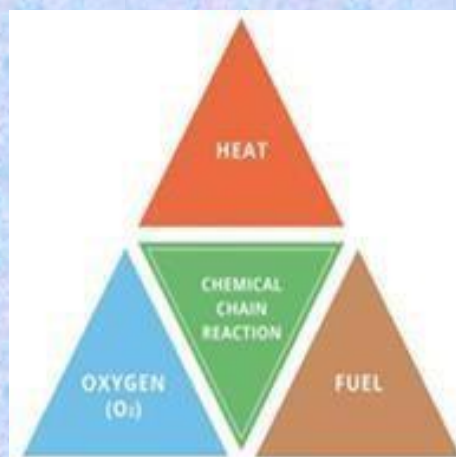


Figure 1.1: A flame tetrahedron

### 1.2 Characteristics of portable sound wave extinguisher

- It is environment friendly and does not harm nature
- Technology design and working principle is simple
- Cost efficient
- Nontoxic and chemical free
- Does not leave any residue
- Works on human hearable frequency

#### Sound Waves:-

Sound Waves play an important role while extinguishing fires. The waves break the chain reaction in the ongoing fire reaction with the help of strong pressure waves.

It pushes the oxygen away from the source of a flame and spread it over a larger surface area. These actions break the fire combustion triangle made up of heat, fuel and oxygen.

Sound is a mechanical pressure wave which has a potential to cause vibration in the entire medium they travel. These vibrations effect the burning of the material and manipulate oxygen surrounding the burning material as a result extinguishing the fire.

#### OBJECTIVE

1. To find out the frequency range that will be able to suppress a candle.
2. To design a portable sound based fire extinguisher.

#### METHODOLOGY

This experiment will be performed and observed in the frequency range of 50 – 80 Hz. The major goal of the experiment is to find the range of working frequency of sound which can neutralize the fire of a candle and record the time taken by the sound wave extinguisher at different frequency.

The methodology of developing a portable fire extinguishers system is explained in flowchart. The most important equipment essential for the creation of the potable fire extinguisher is identified and purchased The setup is developed for investigate the optimum critical frequency followed with data analysis and documentation.



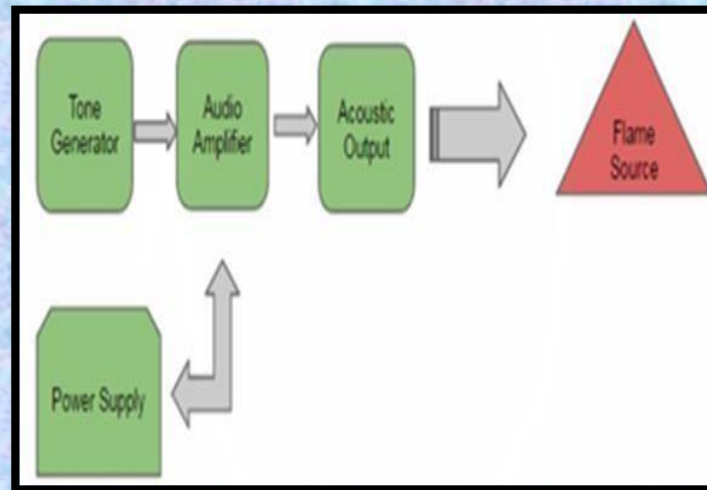


Figure 3.1. Design of portable fire extinguisher

### Requirements

- Speaker (250 watt)
- Amplifier (200 watt)
- Battery or power supply unit
- Camera
- Mobile
- Stopwatch
- Vortex Cannon
- Aux cable

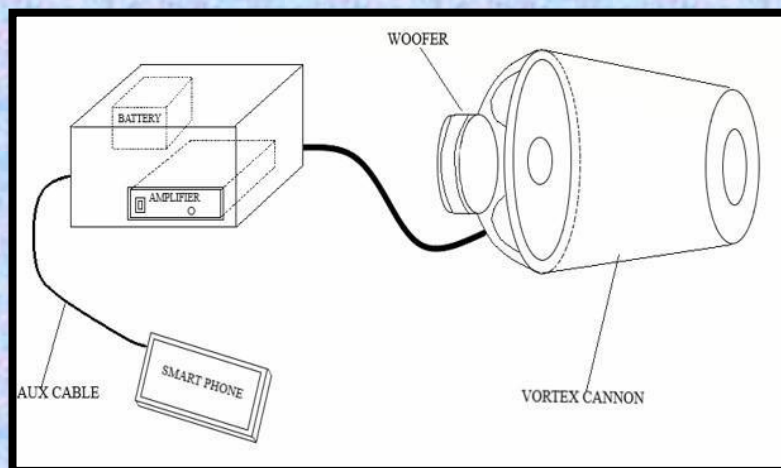


Figure-3.2. Demonstration of Setup

## EXPERIMENT & RESULT

The experiment was conducted to find the suitable range of frequency to extinguish a candle. While performing the experiment mobile phone was used to generate sound wave amplifier was used to adjust frequency stopwatch was used to record time. Recorded data is shown in table 1

Table 1: Frequency-Time Table of the Experiment performed

Frequency (Hz)	Time (sec)
----------------	------------

50	2.2
52	2
54	1.8
56	1.7
58	1.6
60	1.4
62	1.3
64	1.1
66	0.95
68	0.8
70	0.5
72	0.4
74	0.6
76	0.8
78	1.1
80	1.4



Fig 4.1 Sequence of extinguishing of candle

From above results we can conclude that the optimum frequency for extinguishing a fire is between 70-76 HZ.



# **Reliability Evaluation of Fire Extinguisher –AnInnovative Safety Approach**

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**Abstract:-** Reliability evaluation of an engineering system or component or element is very important in order to predict its availability or unavailability and other important indices related to the component or system as a whole. Reliability is the variable which tells about the availability or unavailability of the component under proper working conditions for a given period of time. In this paper a study based on reliability analysis of fire extinguishers installed for safety purpose is evaluated and different variable are obtained. A Fire Extinguisher is very important to control in case of fire for safety purpose.

**Keywords:-** Reliability, Availability, Fire Extinguisher, Fire Fighting, Safety.

## I. INTRODUCTION

A Markov cut-set composite approach was proposed by Singh et al. [1]. The reliability indices have been determined at any point of composite system by conditional probability approach by Billinton et al. [2]. Wojczynski et al. [3] discussed DS simulation studies. New indices based on probabilistic models and fuzzy concepts were presented by Verma et al. [4]. Various reliability indices studies were presented [5-9].

Different methods for reliability of distribution system were

discussed [10-15]. Studies based on fault tree, safety, DS reliability are presented [16-24].

Tiwary et al. [25] has discussed a methodology for evaluation of customer





orientated indices and reliability of a meshed power distribution system. Reliability evaluation of engineering system is discussed [26]. Battu et al. [27] discussed a method using MCS. Various reliability assessment has been presented[28-31].

Fire Extinguisher is very important in order to control fire at a particular place. In order to minimize the effect of fire at any location proper utilization along with the reliability of the equipment is very important aspect to look after. Therefore there is need for evaluation of the reliability. In this paper reliability evaluation of Fire

Extinguishers installed for safety is done and different reliability

parameters are obtained.

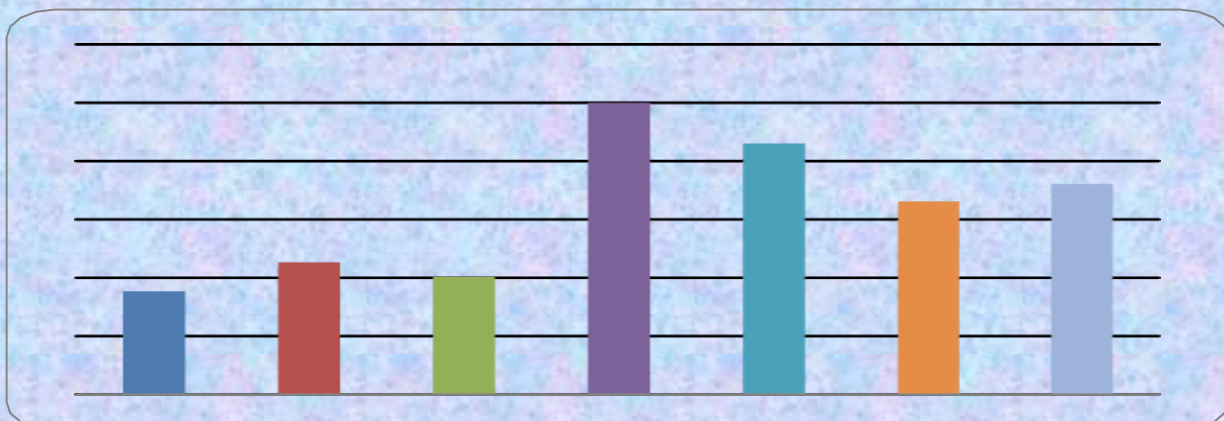
Symbols found on fire extinguishers & what they mean		Water	Foam spray	ABC powder	Carbon dioxide	Wet chemical
Wood, paper & textiles		✓	✓	✓	✗	✓
Flammable liquids		✗	✓	✓	✓	✗
Flammable gases		✗	✗	✓	✗	✗
Electrical contact		✗	✗	✓	✓	✗
Cooking oils & fats		✗	✗	✗	✗	✓

fire extinguisher	1	2	3	4	5	6	7
Failure rate(*10 <sup>-4</sup> )	85	75	80	20	34	54	48

**Table 1:** Initial data for different fire extinguishers.

**Table 2:** Evaluated reliability for different fire extinguishers.

fire extinguisher	1	2	3	4	5	6	7
Evaluated Reliability	0.991536	0.992528	0.992032	0.998002	0.996606	0.994615	0.995212



## REFERENCES

- [1]. C. Singh, "Markov cut-set approach for the reliability evaluation of transmission and distribution systems", IEEE Trans. on Power Apparatus and Systems, Vol. PAS- 100, No. 6, 1981, pp. 2719-2725.
- [2].R. Billinton, "Composite system reliability evaluation", IEEE Trans. on
- of simulation methods for power system reliability indexes and their distributions", IEEE Trans. on Power Systems, Vol.23, No.2, 2008, pp. 486-493.
- [7]. O. Dzobe, C. T. Gaunt, R. Herman, "Investigating the use of probability distribution functions in reliability-worth analysis of electric power systems", Int. J. of Electrical Power and Energy Systems, Vol. 37, 2012, pp. 110-116.
- [8]. I. S. Bae, J. O. Kim, "Reliability evaluation of customers in a microgrid", IEEE Trans. on Power Systems, Vol. 23, No. 3, 2008, pp. 1416-1422.



- [9]. R. Billinton, P. Wang, "Reliability-network-equivalent approach to distribution- system-reliability evaluation", IEE Proc. generation, transmission and distribution, Vol. 145, No. 2, 1998, pp. 149-153.
- [10]. Aditya Tiwary, "Customer and energy based indices consideration for reliability enhancement of distribution system using Improved Teaching Learning based optimization", International Journal of Latest Trends in Engineering and Technology, Vol. 9, No. 1, Sept. 2017, pp. 254-258.
- [11]. Aditya Tiwary, "An Innovative Self-Adaptive Multi- Population Jaya Algorithm based Technique for Evaluation and Improvement of Reliability Indices of Electrical Power Distribution System", International Journal on Future Revolution in Computer Science & Communication Engineering, Vol. 4, No. 2, Feb. 2018, pp. 299-302.
- [12]. Jirutitijaroen P, singh C. "Comparison of simulation methods for power system reliability indexes and their distribution", IEEE Trans Power Syst, 23(2), 2008, pp. 486-92.
- [13]. Aditya Tiwary, R. Arya, S. C. Choube and L. D. Arya, " Determination of reliability indices for distribution system using a state transition sampling technique accounting random down time omission", Journal of The Institution of Engineers (India).

# Job Safety Analysis In Fire Crackers Industry

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**Abstract-** *The main objective of this paper is to identifying the hazard and risk associated in various job indifferent sections which are being carried out in the Fire Cracker Factory and to minimize the hazards in order to make the working environment safe for the workers, so for this purpose we have used Risk assessment methodologies such as Job Safety Analysis for identifying hazards and its consequences by analysing all the processes in the workshop*

**Keywords-** Job Safety Analysis, Risk Rating, Fire Cracker Factory, Risk assessment

## INTRODUCTION

Fire Cracker Industries is a place where manufacturing and packaging of cracker is carried out .During the Manufacturing and Packaging of cracker there is high probability of accidents on every working day. Various hazards are faced during Manufacturing, Fuse cutting, Waste burning , Packing ,Weighting of chemical, Carrying Chemicals, Mixing, Fuse Fixing, Fancy, Lighting, Testing of samples, and the working machine and equipment used during the manufacturing work which result in minor or major or fatality, due to this there is loss of man-hours and to aimed man-power. This may directly affect the manufacturing schedule. So a great concern is needed to minimize the occurrence of these hazards and for this purpose it is very necessary to analyze the Risk Assessment in order to make the workplace safe, As worker and other have a right to be protected from harm caused by any kind of failure and also to take reasonable control measure which ever are necessary. For the purpose we will be using various risk assessment hazards and its consequences by analysing all the processing which are being carried out in the workshop .Safety job and give the control measure to recommendation will be given on minimized the hazards.



## METHODOLOGY

An analysis including five steps:-

1. Select a Job.
2. Break the Job down into steps.
3. Identify the potential hazards.
4. Apply the control to the hazard

one can check whether enough precaution are taken or should do more to prevent harm. And the first step to this is the hazard identification so that one could know whether one level of risk actually exists

	WORK	HAZARDS	CONTROLS
1.	Taking the chemical from ware house.	Falling ,slipping	Wear anti slipping Gauntlet gloves, apron, shoes during working.
2.	Handling of chemicals for mixture.	Eye, Skin, Nose irritation, Headaches, Kidney problem, Prolong exposure affect kidney, White blood cell, Thyroid.	Nose Mask, Safety gloves, Closed eye spectacles.
3.	Weighting for proper mixture of chemical.	Falling ,slipping	Wear anti slipping gloves, shoes during working.
4.	Filling into the roll cap.	Nose irritation, Chest tightness, Shortness of breathing, Irregular Heart beat.	Air purifying devices, Nose Mask.
5.	Transferring to Fuse inserting.	Eye, Skin, Nose irritation, Headaches, Kidney problem, Diarrhea, Muscle weakness.	Use wrist gloves and closed eye goggles, apron (Positive pressure ventilated plastic suits).

### Job Safety Analysis:

S.NO.	WORK	HAZARDS	CONTROLS
1.	Collecting all type of chemical Like Oxidisers, Igniters sand and Special effect chemical.	Slipping of bag or Chemical may fall.	Wear anti slipping Gauntlet gloves, apron, shoes during working.
2.	Mixing operation done manually.	Eye, Skin, Nose irritation, Headaches problem.	Use wrist gloves and closed eye goggles, apron (Positive pressure ventilated plastic suits).
3.	Mixing in trays.	Friction causes fire.	Use wooden tray.
4.	Mixed chemical placed to tube filling.	Static electricity charges cause fire	Use metal plate in outside of room wall.
5.	Charcoal chemical mixing for cotton wicks.	Shortness of breathing, Irregular, Heart beat Eye, Skin, Nose irritation, Headaches problem	Nose Mask, Safety gloves, Closed eye spectacles.

Both approaches to risk assessment are the most commonly applied. Risk assessment method are quickly and relatively easy to use as board consequences and likelihoods can be identified and they can provide a general understanding of comparative risk between risk event, and the risk matrix can be used to separate risk events into risk classes (rating).

A logical systematic process

Matrix method in Risk Assessment is a semi-quantified way of determination. Risk value is determined by estimating of the potential severity of hazardous event and the likelihood that it will occur. Risk value is formulated as:-

$$R = P \times S$$

Probability	Severity			
	Extremely Harmful 4	Harmful 3	Slightly 2	Insignificant 1
Very Unlikely 1	16	12	8	4
Unlikely 2	12	9	6	3
Likely 3	8	6	4	2
Very Likely 4	1	3	2	1

Where,

P= Likelihood of occurrence. S= Potential Severity of Harm.

Now,

For filling the mixture of chemical into the Roll cap.

Work: - Handling of chemical for mixing

$$4 \times 3 = 12$$

Similarly for, Mixing

Work: - Collecting all type of chemical Like Oxidisers, Igniters and Special effect chemical.  $R = P \times S$

$$= 3 \times 4 = 12$$

Risk that should be reduced so that they are tolerable or acceptable.

Work:- Mixing operation done manually.  $R = P \times S$   
 $= 4 \times 3 = 12$

Risk that should be reduced so that they are tolerable or acceptable.

Risk Rating Criteria: -

Category of Risk	Evaluation of tolerability
Very low (Level 1,2,3,4)	Acceptable or (Negligible)
Low (Level 5,6)	Risks that should be reduced so that they are tolerable or acceptable (unwanted)
Medium (Level 10,11)	Risks that should be reduced so that they are tolerable or acceptable (unwanted)
Very high (Level 15,16)	Unacceptable

Risk that should be reduced so that they are tolerable or acceptable.

Work: - Taking the chemical from Warehouse

$$R = P \times S$$

$$= 4 \times 3 = 12$$



## I. CONCLUSION

The use of Risk Assessment methodologies contributes to the prevention of accidents and helps to make the system a safe place to work. Thus in this analysis Job Safety Analysis has been performed in every section of the industries. Potential hazards associated to manufacturing work under different sections have been identified and proper control measures have been recommended by preparing Job Safety Analysis Worksheet.

Safety regulations must be established in all the fire factories. This rule must include the maximum amount of chemical that can be handled at one time and an absolute prohibition on smoking while making fireworks. The factories workers should focus exclusively on making fireworks in order to avoid carelessness resulting in rough handling. The fire work should not be exposed to direct sunlight while drying outdoors, especially in summer.

Firework making should be suspended in lightning storms that can result in short-circuit.

The analysis clearly shows that the accidents are held mostly due to human error. An effective safety management with the proper training and education for the workers may prevent the accidents considerably.

## REFERENCES

- [1] Vinit Jaiswal, Vineet Banodha, & Praveen Patel, "Risk Assessment in maintenance work at diesel locomotive workshop", 59-63(2014), IJEM.
- [2] A.Sukumar....et....al..., Trace elements in scalp hair of manufacturers of fireworks from Sivakasi, Tamil Nadu. The Science of the Total Environment, 114 (1992) 161- 168 Elsevier Science Publishers.
- [3] Ioannis A...et...al..., Accident sequence analysis for sites producing and storing explosive. (2009) (1145-1154) Elsevier Science Publishers.
- [4] Sekar . T.....et..al..., 2010, Planning of industrial estate for firework industries in Shivakasi.  
International Journal of Engineering Science and Technology 2, 2207-2217 .
- [5] Dr.R.Sophia Porchelvi....et..al..., Regression Model for the People working in

Fire Work Industry- Virudhunagar District, International Journal of Scientific and Research Publications, Volume 5, Issue 4, April 2015 1 ISSN 2250-3153.

- [6] Dhruv Katoria ..et...al..., A Review of Risks to Workers Associated with Fireworks Industry. International Journal of Environmental Engineering and Management. ISSN 2231-1319, Volume 4, Number 3 (2013), pp. 259-264.
- [7] A. Azhagurajan....et...al..., Study on nano scale pyrotechnic star chemicals in aerial fireworks manufacturing. Journal of Achievements in Materials and Manufacturing Engineering. Volume 74 • Issue 1 • January 2016
- [8] Padma .A...et...al..., Agile Augmentation of Clean Air in an Around Fire Cracker Industries Located Villages  
.IOSR Journal of Environmental Science, Toxicology and Food Technology (IOSR-JESTFT) e-ISSN: 2319-2402,p- ISSN: 2319-2399.Volume 8, Issue 12 Ver. III (Dec. 2014), PP 01-06 .
- [9] Traditional Fireworks of Barpeta, Assam Interactive Need Assessment Survey & Design  
Study Report for DCS@MSME.Micro, Small and Medium Enterprise (MSME)  
Design Clinic Scheme July 2014 .
- [10] Abdulwadud O....et....al..., (1998) Injuries associated with fireworks in Victoria: an epidemiological overview.  
Inj Prev 4:272-275
- [11] Berger LR, Kalishman S, Rivara FP (1985) Injuries from fireworks.  
Pediatrics 75:877-882
- [12] Barhanpurkar S....et...al..., (2005) Profile of fireworks related ocular injuries(FROI) from western India. Indian J Community Med 30:98-99
- [13] Smith GA...et...al..., (1996) The rockets' red glare, the bombs bursting in air: fireworks-related injuries to children. Pediatrics 98:1-9
- [14] American Academy of Pediatrics (2001) Committee on injury and poison prevention. Fireworks-related injuries to children. Pediatrics 108:190-191
- [15] See LC...et...al..., (1994) Epidemiology of fireworks injuries: the Nationalelectronic injury surveillance system, 1980-1989. Ann Emerg Med 24:46-50



# Fire And Explosion Risk Assessment of Crude Oil Storage Tank In Oil Refinery

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## Introduction

**Abstract-** Fire and explosion in a crude oil storage tank is one of the devastating threats for oil storage area or terminal. This kind of hazard results in human fatality, environmental damage and causes a great economic loss for hydrocarbon industry. In this paper the scenario of fire and explosion in a tank has been simulated with the help of various methodologies like Fault tree analysis (FTA) and Structural importance degree (SID). With the help of these methodologies the most critical basic events (BEs) which may lead to accidents has been pointed out. The risk score of the specific crude oil tank has been calculated through MATLAB software. The results indicated that the final score of fire and explosion risk is in caution area. Sensitivity and importance analysis has been performed to identify the most crucial BEs which will provide insights to reduce or the risk.

**Keywords-** Fire and explosion, crude tank, Fault tree analysis, tank risk level, MATLAB

## I. Introduction

In recent year's use of petrochemical products like petrol, diesels, kerosene, LPG are increasing with the rapid increase of population. To fulfil these requirements a number of refineries are working to refine the crude oil to produce various petrochemical products. As crude oil is used as the raw material in refinery processing unit. So large-scale crude oil storage tanks have been constructed in refinery storage site to store crude oil. As almost all the industries strictly following the safety guidelines and standards during the construction of storage tanks. But sometimes due to natural phenomena or because of human error accidents are happening in refinery storage site

.So Fire and Explosion in crude oil storage tank is big issue in refinery storage site or in oil terminal. As a number of safety guidelines and procedure have been following but still there is some chances of fire occurrence. Therefore, risk assessment for oil storage tanks is very important due to different potential hazards and economic losses. Although several investigations have been performed in order to develop qualitative and quantitative methods for recognition and assessment of risks, few works have been done in a given country, equipment or its components in industries in order to determine failure rate and estimate likelihood of disaster occurrence. The present study aimed at determination of final risk level of fire and explosion in crude oil storage tank and provision of control strategies. The study for the fault tree analysis has been done on crude oil storage tank no.2 of Indian Oil Corporation Limited, paradip storage site. All the 11 crude oil tanks of that refinery are of Floating roof tank type storage tank. In the study all the basic events (BEs) which may lead to accidents has been pointed out and structural importance degree has been evaluated.

## **II. METHODOLOGY**

### **2.1 Fault tree analysis**

Fault tree analysis is a top to bottom deductive failure analysis, which starts with a potential undesired event (accident) called as TOP event, and then analysing all the ways it can take place. Fault tree analysis (FTA) of crudeoil tank has been done to get all the basic events associated with it. Minimal path sets method has been followed up to get all the possible way of hazard occurrenceAfter the analysis 37 BEs has been pointed out which may lead tothe fire andexplosion of crude oil tank.

The fault tree has been simplified by using Boolean algebra to produce the Minimal path sets (MPS), which represent the system safety. A MPS is the smallest combination of basic events whose non-occurrence, it is surethat top event does not happen.

## **MATLAB**



MATLAB (matrix laboratory) is a multi- paradigmnumerical computing environment and proprietary programminglanguage created by Math Works.

MATLAB permits matrix manipulations, implementation of algorithms, creation of user interfaces, plotting of functions and interfacing with programs written in other languages. MATLAB has been used hereto evaluate the final risk score of crude oil tank no.2 by using operational parameter

## RESULT

Analysis of fault tree has been done from which 13 Minimal Path Sets were produced, that means there are 13possible paths to eliminate the oil tank accidents occurrence. The quantitative evaluation of FT represents the calculation of the structure importance degree (SID) of the BEs. The SID evaluates the BE influence of tank and on the total logical structure of the top event and exclusively depends on its location in FT. The larger SID of BE, thehigher effect upon the unwanted event

Parameter	Amount
Design temperature	160°C
Design pressure	1034.21 Millibar
Operational temperature	40°C (maximum in summer)
Operational pressure	Atmospheric
Internal diameter	79m
Tank height	13.6m

After the evaluation of SID for each BEs, the results were compared and arranged from highest value to lowest one. The order of BEs based ontheir importance degree are illustrated below:

For the evaluation of final risk score of crude oil tank no.2, the operational parameter and the scores for risk assessment indices for fire and explosion in crude oil storage tanks hasbeen taken into consideration.

Operational parameters of crude oilstorage tank:

The score limits for risk assessment indices for fire and explosion in crude oil storage tank no.2 is as follows:

$$I\emptyset(34)= I\emptyset(35)>I\emptyset(36)= I\emptyset(37)>I\emptyset(31)= I\emptyset(32)= I\emptyset(33)>I\emptyset(30)>I\emptyset(28)= I\emptyset(29)>I\emptyset(1)= I\emptyset(2)= I\emptyset(3)= I\emptyset(13)= I\emptyset(14)= I\emptyset(15)= I\emptyset(16)= I\emptyset(22)= I\emptyset(23)= I\emptyset(24)= I\emptyset(25)= I\emptyset(26)= I\emptyset(27)> I\emptyset(4)= I\emptyset(5)= I\emptyset(6)= I\emptyset(17)= I\emptyset(18)> I\emptyset(11)= I\emptyset(12)> I\emptyset(7)= I\emptyset(8)= I\emptyset(9)= I\emptyset(10)= I\emptyset(19)= I\emptyset(20)= I\emptyset(21)$$

The results indicates that the mostcrucial BEs for causing the fire and explosion accident are X34 (formation offlammable cloud) and X35 (Turbulent mixing between vapour and air). The second critical one is poor ventilation initiators and followed by oil leakage.

By using the MATLAB software the finalrisk score of crudeoil tank is 0.190.

## **CONCLUSION**

In this study fire and explosion risk assessment of crude oil tank no.2 has been proposed. And the final risk score of crude oil tank fire and explosion is not in safe area, it is in caution area. Sothere is some probability of hazard occurrence. The first two most critical basic events are belongs to the pressure relief valve, so correction measures should be taken for this valvein the storage tank. Other critical events are belongs to oil spill and oil leakage contributors, so regular inspection of the storage tank and oil level indicator or alarm should be done,by which the accidents probabilities willreduce.

## **REFERENCES**

- [1] H. A. Ibrahim, H. S. Syed, Hazard Analysis of Crude Oil Storage Tank Farm, International Journal of ChemTech Research Vol.11(2018)300-308.  
Vaibhav Sharma et al, Study and Analysis of Storage Tank Hazards and its Mitigation Measures Using Bow Tie Diagram, Technology(2018).
- [2] Peter Vidmar et al, Safety assessmentof Crude oil tankers, Safety Science 105 (2018) 178-191.
- [3] Reza Gholamnia et al, Fuzzy Risk assessment of Fire and Explosion in the Crude Oil Storage Tanks, Journal of Applied Environmental and Biological Sciences , 5(6) (2015) 268-272.
- [4] Lei Shi et al, Fuzzy fault tree assessment based on improved AHP for fire and explosion accidents for steel oil storage tanks, Journal of Hazardous Materials 278(2014) 529-538.



# Assessment of Toxic and Flammable Gas Formation in Sewer System of A City

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## **Abstract-**

Several numbers of accidents has occurred while performing a job inside sewage manholes and pit many of them are fatal accidents this is due to lack of basic awareness of worker working in confined space are and dealing toxic as well as flammable gases present inside the sewer system. This paper deals with various hazards related to working in sewer system and tells us about what are the safety precautions that need to be taken before entering the sewer system so as to reduce the number of death of sewage cleaning workers.

**Keywords-** Flammable, Toxic, Lethal, Hazardous.

## **INTRODUCTION**

sewage system is used every day it is important to maintain it after a period of time while performing this there is threat to life because of confined space and the presence of toxic and flammable mixture present in sewer manholes. The concentration of this mixture can be huge if the sewer was closed for a long period of time due to anaerobic condition.

There several case studies that shows how hazardous this sewer cleaning job is, several number of fatalities has occurred while performing this work, Some of them are even lethal that may cause death of the sewage worker this is due to following reasons given below which are discussed in detail further-

Sewage system is water conveying system that carries waste water from different part of cities to a predefined place which mainly is effluent treatment

1. Oxygen deficiency
2. Presence of toxic and poisonous gases inside sewers
3. Explosion hazard due to the presence

Identification of sewer zones	
Required equipment and survey sheet	
Collection of data	
Data analysis	
Results and conclusion	



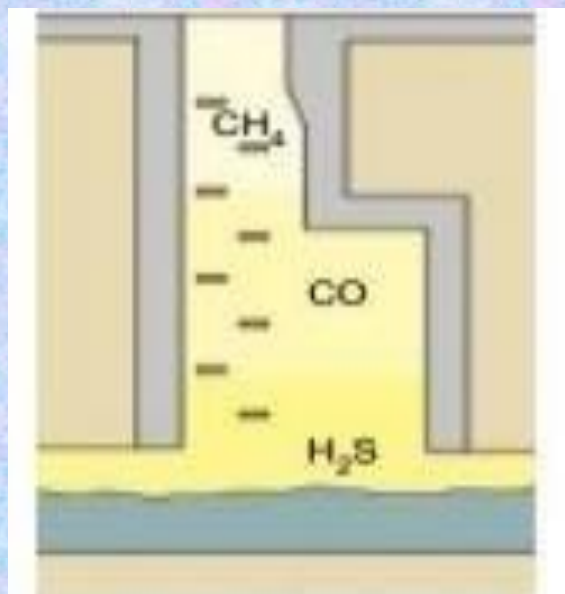
## METHODOLOGY

A limited study has been done for emission of methane inside sewer but since it is explosive in nature it has high risk of fire and explosive hazard also Methane is a highly potent greenhouse gas, which is significantly contributing to climate change. A live survey method to determine the level of flammable gas which is present inside the sewer system. As per OSHA standards the LEL of methane is given below-

TABLE 1: Properties of methane

S.No	Hazardous gas	OEL (ppm)	Relative density	LEL/UEL
01	Methane	----	0.6	5.3-15%

This can be done in two parts continuous monitoring of methane concentration in both gaseous and liquid phase is important for the accurate quantification and overall understanding of methane production and emission from sewer. Since the determination of Methane from liquid state will take



longer period of time and lot of laboratory work so we have used the gas monitoring with help of detector. This is the best way to obtain data because it is realistic and accurate. It is done by help of flammable gas detector which shows the lower explosive limit (LEL) concentration of flammable gas.

Methodology process Fig. : 1

Down below are some important points on the basis of which a survey sheet has been made-

1. General information.
2. Pre entry requirement check list.
3. Environmental factor.
4. Entry and work precautions safety equipment used.
5. Methane concentration in sewer.
6. Emergency response plan.
7. after work completion.
8. Summary of work.

### III. DATA OBTAINED

The data obtained as an experimental data taken by the monitoring instrument which detects the lower flammability of methane gas inside the sewers at different areas in three different zones. For calculations we have taken the average of these obtained

S.NO.	AREA/ZONE	PERMISSIBLE EXPOSURE LIMIT	OBSERVED LEL
1	Location P Sample 1	LEL%(<5)	8.0
2	Location P Sample 2		6.58
3	Location P Sample 3		7.43
4	Location Q Sample 1		6.7
5	Location Q Sample 2		5.8
6	Location Q Sample 3		6.9
7	Location R Sample 1		6.6
8	Location R Sample 2		7.4
9	Location R Sample 3		6.9
10	Location S Sample 1		5.93
11	Location A Sample 1		5.7
12	Location A Sample 2		6.6
13	Location A Sample 3		6.2
14	Location B Sample 1		5.9
15	Location B Sample 2		5.6
16	Location B Sample 3		5.7
17	Location C Sample 1		4.3
18	Location C Sample 2		5.0
19	Location C Sample 3		5.4
20	Location D Sample 1		4.0
21	Location W Sample 1		4.3
22	Location W Sample 2		2.0
23	Location W Sample 3		4.5
24	Location X Sample 1		5.7
25	Location X Sample 2		5.6
26	Location X Sample 3		5.0
27	Location Y Sample 1		4.9
28	Location Y Sample 2		5.7
29	Location Y Sample 3		6.8
30	Location Z Sample 1		3.0

values so as to determine which zone has the maximum concentration of methane gas inside the sewer.

After obtaining these data of different part of the city an observation table is made in which the concentration of methane gas is noted which is present inside the sewers with the help of monitor. These readings are just after opening the sewerage because the methane gas is lighter than air therefore it accumulates at the upper region of the sewers as given in the figure below.



1. Graph for Observation The First zone has the highest value of concentration of methane gas which is **6.8**, so this region is more dangerous as compared to different parts of the city it could be due to low frequency of maintenance of sewer system and presence of lake near it.



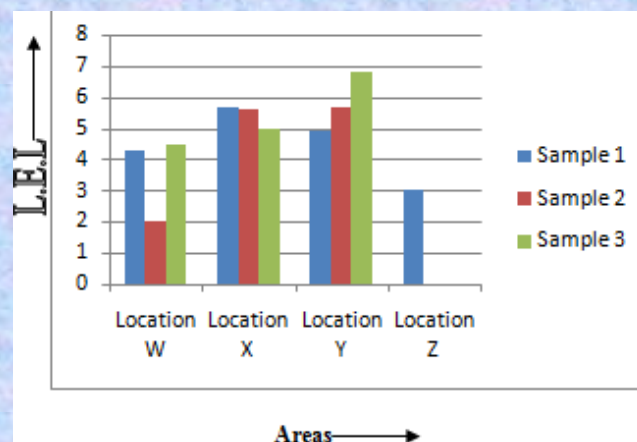
Fig. 3 Graph of data obtained

Average of zone 1

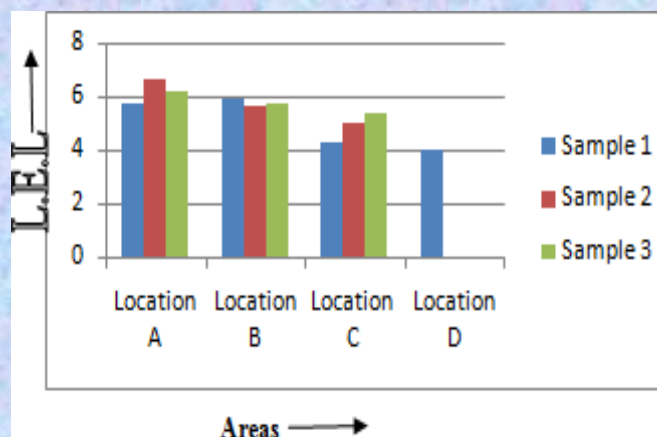
while the second zone has low value of methane concentration as compared to the western zone which is **5.4** but it is still in the flammable

3. Graph for Observation Table 3-

In the third zone has the lowest concentration which is **4.75** which is lower than the flammable range of methane it is due to because of the less area is covered by the central zone sewage treatment plant.



it is to be found it is due the population density of this area is very high and in the region some small scale industries are also there.



## CONCLUSION

It is to be concluded that there is presence of flammable gas which is methane inside the sewer due to decomposition of waste material in anaerobic conditions inside the sewer and this gas has maximum concentration in the first zone of the city because of high populated area and low capacity of sewage treatment plant as well as the frequency of cleaning of sewage lines should be done within 6 months which was not there. Before entering inside the

the presence of the gas using a long handle gas monitoring pole and extend the period of wait until there level of gas are within the limits.

sewer one need to take some safety. While performing this work it is

precaution which are given below which should be the safe operating procedure while cleaning as sewage line to prevent the death of the sewage cleaning worker.

necessary that one should a safety harness whose one end should be held by a person standing outside the manhole so that the worker cleaning inside the sewer line gets unconscious he may be rescued with help of harness.

protective gears should be provided with proper work permit.

- Before commencement of the work the area of work shall be clearly marked and barricading should be done along the site.
- Ventilation should be provided inside the sewer line by opening the adjacent two or three manhole on the both sides of lines 1 hour prior to work and if this is not possible then mechanical ventilation should be provided before entering inside the sewer.
- Use of gas monitors for toxic as well as flammable gas like Methane, Hydrogen sulfide, Carbonmonoxide, etc.
- If there is a traces of any gas then the team should wait and again check for equipment and safety gears should be cleaned and it is necessary for all the workers to take a bath for prevention from any kind of infection and all the barricades, sign boards shall be removed from work place.



## REFERENCES

- [1] V.D. Ambeth Kumar,<sup>1</sup> D. Elangovan,<sup>1</sup> G. Gokul,<sup>2</sup> J. Praveen Samuel,<sup>1</sup> and V.D. Ashok Kumar<sup>3</sup>, “ Wireless Sensing System For The Welfare Of Sewer Laborers” in Healthc Technol Lett, 5(4): 107-112 2018 Aug 2018.
- [2] Dr.D.Sivakumar<sup>1</sup>, Mathioli Anbarasu<sup>2</sup>, Mohammed Thameem Ansari<sup>3</sup>, “Implementation Of Private GSM Network For Disaster Management And Detection Of Hazardous Gases In Sewages And Manholes” in International Research Journal of Engineering and Technology (IRJET), Volume: 05 Issue: 04 | Apr-2018.
- [3] Harsh Maurya , Dr Md. Arshad, “Manual scavenging in India a issue and challenge” in International journal of trend in scientific research and development volume 3 issue 5, 2018
- [4] Tatiana Salamanca “ Prototype for Monitoring Vital Signs in Confined Spaces”, Vision Electronica ,Vol. 12 No.1 (2018).
- [5] Yuvin Chinniah, Ali Bahloul, Damien Robert
- Friedman†, Uichin Lee, Luiz Vieira, Diego Rosso‡, Mario Gerla, Mani B Srivastava, “ Sewer Snort: A Drifting Sensor For In-Suit Sewer Gas Monitoring ” in UCI- CCE, 2016.
- [7] Varun kumar Ojha, Parmatha Dutta, Atal Chaudhuri “Identifying hazardousness of sewer pipeline gas mixture using classification methods: a comparative study” in Engineering Applications of Neural Networks, 28, pages 1343-1354, 2017.
- [8] K S Kamalesh kumar, V. Prabhakaran, G. Anandhakumar, lokesh murali, “Analyzing Manual scavenging death rate over a critical circumstance and method to ensure safety” in Journal of Chemical and Pharmaceutical Sciences, 3097-31785, 2016.
- [9] Ibiam O. F. A and Igwenyi I. O. “Sewage and its benefits to man” in International Research Journal of Biotechnology (ISSN: 2141-5153) Vol. 3(10) pp. 174- 189, December, 2012
- [10] Sugato Ghosh, Animesh Singh, Hiranmay Saha, Varun Kr Ojha, Paramartha Dutta, “Sensor array for manholes gas analysis ” in International Symposium on Physics and Technology of Sensor, 2589-9037, 2012.
- [11] Gian Paolo Volpato, M.D.

## STUDENTS ACHIEVEMENTS

Name of Student	Workshop/Course/Certificate
Shubham Yadav	Certificate By FEMA
Nikhil Chopade	Webinar: Fire and Emergency Prevention Measures for Industries
Pratyush Tripathi	IOSH Managing Safely, NEBOSH IGC , FIRE AND SECURITY INDIA EXPO
Harshit Soni	Envisage2019
Harshal Pawar	1) Fire and Emergency Prevention Measures for Industries " on 28 Sep 2021 to 30 Sep 2021 organized by National Institute of Disaster Management, Ministry of Home Affairs, Govt. of India. 2) Specialization course in energy production, distribution and safety from coursera.
Shubham Sahu	All India Volleyball Championship , First aid training Program, Technical Quiz
Advait Sharma	Hazard and Hazard control ( EHS INDIA)
Prateek Sharma	Swayam NPTEL exam fluid mechanics
Shashikant Choudhary	Community preparedness fire induced disaster
Pratham Joshi	Swayam NPTEL Exam Fluid Mechanics
Kunal Kumar	Model exhibition, fast and furious (Roadies)
Tejas Chavan	The Knights of Safety
Laxman Singh Lodha	Fire security association of india
Jalaj NandkishorKathe	Course on The Effect of Fires on People, Property and the Environment and 2nd on Safety in the Utility Industry
Divyansh Mishra	Model Exhibition
Rawool Tejas Ramesh	3 events in FSAI Tech fest 1) Innovative Ideas 2)Panel Discussion 3) Quiz Competition , Course name - Managing Safely by IOSH
Shubham Mishra	NPTEL online certification exam



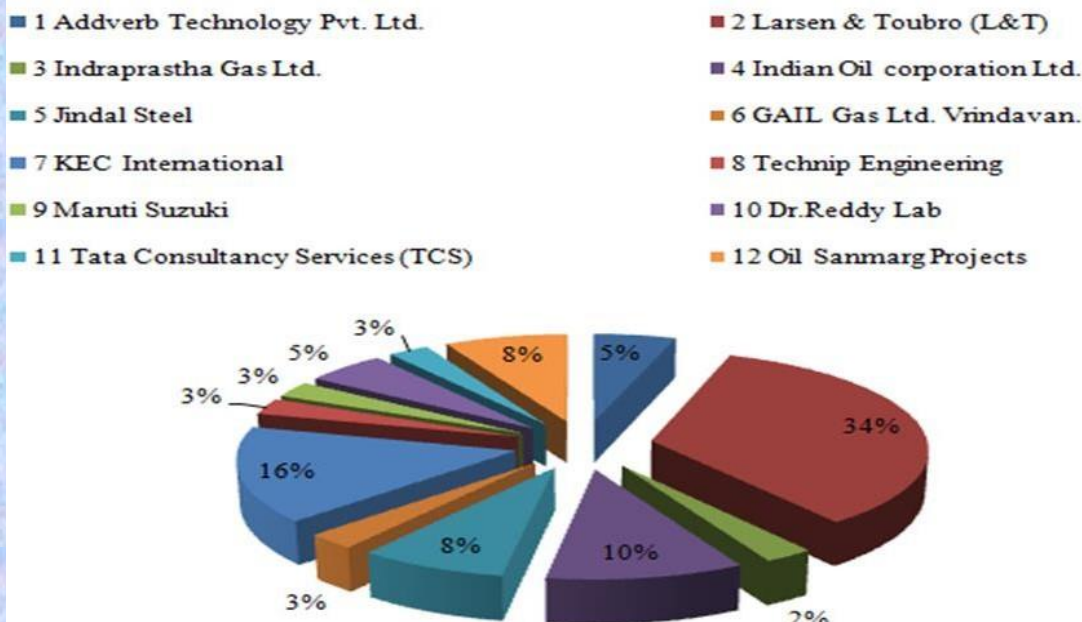
Avee Jain	RAITEA 2019 conference, Coursera Courses: Disaster Preparedness, Effect of fire
Kunal Jain	Course: The effects of fire on people, property and the environment, Disaster preparedness. Etc
Shailesh Kumar Singh	All events in which I have participated and course completed
Himadri Sekhar Bera	3 years of experience as a safety officer in construction and 40 days shutdown project Cum internship in Haldia Petrochemicals Ltd.
Kshitij Sharma	International conference, EF-SET
Priyanka Adlak	First Aid Training, FM Global Seminar
Sahil Sangwan	Graphic Design
Shravyansh Soni	FIRE TECH FEST QUIZ AND INDIAN RED CROSS SOCIETY
Aridaman Singh Tomar	International Conference
Abheet Tripathi	1) Fire Management Training jointly organised by United Cities and Local Governments Asia Pacific( UCLG ASPAC)
Shakti Swarup Das	NPTEL Online Certification, Spoken Tutorial, ILO and WHO Online Certifications
Devesh Dixit	Training on process safety management, training on safety supervisor and leadership
Mohammad Maaz Ali	Workshop and Virtual certification
Mohit Satpute	Fire and emergency prevention measures for industries
Varun Sharma	FSAI chapter - national tech fest - winner
Himanshu Paradkar	One Week National Tech-Fest
Mehakpreet Singh	Panel discussion
Padma Mushahary	FSAI
Mitali Mandge	FSAI Techfest ,Safety Supervision , Fire

	prevention plan, process Safety Management
<b>Akhil Mohan</b>	“Satellite based Navigation: A Journey from GPS to Mobile Phone Platform”
<b>Ashutosh Rana</b>	Discover the World of Business Modeling in Fire and safety Industry
<b>Mrunal Masarkar</b>	Fire and Emergency Prevention Measures for Industries & Basics of Disaster Management
<b>Vinod Singh Rajpoot</b>	Fire and safety quiz held by IEI UPSC & IEI DELHI, Electric and hybrid vehicle





# PLACEMENT LIST OF 2020



## PLACEMENT 2019 - 2020

S.No.	Name Of Student	Name Of Company	Placement Type	Package
1	Aakash Dayma	TATA Consulting Engineering	On Campus	4.0
2	Abhishek Shukla	Vedanta	On Campus	7.95
3	Abhishek Baghel	Vedanta	On Campus	7.95
4	Abhishek Solanki	Amax Health Safety Environment	Off campus	2.00
5	Aditya Dubey	Shapoorji Pallonji	On Campus	3.75
6	Anil Kumar Patidar	Shapoorji Pallonji	On Campus	3.75
7	Anirudha Namdev	Sun Pharmaceuticals Ltd.	On Campus	2.00
8	Ankit Mourya	KEC International	On Campus	3.35
9	Anshul Porwal	TATA Consulting Engineering	On Campus	4.0
10	Arpit Ved	Shapoorji Pallonji	On Campus	3.75
11	Ashutosh Mevade	Vedanta	On Campus	7.95
12	Ashutosh Mishra	KEC International	On Campus	3.35
13	Ayush Agrawal	Reliance Industries Ltd.	On Campus	8.00
14	Babulal Kumawat	Vedanta	On Campus	7.95
15	Chhayank Deshmukh	Vedanta	On Campus	7.95



16	GandharvaPable	Reliance Industries Ltd.	On Campus	8.00
17	Gourav Pal	Shapoorji Pallonji	On Campus	3.75
18	GovindaPatel	Reliance IndustriesLtd.	On Campus	8.00
19	Harshvardhan Singh Gour	KEC International	On Campus	3.35
20	HemantOjha	Upgrad	On Campus	2.5
21	JaydeepMalviya	Torrent Pharmaceuticals	On Campus	3.36
22	Ketan Patil	Reliance IndustriesLtd.	On Campus	8.00
23	Kunal Patidar	Catalysts	Off campus	2.40
24	Kaushal Jat	Upgrad	On Campus	2.5
25	Mitan Vyash	Maruti Suzuki IndiaLimited	On Campus	8.00
26	Lovesh Mangal	Reliance IndustriesLtd.	On Campus	8.00
27	NamanPandit	Maruti Suzuki IndiaLimited	On Campus	8.00
28	Nikhil Dubey	Reliance IndustriesLtd.	On Campus	8.00
29	Nikhil Sharan	Vedanda	On Campus	7.95
30	Nishita Chouhan	Vedanta	On Campus	7.95

31	Piyush Kumar Pandey	Reliance IndustriesLtd.	On Campus	8.00
32	PrabhanshuJain	Shapoorji Pallonji	On Campus	3.75
33	PradumnSharma	Vedanta	On Campus	7.95
34	Radheshyam Kamde	Punj Liyod Ltd.	On Campus	2.72
35	Rahul Mahajan	Reliance IndustriesLtd.	On Campus	8.00
36	Rajat Gupta	Shapoorji Pallonji	On Campus	3.75
37	RajveerSingh Thakur	Sun Pharmaceuticals Ltd.	On Campus	2.00
38	Sagar Gami	KEC International	On Campus	3.35
39	Sivani Shah	Vedanta	On Campus	7.95
40	ShrishtiKotiyal	GSFC	On Campus	7.50
41	ShubhamAgrawal	Sri Aurobindo Medical College & P.G. Institute	Off campus	1.50
42	ShudhanshuSharma	Afcon Infrastructure	On Campus	3.90
43	Sumit Kumar Soni	KEC International	On Campus	3.35
44	Sunil	Shapoorji Pallonji	On Campus	3.75
45	Tanish Kapoor	Shapoorji Pallonji	On Campus	3.75
46	Tarun Namdev	Indra Security andAllied Services Pvt. Ltd.	Off campus	2.00
47	Uditya Singh Chouhan	Sri Aurobindo Medical College & P.G. Institute	Off campus	1.50
48	VaibhavMandre	KEC International	On Campus	3.35
49	VikasPatel	Catalysts	Off campus	2.40
50	Vimal Kumar Gupta	Punj Liyod Ltd.	On Campus	2.72



51	Vishal Das	Vedanta	On Campus	7.95
52	Yash Gajbhiye	Sri Aurobindo Medical College & P.G. Institute	Off campus	1.50
53	PrinceKurmi	KEC International	On Campus	3.35
54	Nakul Kumar Sharma	Indian Oil PETRONAS.	Off campus	5.72
55	ShubhamSaini	KEC International	On Campus	3.35
56	Vipin Rai	Reliance IndustriesLtd.	On Campus	8.00
57	ShivanshuTiwari	Punj Liyod Ltd.	Off campus	2.72

## HIGHER EDUCATION

S.No.	Name ofStudent	Enrollme ntNumber	Degree/ Diploma	Specialization	Name of University/Institute
1	Aditya Sharma	0808FT161010	M.Tech	Industrial Safety Engineering	IES IPSA
2	Ashish	0808FT161027	PG Diploma	Life Safety	Haryana Institute
3	Nishita Chouhan	0808FT161072	M.Tech	Industrial Safety Engineering	IES IPSA
4	PrabhanshuJain	0808FT161075	M.Tech	Industrial Safety Engineering	IES IPSA
5	Rahul Dahiya	0808FT161079	M.Tech	Industrial Safety Engineering	IES IPSA



# SASAN INTERNSHIP





# SWARANJALI













## आईपीएस एकेडमी को बेस्ट परफॉर्मेंस इंस्टिट्यूट अवॉर्ड मानव संसाधन विकास मंत्रालय ने एकेडमी को टॉप 25 परफॉर्मिंग आईसीसी में दिया स्थान

मिठी रिपोर्टर . इंदौर

मानव संसाधन विकास मंत्रालय ने आईपीएस एकेडमी, इंस्टिट्यूट ऑफ इंजीनियरिंग एंड साइंस को बेस्ट परफॉर्मेंस इंस्टिट्यूट अवॉर्ड से नवाजा है। देशभर के 950 संस्थान, जिनमें आईआईटी और एनआईटी भी शामिल हैं, इसमें आईपीएस एकेडमी को टॉप 25 परफॉर्मिंग आईआईसी में स्थान मिला है।

बुधवार को एआईसीआईई हैडक्वार्टर ऑडिटोरियम, नई दिल्ली में एमएचआरडी मिनिसटर रमेश पोखरियाल 'निशंक' और राज्यमंत्री भोत्रे संजय शामराव ने यह सम्मान दिया। इस समारोह में डॉ. अनिल डी. सहस्रबुद्धे, चेयरमैन एआईसीआईई, डॉ. एम.पी. पूनिया, वाईस चेयरमैन



नई दिल्ली में हुए समारोह में एमएचआरडी मिनिसटर रमेश पोखरियाल 'निशंक' ने इंस्टिट्यूट को यह सम्मान दिया।

एआईसीआईई, डॉ. डी.पी. सिंह, अध्यक्ष, यूजीसी आदि मौजूद थे।

मानव संसाधन विकास मंत्रालय ने देशभर में कुछ चुनिंदा इंस्टिट्यूट को आईआईसी का दर्जा दिया है। ये इंस्टिट्यूट अपने यहां बच्चों में आंत्रप्रेन्योरशिप को प्रोत्साहन देने के

लिए अग्रणी भूमिका निभाते हैं। संस्थान के अध्यक्ष अचल के चौधरी ने बताया कि ये अवॉर्ड हमारे आंत्रप्रेन्योरशिप की दिशा में किए कार्यों की सराहना पर मोहर है। संस्था की प्राचार्या डॉ. अर्चना कीर्ति चौधरी ने बताया कि संस्था में कई बच्चे अपने स्टार्टअप डालने की

राह पर चल पड़े हैं। संस्था के इंस्टिट्यूट ऑफ इंजीनियरिंग एंड साइंस इंदौर के आईआईसी प्रभारी प्रो. रूपेश दुबे में कहा कि संस्था के विद्यार्थी स्मार्ट इंडिया हैकैथॉन में अव्वल आने के साथ ही सिंगापुर इंडिया हैकैथॉन में भी भारत का प्रतिनिधित्व कर रहे हैं।

संस्थान एच फायर एंड सिक्योरिटी एसोसिएशन ऑफ इंडिया द्वारा दो दिवसीय 'विंडिकेटर-2019' कार्यक्रम शनिवार से संस्थान में आयोजित किया गया। इसमें पेपर प्रेजेंटेशन एवं विभिन्न प्रकार की फायर सेफ्टी ड्रील आयोजित की गई। कार्यक्रम में फायर सेफ्टी डिपार्टमेंट के विद्यार्थियों ने भाग लिया। संस्थान प्राचार्य डॉ. अर्चना कीर्ति चौधरी ने बताया कि कार्यक्रम में फायर प्रोटेक्शन सिस्टम, हेल्थ एंड हाईजीन, इंडस्ट्रीयल सेफ्टी, रिस्क असेसमेंट व हेजाडियस पदार्थों के रखरखाव जैसे विषयों पर छात्र-छात्राओं ने अपने शोध पत्र प्रस्तुत किए। विभागाध्यक्ष डॉ. प्रवीण पटेल ने बताया कि कार्यक्रम के दूसरे दिन विभिन्न प्रकार की ड्रील जैसे



ट्रेलर पंप- ड्रील, बी ए सेट ड्रील, फायर एक्सटिंग्यूशर ड्रील व हाईड्रेंट ड्रील प्रतियोगिताओं का आयोजन किया जाएगा। सभी प्रतियोगिताओं के विजेता व उपविजेता को फायर एंड सिक्योरिटी एसोसिएशन ऑफ इंडिया मप्र चेप्टर द्वारा पुरस्कार नकद राशि के रूप में दिए गए।



# स्टूडेंट्स ने जाने आग बुझाने के आधुनिक तरीके



सिटी रिपोर्टर | इंदौर

आईपीएस एकेडमी में फायर एंड सेफ्टी डिपार्टमेंट के स्टूडेंट्स के लिए दो दिनी विंडिकेटर-2019 कार्यक्रम किया गया। फायर एंड सिक्योरिटी

एसोसिएशन ऑफ इंडिया की ओर से हुए इस कार्यक्रम के पहले दिन फायर प्रोटेक्शन सिस्टम, हेल्थ एंड हाईजीन, इंडस्ट्रियल सेफ्टी, रिस्क असेसमेंट व हेज़ार्डियस पदार्थों के रखरखाव पर स्टूडेंट्स ने अपने शोध पत्र प्रस्तुत किए। दूसरे दिन

ट्रेलर पंप ड्रिल, बीए सेट ड्रिल, फायर एक्सटिंग्यूशर ड्रिल व हाईड्रेंट ड्रिल आदि प्रतियोगिताएं की गईं, जिसमें पार्टिसिपेंट्स ने आग बुझाने के आधुनिक तरीकों को बताया। विंडिकेटर के तहत हुई सभी प्रतियोगिता के विजेताओं को पुरस्कृत किया गया।



## छात्रों ने बताए अग्निसुरक्षा के अत्याधुनिक तरीके

### विंडिकेटर 2019 का आयोजन

इंदौर 6 अप्रैल: फायर एंड सिक्योरिटी एसोसिएशन ऑफ इण्डिया एवं आईपीएस अकादमी के इंजीनियरिंग संस्थान द्वारा प्रायोजित कार्यक्रम दो दिवसीय विंडिकेटर-2019 आयोजित किया गया। इस कार्यक्रम में पेपर प्रेजेंटेशन एवं विभिन्न प्रकार की फायर सेफ्टी डील आयोजित की गई।

इस दो दिन के कार्यक्रम विंडिकेटर-2019 में फायर सेफ्टी डिपार्टमेंट के विद्यार्थियों ने भाग लिया। संस्थान प्राचार्य डॉ. अर्चना कौलि चौधरी ने बताया कि इस कार्यक्रम में फायर प्रोटेक्शन सिस्टम, हेल्थ एंड हाईजीन, इंडस्ट्रियल सेफ्टी, रिस्क असेसमेंट व हेज़ार्डियस पदार्थों के रखरखाव जैसे विषयों पर छात्र-छात्राओं ने अपने शोध पत्र प्रस्तुत किए। विभागाध्यक्ष डॉ. प्रवीण

षटेल ने बताया कि कार्यक्रम के दूसरे दिन विभिन्न प्रकार की डील जैसे ट्रेलर पंप ड्रिल, बीए सेट ड्रिल, फायर एक्सटिंग्यूशर ड्रिल व हाईड्रेंट ड्रिल प्रतियोगिताओं का आयोजन हुआ। विंडिकेटर-2019 में सभी प्रतियोगिता के विजेता व उपविजेता को फायर एंड सिक्योरिटी एसोसिएशन ऑफ इण्डिया म.प्र. सेक्टर द्वारा आयोजित पुरस्कार नगद राशि के रूप में दिये गये।

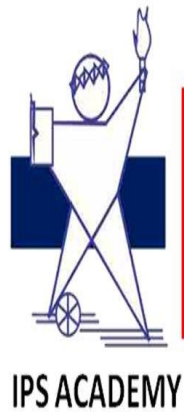












**HEARTIEST WELCOME**

**Dr.Reddy's**



**CENTRAL PLACEMENT CELL**





IPS Academy Indore  
Institute of Engineering & Science  
**TIMES ENGINEERING  
SURVEY 2021**



**Rank 1st in Central Zone**

**30th Rank in Top 125 Private  
Engineering Colleges of India**

**39th Rank in Top 175  
Engineering Colleges of  
India (Overall)**



**Institute of Engineering & Science**

- (Approved by AICTE, Govt. of MP, Directorate of Technical Education M.P.)
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