



FSAI Journal

September-October 2019 | www.fsaijournal.in | ₹ 90

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PERSEVERANCE, DEDICATION & COMMITMENT
towards building a Safe and Secure Nation

FIRE & SECURITY ASSOCIATION OF INDIA (FSAI)
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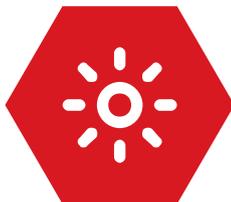
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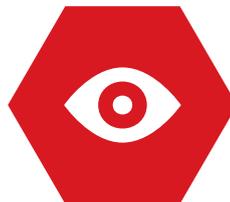


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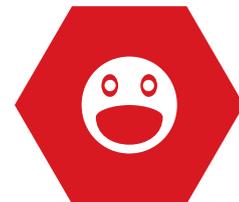
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Sept-Oct 2019

Contents



FSAI BILLBOARD

16

BEST ASSOCIATION AWARD TO FSAI

18

FSAI BILLBOARD

TRUE DELIGHT AND MEMORABLE EXPERIENCE TO RECKON!
Curtain Raiser on PACC 2019




LEAD STORY

PANKAJ DHARKAR
Integration of MEPP Services in Tall Buildings - Challenges & Trends

24

36

LEAD STORY

FELIPE HERRERA
Remediation for Fire Safety of Garment Factories in Bangladesh




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Sept-Oct 2019

Contents

■ FIRE SAFETY DESIGN

52

FIRE PROTECTION AND SAFETY ■

MM BHUSKUTE
Fire Extinguishers Selection, Placement, Use and Maintenance





■ NFPA

JESSE ROMAN
Mind the Gap

59

	FSAI INITIATIVES: CHAPTER ACTIVITES.....	62
	QUIZ.....	69
	FEEDBACK FORM.....	70
	MEMBERSHIP FORM.....	71
	FIRE SAFETY PRACTICES.....	73
	PUBLISHER'S PAGE.....	74

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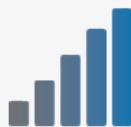
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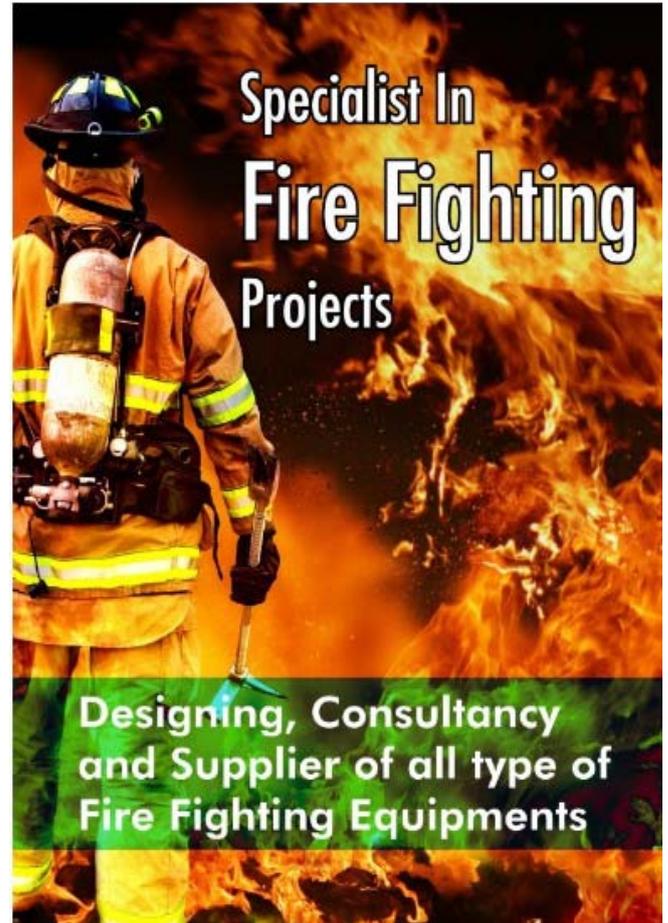
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From the President

Dear Patrons,

First thing first!

What a proud honor it is! As part of the India Association Congress (IAC) proceedings, FSAI has been judged as the "Best Association - 2018-'19". The coveted award was received by Garry Singh, Chairman, Security Standards Committee of our association on 24th August at a glittering valediction ceremony of IAC held at Gurugram, Haryana. India Association is a duly accredited apex consortium of many leading associations in the country. We became winners by fulfilling a number of objectives and goals set in the contest specifications.

As already highlighted by FSAI's Executive Council, this recognition is a great milestone in our 17 years of dedicated service to the society and nation at large, in the arena of challenging fire safety and security relevant concerns.

Beginning the journey as a small entity in the year 2002, with its registered headquarters at Chennai, the association has grown by leaps and bounds. With a symbolic two digit membership at the beginning, now FSAI's strength has touched 9,000+ and still counting. Now we have both chapters and regions in most of the states. The extraordinary spirit of voluntary engagement by the top level governing body devoting adequate time and energy gave a banyan tree shade effect. Rest of the fraternity at working executives' level drew inspiration, did their jobs wonderfully well and brought desired results at ground level. Today we are a force to be reckoned in the area of fire safety and security related cultural as well as promotional cum developmental work. All chapters and regions carry out a number of tasks, many of which go much beyond the scheduled plan of frequency, quality and timely delivery.

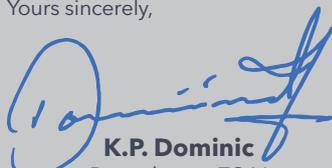
In addition to the above feat, our International President, Pankaj Dharkar received yet another recognition to his untiring efforts by winning the Gujarat Real Estate Award 2018. Many congratulations and we wish still better luck in his future endeavors as well. Besides, professionally few new standards that we carved out and published on building safety under the leadership of Pankaj Dharkar along with his dedicated team of architects/ engineers are likely to become landmark documents for the country. In the upcoming PACC, the proposal for ratification of these guidelines shall be put up. We expect a successful walkthrough nod over there.

FSAI has always been fortunate in gaining unstinted support from all corners - govt., industries, professional bodies, designers, standard setters, regulators, insurance companies, educational institutions, security organizations etc., and it is for us to avail them and deliver the outputs.

Deservedly this edition of your favorite Journal is a Curtain Raiser Pullout on PACC Conclave 2019 to be held at Dubai between 26th & 29th of Sept. Let me once again seek the attention of all stakeholders; request them to block their calendar and be at the congregation. I wish to sum up the important narratives on the event which come up in succeeding pages with a three (literal) liner!! "Other than a golden opportunity to reach out, sense, see, listen, feel, meet and do networking, PACC shall help us achieve more. Every delegate irrespective of their "business or occupation" will have something unique and purposeful to take home. This is just because Architecture has already been ingrained into the DNA of modern society".

Let me sign out with the following quote from James Cash Penney,
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Yours sincerely,



K.P. Dominic
President - FSAI



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FROM THE CHAIRMAN'S DESK

Dear Friends,

Today's turbulent personal security concerns all over the country and that too, with higher consequential impact on the weaker gender and children calls for additional attention. The festivity spell beginning from Ganesh Utsav and extending through Navratri/Durga Pooja, Diwali till New Year's Eve, could be more pertinent. In this context, let me also appeal to parents/elders in the families as well as neighborhoods to do their bit by inspiring the soft targets about practical safeguards as well as the need for adherence to restraint in their behavior and movements (to certain extent) such that they do not become victims.

Coming to the facilitation efforts on security awareness, Nov-Dec. issue of FSAI Journal would be solely dedicated to **"Women and Child Safety"**. To make it fruitful, we seek good articles as well as other promotional material that would add substance and meaning. All FSAI chapters are in the process to organize more awareness programmes of significance. **Few FSAI chapters have been able to work with police personnel, with regard to Women Safety Campaigns.** The school chapters are also doing good work towards fire safety and security.

The most sought after FSAI's flagship event - **Project Heads, Architects & Consultants Conclave 2019 (PACC-2019)** is to be held at **Dubai** from **26th to 29th of September** is round the corner. As usual, the conference with high quality plenary sessions and panel discussions with participation from eminent experts and visionaries in the field of building industry - consultants, architects and realtors, the conference shall become a one of its kind experience! The concurrent exhibition will provide the participants an opportunity to see and understand newer and emerging technologies with regard to fire safety and security. Those who are seeking relief from the stress, will be benefitted by spiritual/ management science discourses as a part of this conclave. Not to miss, the business here will be combined with pleasure too! Relaxing entertainment programmes and pleasure trips shall also create an extra motivational effect. In all, **this year's PACC is bound to provide a unique and memorable experience to one and all**, who are all set to visit Dubai with us!

I am tempted to invite all the FSAI members to avail this opportunity and be a part of PACC 2019, as it will provide best of both the worlds - knowledge and entertainment! So, rush your registration, if not done and get ready for the mega event to unfold soon!

While concluding, let me wish everyone a **happy festive season** and convey my **best wishes for progress and prosperity in our Surakshit Bharat!**

Yours sincerely,



Dipen Mehta
Chairman – FSAI Journal





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EDITOR'S PAGE



Dear Readers,

Welcome back!

This issue happens to be the Curtain Raiser Special for PACC-2019. The endeavor has already become a spectacular annual plethora of FSAI by its own merit, versatility and mass appeal. This year's congregation in September at Dubai is likely to cross many yardsticks with regard to the quality landmark. Among the dignitaries who shall be leading the sessions and discussion panels, there shall be a balanced mix of technical/ management experts, policy makers, standard formulators and professional safety cum security experts. Besides, delegates and other visitors can be rest assured of excellent organizational perfection. This will also be complemented through nicest possible level of hospitality.

We have already seen a lot of people registering for this year's PACC. But people who are yet to be registered as delegates should reach out to us and enroll their names, immediately. Utmost care has been taken to ensure that the three full days' expo, conferences, panel discussions and 'Awards night' along with the entertainment segment go very smooth at near perfection level. We also wish to thank all leading business and corporate houses for being with us as strategic partners and consenting to take up independent responsibility in lending support and executing an array of responsibilities (at different categories and levels).

Coming to the rich content of the journal, thematic article on "Fire - Life Safety, Security and Building Services – An Integrated Approach" includes a scholarly article contributed by none other than Pankaj Dharkar, FSAI International President. He deals with the aspect of "Integration of MEPF Services in Tall Buildings - Challenges & Trends". This piece of technical narrative can be used as a ready reckoner for all those involved (directly or indirectly) in designing and building structural work as well as their application/ maintenance and upkeep.

Then we have a masterpiece write-up on "Remediation of Fire Safety in Garment Factories – A case study from Bangladesh" provided by Felipe Herrera. MM Bhuskute, FSAI Training wing Chairperson has contributed an exhaustive view on "Portable Fire Extinguishers" also known as "Life Saving First Aid Firefighting Appliances".

Next is "Implementation of Job Safety Analysis (JSA) Methodology in Fireworks Manufacturing" - a paper by - Anurag Pandey, Manish Tripathi, Sahib Singh Chadha, Shubham Tripathi, Dr Bikarama Prasad Yadav, highly relevant looking at the upcoming Diwali festivities. An abstracted article from NFPA Journal – "Mind the gap" about the detecting/ sealing of flame ingress points along buildings gauged against the inherent need for 'frequently opening and closing type doors in hospitals' by Jesse Roman is yet another information packed piece of writing.

Also including the "Good fire safety practices" in the format of a picture gallery", brainstorming quiz and other regulars, the journal will keep you engaged through every page!

Relax and enjoy the pleasure of reading.

Yours sincerely,

A handwritten signature in blue ink, appearing to read 'KNK Murthy'. The signature is stylized and fluid.

KNK Murthy
Editor - FSAI Journal

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FSAI AWARDED BEST ASSOCIATION



Garry Singh receiving the award on behalf of FSAI

Fire & Security Association of India (FSAI) got knighted as the “Best Association – 2018-’19” by “India Association Congress (IAC)” held between 23rd & 24th of August ’19 at Gurugram, Haryana.

IAC is an accredited “Apex consortium” empowered to oversee and monitor the functioning of many member organizations in the country through a proven and time-tested networking. In that process, our rating has been observed worthy for bestowing the above recognition. As highlighted by the National Executive Committee of FSAI, deservedly it is a “significant milestone in the organization’s 17 years of perseverance, dedication and commitment towards a safer and more secure India.”

The specific performance highlights which drew the attention of the jury were the quality & quantum of the relevant promotional initiatives followed by the scheduling and uninterrupted as well as flawless

execution of the same. They constitute training, seminars, workshops, tek talks, conferences, congregations, conclaves and expos at regular intervals. Such endeavors reflect our national level outreach and large cross-sectional coverage among metropolis, other cities, towns, suburbs and rural areas. The latest, highly relevant and novel addition in this endeavor is the introduction of an exclusive “Women and Children Safety” programme. Besides, we have already embarked upon the opening of separate chapters for ‘Women’ and ‘Schools’ at mass level.

Types of programmes being organized by the association include awareness creation on almost all aspects of life cum asset safety concerns in general with additional emphasis of fire prevention, control, migration and personal cum societal security.

Technically and professionally, FSAI’s facilitation efforts are being

deeply felt and appreciated among architects, designers, engineers, consultants, entrepreneurs, standard formulators, regulators, govt. authorities, builders, industries, automation developers, risk rating auditors, underwriters, educational institutions, Medicare units, hospitality sectors and an array of professional agencies/ organizations in fire cum security service domain.

The highly innovative motivational campaign such as the ongoing ‘Surakshit Bharat’ initiative is becoming popular among the masses. In sequel, the Walkathon, Marathon, Mountaineering and a variety of healthy contests including firefighting/ rescue drills, first aid classes, blood donation camps, tree plantation drive etc., have been found by the jury as exceptionally innovative and worthy of emulation.

Above all the ‘Bravery Awards’ of FSAI consists of identification, selection, appreciation and recognition of the valiant efforts by deserving individuals or groups in the field of fire service and security. They cover the aspects of rescuing/ saving of innocent lives as well as invaluable cum hard earned assets getting trapped in fires, mishaps or security related turmoil. This deed provides us unmatched happiness and satisfaction as compared to any other attribute of virtue or goodwill gesture we can demonstrate.

By virtue of ‘winning’ accolades like the “Best Association” status, FSAI would like to strive harder with earnestness as well as sincerity, thereby ‘winning’ the hearts of all citizens of the county at large. ■



PACC 2019
SEVENTH EDITION
Project Heads, Architects & Consultants Conclave

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*Curtain raiser to the gala event at
Hotel Grand Hyatt, Dubai between 26th to 29th of September 2019*

PACC (Project heads, Architects & Consultants' Conclave) also christened as a flagship event of FSAI, the association shall be hosting its 7th edition of this phenomenal event that yields an overwhelming response year after year, since the time of its inception. This time, organized at the commercial and cultural citadel of UAE, backed by the highly inspirational feedbacks being received for this event during past 6 years, being held at exotic locations across the world, this one also will be an exceptionally great treat to watch, feel and walk through. The opportunity to meet, listen to and do networking shall be unparalleled, a rare opportunity so to say! Delegates, irrespective of their business or occupation, will have something unique and purposeful to take back. There shall be a thematic (Surakshit Bharat) Opening Ceremony and an Inaugural Function that will be graced by a galaxy of Guests of Honour, who have confirmed their participation. This shall be followed up by general, focussed and plenary sessions chaired by great leaders in PACC arena (from India as well as overseas) and conducted by experts in respective fields of deliberation. Most of the sessions shall also be punctuated by insightful Panel Discussions moderated by leading personalities associated with each discussion agenda and participated by dignitaries who have done various studies and researches on respective subjects being covered. Above all, the event shall be crowned by a '3 day' high-tech exhibition (including distribution of catalogues, appraisal by experts, demonstration, working model displays etc.) Needless to mention that there shall also be a much needed and well deserving spirituality driven discourse. In this process our friend, philosopher and guide, a universally respected and adored guru of Shri Swami Narayan Cult - His Holiness Mahant Swami Maharaj, will add a divine, motivational and positive aura amid the ambience. In addition to knowledge sharing sessions being planned meticulously, there are adequate arrangements in place like conducted tour of Dubai, variety of entertainment sessions and also a special Award Night, creating heightened curiosity and excitement!

Eminent personalities who have added value addition to this gala event in the previous years bears testimony to the fact that the tradition is much in sync this year as well, as the participation and insights of these stalwarts is the core purpose of organizing this mammoth event, that will eventually benefit the cross-section of society, with professionals

from multifold fields gathering together, sharing their invaluable knowledge and proposing solutions for betterment and excellence in varied fields, amalgamating into a composite thought process and implementation techniques for fire and security, at large.

Eminent speakers who have agreed to spend some of their precious time in Dubai to be among the delegates and share their views on the movement and initiatives of FSAI are:

1. Shri Pujya Brahmavihari Swami, BAPS Swaminarayan Sanstha
2. Dr. Vikram Singh, Former Officer of Indian Police Service, 1974 batch; Former Director General of Police, Uttar Pradesh
3. A Sr. Representative from M/s, Anand Tatu, an Ahmedabad based complete design organization established in 1984, having professional practices in architecture, planning and interior designing, pan India for more than three decades now.
4. Puneet Garkhel, Partner, PWC, Global Intelligence & Strategic Threat Advisory Services
5. R. George John, Design Director, RC Architecture, one of the co-founders of RCA, George is an award-winning designer and has over 20 years of experience in Design and Architecture Founder – ICECD
6. Ar. Charanjit S. Shah, Principal Architect, Creative Design
7. Dr. Hina Shah, Entrepreneur
8. Anand Sanghvi, Director, Panchshil Realty
9. Deepak Rao, Extra Sensory Perception Experience
10. Ganesh Nayak, Chief Operating Officer and Executive Director, Cadila Healthcare Limited.
11. Dr. Prabhat Rahangdale, Director, Maharashtra Services & CFO, Mumbai Fire Brigade
12. D.K. Shami, Fire Advisor, DG FS, CD & HG, Ministry of Home Affairs, Govt. of India
13. Mr. Maroof Raza, Defence & Security Specialist
14. Jaya Row, one of the most powerful speakers on Vedanta, the oldest management school in the world.

PACC, a highly acclaimed event that has created verve and its distinct mark across the world, this time around, keep glued to Dubai, as all the action is planned in the illustrious city. Meeting professionals across various fields offers unique opportunities for networking and business propositions; each one in a frame of mind that's away from the hustle bustle of their busy routines, gives birth to fresh ideas and innovative solutions, proving worthwhile at individual as well as huge collaborative levels; with driving perspectives and advanced techniques, it's a one of its kind platform, where business is blended with pleasure, giving a double treat to one and all! This time too, the event is all set to match up to the expectations that it has raised through its previous editions. History in the making, yet again, PACC, here's to huge success in the becoming! ■

PACC 2019 AGENDA

Day 1: 26th September 2019

12.00 pm - 05.30 pm	Registration, Lunch, Check-In & Leisure Time
05.30 pm - 07.00 pm	Departure to Bab Al Shams
07.00 pm - 07.30 pm	Arrival with Ceremonial Welcome
07.30 pm - 07.45 pm	Welcome Performance
07.45 pm - 08.00 pm	Welcome to PACC 2019 by FSAI team
08.00 pm - 08.20 pm	Welcome by Curtain Raiser Partners
08.20 pm - 10.00 pm	Entertainment & Welcome Dinner
10.00 pm	Departure to Grand Hyatt

Day 2: 27th September 2019

09.00 am - 09.10 am	Inauguration of PACC 2019
09.10 am - 09.15 am	Address by Mr. Pankaj Dharkar, International President, FSAI & Chairman PACC 2019
09.15 am - 09.20 am	Address by Mr. K P Dominic, National President, FSAI
09.20 am - 09.25 am	Address by Mr. Ashish Dhakan, Managing Director, Prama Hikvision
09.25 am - 09.35 am	Ayala Dance performance, courtesy Dubai Tourism
09.35 am - 09.45 am	Address by Chief Guest
09.45 am - 10.00 am	Welcome by Motivational Session Partners
10.00 am - 10.45 am	Motivational Speaker - Pujya Brahmavihari Swamiji, Akshardham
10.45 am - 11.05 am	INAUGURATION OF EXPOSITION & NETWORKING TEA BREAK
11.05 am - 11.25 am	TECH TALK 1 - Modern Day Security Challenges - Mr. Maroof Raza, India Defence Analyst

TRACK 1 - Fire Challenges in High Rise Buildings

11.25 am - 11.35 am	Importance of Valves in Fire Fighting, Presentation by Sant Valves
11.35 am - 11.55 am	Case Study by Mr. Roy Fernandes, Project Director, Jensen Hughes
11.55 am - 12.40 pm	PANEL DISCUSSION - Fire Challenges in High Rise Buildings Moderator - Mr. Pankaj Dharkar, President, Pankaj Dharkar & Associates
12.40 pm - 12.50 pm	Open House for Q & A
12.50 pm - 01.10 pm	TECH TALK 2 - Growth Opportunities, Indian Reality Markets - Mr. Jaxay Shah, Chairman CREDAI
01.10 pm - 01.50 pm	LUNCH BREAK
01.50 pm - 02.10 pm	TECH TALK 3 - Understanding Changes in NBC 2016 Shri. Sanjay Pant, Head Civil Engineering, Bureau of Indian Standards

TRACK 2: Securing Public Spaces

02.10 pm - 02.30 pm	Latest Security Trends, Presentation by Honeywell
02.30 pm - 02.50 pm	Case Study by Mr. Tinku Acharya, Founder & Managing Director, Videonetics
02.50 pm - 03.35 pm	PANEL DISCUSSION - Securing Public Spaces Moderator - Mr. Gautam Goradia, CEO & Managing Director, Hayagriva Software
03.35 pm - 03.45 pm	Open House for Q & A
03.45 pm - 04.05 pm	TECH TALK 4 - Success Story - Mr. Ganesh Nayak, Managing Director, Zydus Cadilla
04.05 pm - 04.15 pm	TEA BREAK
04.15 pm - 04.35 pm	TECH TALK 5 - Success Story TBA

TRACK 3: Electrical Hazards & Safe Practices

04.35 pm - 04.45 pm	Fire Safe Cables, Presentation by RR Kabel
04.45 pm - 05.05 pm	Case Study by Ms. Sujata Gupta, Technical Director, CKR Consulting Engineers, Dubai
05.05 pm - 05.50 pm	PANEL DISCUSSION - Electrical Hazards & Safe Practices Moderator - Mr. Pradeep Sheth, MD, INI Design Studio
05.50 pm - 06.00 pm	Open House for Q & A

AWARDS NIGHT

07.30 pm - 07.35 pm	Welcome by Mr. Suresh Menon, General Secretary, FSAI
07.35 pm - 07.40 pm	Presentation by Hospitality Partner
07.40 pm - 07.45 pm	Presentation by Awards Partner
07.45 pm - 08.15 pm	Awards Night
08.15 pm - 11.00 pm	Cocktails & Entertainment with Band Rhapsody Out Loud

Day 3: 28th September 2019

09.30 am - 09.40 am	Welcome by Mr. Liaqut Ali Khan, Past President & Member Advisory Board, FSAI
09.40 am - 10.20 am	Motivational Speaker - Smt. Jayshree Row, Vedanta Vision
10.20 am - 10.40 am	TECH TALK 6 - Women as Business Boss; A path towards Financial Independence & Security by Dr. Hina Shah, Founder ICECD
10.40 am - 11.00 am	TEA BREAK
11.00 am - 11.20 am	Tech Talk 7 - Securing Modern Cities by Mr. Stephen Swain, Owner, Security Innovation & Technology Consortium

TRACK 4 - Artificial Intelligence for Security Solutions

11.20 am - 11.30 am	The Latest Trends in E-Surveillance, Presentation by Hikvision
11.30 am - 11.50 am	Emerging IT Businesses in Security Services (SaaS / PaaS / IaaS) by Mr. Pramoud Rao, Managing Director, Zicom
11.50 am - 12.35 pm	PANEL DISCUSSION - Artificial Intelligence for Security Solutions Moderator - Mr. Rajnish Aggarwal, Partner, PDA Consultants
12.35 pm - 12.50 pm	Open House for Q & A
12.50 pm - 01.10 pm	TECH TALK 8 - Success Story TBA
01.10 pm - 01.50 pm	LUNCH BREAK

TRACK 5 - Contribution of IoT & IBMS in Smart Buildings & Cities

01.50 pm - 02.00 pm	Latest Trends in IBMS, Presentation By Johnson Control
02.00 pm - 02.20 pm	Presentation by Mr. Satish Adurkar, Chief Executive Officer, Energy Management and Controls Company
02.20 pm - 03.05 pm	PANEL DISCUSSION - Contribution of IoT & IBMS in Smart Buildings & Cities Moderator - Mr. Ashwin Ijantkar, Director, Epsilon Design Consultancy
03.05 pm - 03.15 pm	Open House for Q & A
03.15 pm - 03.55 pm	BIG8 Debate - Emerging India Markets
03.55 pm - 04.15 pm	TEA BREAK

TRACK 6 - Comprehensive FLS by Integrating all Utility Services

04.15 pm - 04.35 pm	Case Study by Mr. Dharmendra Gandhi, Director Design, Consistent Consultants, Dubai
04.35 pm - 05.20 pm	PANEL DISCUSSION - Comprehensive FLS by Integrating all Utility Services Moderator - Mr. Sandeep Goel, Director, Proion Consultants
05.20 pm - 05.30 pm	Open House for Q & A

Gala Dinner

07.45 pm - 08.00 pm	Welcome Address by Mr. Pankaj Dharkar, International President, FSAI & Chairman, PACC 2019 and Mr. K.P. Dominic, National President, FSAI
08.00 pm - 08.15 pm	Welcome by Gala Dinner Night Partner
08.15 pm - 09.15 pm	ESP Session by Mastermind Deepak Rao
09.15 pm - 12.00 am	GALA NIGHT Entertainment by Band ELEKTRO SUFI

Day 4: 29th September 2019

Breakfast and Check out

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IS 16088:2012



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confirming requirements of A STM F442
Standards : UL 1821 and IS16088 : 2012

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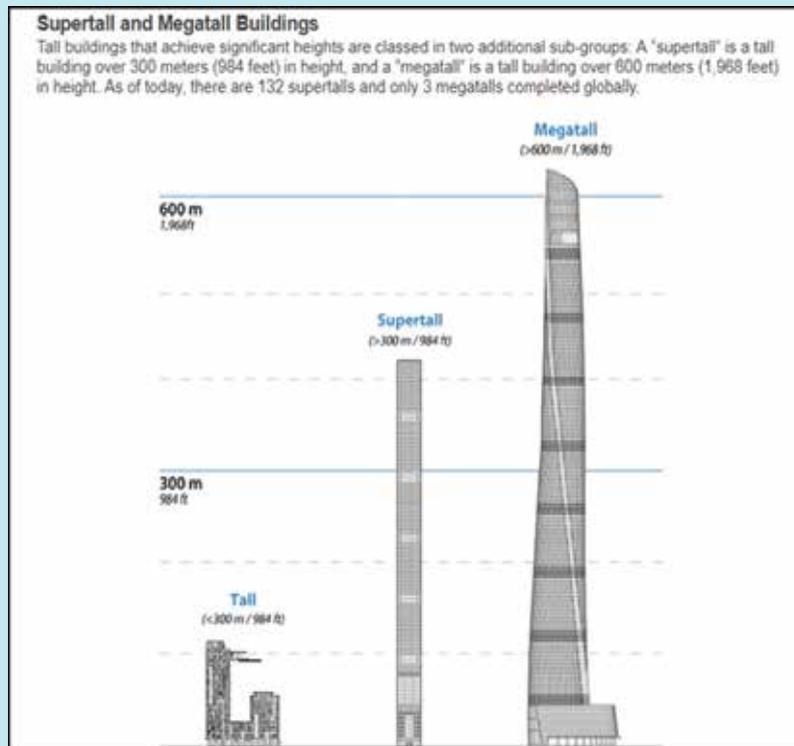
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INTEGRATION OF MEPF SERVICES IN TALL BUILDINGS - CHALLENGES & TRENDS

By Pankaj Dharkar

Preamble:

Tall buildings dotting the sky around the landscapes of all countries have become so familiar that we are now used to them. It could be exceptional at times standing below few of them and just marveling at the magical (but truly factual) heights they have scaled. The trend of high rise buildings started in America and as of now, 50 of the tallest skyscrapers in the world are located in Asia. China is the fastest growing country in terms of skyscrapers whereas Dubai, which has more than 70 skyscrapers whose height exceeds 200 m, is ahead of any other city in Asia. World's most famous BurjKhalifa Tower in Dubai became an 'ever to be seen and enviable' master piece of 'tall building technology'. With an amazing height of 829. 8 meters, 163 floors, 57 elevators, 8 escalators and many other firsts achievable within a single structure, this mansion is a 'mixed use' facility which includes homes, establishments, hotels, parking lots etc., with 24 x 7 occupancy of thousands of people and attracting large number of tourists waiting in serpentine queues all the time. On the Indian front, India ranks 13th in the list of 150m+ completed tall buildings. Mumbai, the commercial capital, has the most number of high-rise buildings in India and is expected to be on the lead with many more high rises and super tall buildings already under construction in the city.



Definition of Tall Buildings:

Tall" above 600m

NFPA defines- High-rise as a building 75 feet (23 m) or greater than measured from the lowest level of fire department vehicle access to the floor of the highest occupiable story.

ASHRAE Technical Committee for Tall Building TC 9.12 has defined – "A Tall Building as one whose height is greater than 91m (300 feet)"

Council on Tall Building and Urban Habitat (CTBUH) defines a tall building as: "One in which the "Tallness" strongly influences the Planning, Design or Use"

CTBUH classifies Tall Buildings into 2 Sub-groups: "Super Tall" as any building over 300m and "Mega

TYPES OF TALL BUILDINGS

1. **Commercial Tall Buildings:** These type of buildings are entirely for commercial use having multi tenant offices at various levels. The core in the centre of the building is common for the tenants at every level with respect to supply of ducting, chilled water/ refrigerant piping and other MEP services.
2. **Residential Tall Buildings:** These are only for residential purpose having mainly two types of area: A) Apartments (Owner's area) B) Public Amenities (Common area which includes Foyer, lobby, club house etc.) Residential

towers usually have number of shafts catering to each flat for different MEP services, while the lift lobbies and other common areas are served separately.

3. **Mixed-use Tall Buildings:** In such buildings usually Retail, Offices and Hotel Public areas are at lower levels while the Guest rooms & Serviced apartments are at upper levels.

Such mixed use buildings are a challenge for the designers of various services due to diversity in its usage and ownership besides safety & security issues.

Importance of Integrated Design Approach in Tall Buildings

Integrated design, is a design process where each component is considered as an important part of a greater whole i.e. Building.

All buildings require integration, at the early stages of the design process because, they involve coordination of complex, interdependent services.

Sustainable design is the thoughtful integration of architecture with Structural, Civil, Electrical, Mechanical, Plumbing and Fire Engineering.

The best building designs result from the early integration of MEPF design with the structural and architectural plans

Successful super high-rise designs are created through an integrated process between architecture, structure, and MEPF systems.



Westin Hotel, Goregaon, Mumbai (Mixed Use)



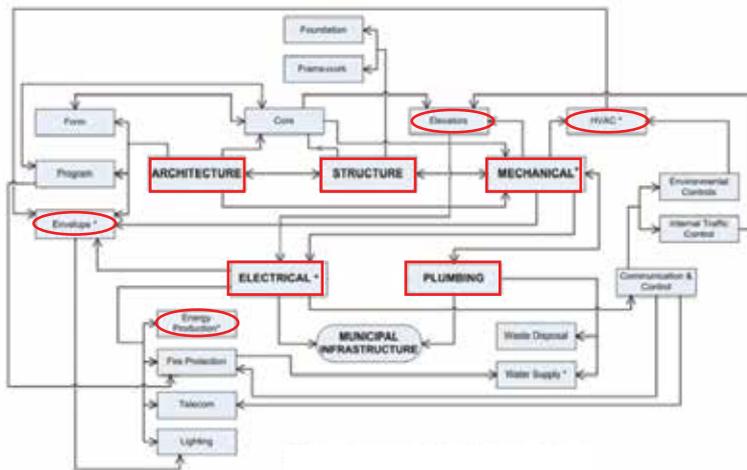
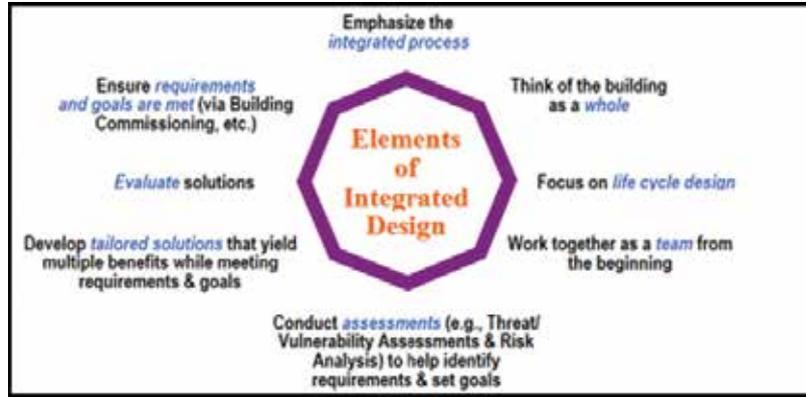
Orchid Crown Residential Tower



City View, Bangalore (Mixed Use)

A fully integrated approach also provides for economical solutions that are easy to implement and require less coordination during the construction phase.

Integrating sustainable design solutions and features into an aesthetically desirable development can be challenging and requires early integration of all project team members in the design process.



Major system/sub-system in which sustainability can be implemented

MEPF Services in Tall Buildings: Challenges

Codes & Standards:

The largest, and often the most overlooked, challenge in designing super high-rise buildings is understanding & following the local practices, culture, codes and standards. The challenge is compounded by the change in space usage from floor to floor, which is typically encountered from parking levels, to lobby areas, to occupied spaces, to mechanical floors.

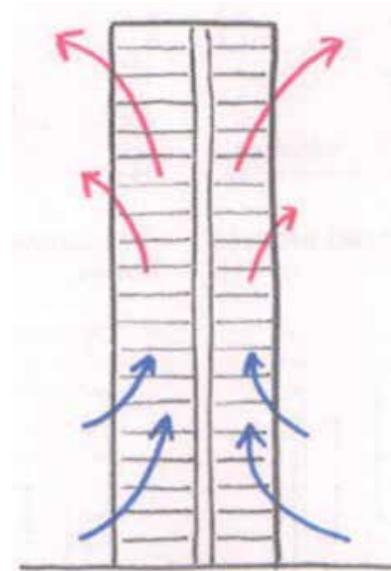
Another challenge is integrating sustainability, reliability of building systems, stack effect, wind effect, infiltration, life safety, and security. The vertical distribution and transportation requirements are quite different. The riser space required to provide power, communications, conditioned air, and elevator access is considerable, and at odds with the desire to maximize usable building area.

		Physical Sub-Systems and Components												
		ARCH			STR.			MEP						
Sub-System	Component	Form	Program	Envelope	Core	Foundation	Framework	HVAC	Elevators	Lighting	Telecom	Fire Protection	Water Supply	Waste Disposal
		ARCHITECTURE	Lobbies	xx	xx	x	xxx	o	o	xx	xxx	x	x	xx
Stairs	x		xx	o	xxx	o	x	o	xx	o	o	xxx	o	o
Space Layout	xx		xxx	xxx	xx	o	xxx	xxx	xx	xx	x	xx	xx	xx
Walls / Partitions	x		xxx	xxx	xx	xx	xxx	xxx	xx	xxx	xx	xxx	x	x
Operable Windows	o		xx	xxx	o	o	o	xxx	o	o	o	xx	o	o
Cladding/Insulation	o		o	xxx	o	o	xx	xxx	o	o	o	x	o	o
Curtain Wall	xx		xx	xxx	o	o	xxx	xxx	o	xxx	o	o	o	o
Ceiling	o	xxx	o	o	o	xxx	xxx	o	xxx	xx	xxx	xxx	xxx	
STRUCT	Lateral Load Resistance	xxx	xxx	xxx	xxx	xxx	xxx	xx	xx	o	o	o	o	o
	Gravity Load Resistance	xx	xxx	xxx	xxx	xxx	xxx	xx	xxx	o	o	o	o	o
MEP	Heat Pumps	o	xx	xxx	o	o	o	xxx	o	o	o	o	x	o
	Chiller	o	xx	xxx	o	o	o	xxx	o	o	o	o	xx	o
	Boiler	o	xx	xxx	o	o	o	xxx	o	o	o	o	xx	o
	Duct / Piping	o	xx	o	xxx	o	xxx	xxx	xx	o	o	o	xx	xx
	Shafts	o	x	o	xxx	x	xxx	xxx	xx	o	o	xx	xx	xx
	Air Return	o	o	xxx	x	o	o	xxx	o	o	o	o	o	o
	Air Supply	o	o	xxx	x	o	o	xxx	o	o	o	o	o	o
	Plumbing	o	xx	o	xx	o	xx	xx	o	o	o	xxx	xxx	xxx
	Fuel Cells*	o	x	xxx	o	o	x	xxx	o	xx	o	o	xx	o
	PV Cells*	xx	x	xxx	o	o	x	xxx	o	xx	o	o	xx	o
Wind Turbines*	xx	x	xxx	o	o	x	xxx	o	xx	o	o	xx	o	

* Sustainable Components

Key: Degree of influence
 xxx Major
 xx Moderate
 x Minor
 O N/A or Rare Influence
 Influences of physical sub-systems and components

		Physical Sub-Systems and Functions											
		ARCH				STR.			MEP				
Sub-System \ Function	Form	Program	Envelope	Core	Foundation	Framework	Elevators	HVAC	Lighting	Telecom	Fire Protection	Water Supply	Waste Disposal
	Life Safety	o	xx	x	xxx	xxx	xxx	x	x	x	xx	xxx	xx
Structural Stability	xxx	xx	x	xxx	xxx	xxx	o	x	o	o	o	o	o
Waste Disposal	o	o	o	o	o	o	o	o	o	o	o	xx	xxx
Electrical Supply	o	x	o	o	o	o	xxx	xx	xxx	x	x	o	o
Water Supply	x	o	o	o	o	o	o	o	o	o	o	xxx	xxx
Indoor Temp. Control	xx	o	xxx	o	o	o	o	xxx	x	o	o	o	o
Vertical Transport	x	xx	o	xxx	o	x	xxx	o	o	o	o	o	o
Interior Illumination	xx	x	xxx	o	o	o	o	o	xxx	o	o	o	o
Water Infiltration Control	xx	o	xxx	o	o	o	o	o	o	o	o	o	o
Day Lighting	xxx	xx	xxx	o	o	o	o	o	o	o	o	o	o
Organization	xxx	xxx	x	xxx	o	o	xx	o	x	o	xx	o	o
Energy Conservation	xx	xx	xxx	o	o	o	x	xxx	xxx	o	o	o	o
Communication	o	xx	o	o	o	o	xxx	xxx	x	xxx	o	o	o



Stack effect

Climate at Higher Altitude:

Ambient Climate conditions vary with altitude and such changes can seriously affect the load calculations and also the overall performance of Super and Mega tall buildings. Elevation specific Climate data is of importance for design of mega & super tall buildings since the temperature & wind 100m above grade is not same as 600m.

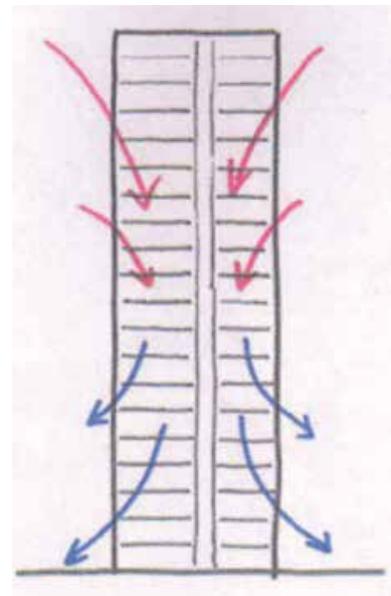
effect occurs in cold climate when air enters from the lower floors and exits from top floors whereas Reverse Stack effect occurs in warm climate when air will enter from upper floors and exit at lower floors. The stack effect must be considered in the system design and will often require considerable fan speeds to generate the necessary air-flow to overcome the stack effect.

Stack Effect:

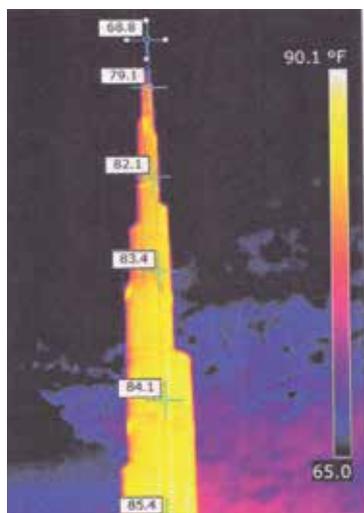
This condition exists in tall buildings when outdoor temperature is significantly lower or higher than the temperature inside the building. Stack

Lateral & Vertical Loads:

One of the biggest challenges in case of tall buildings is to create a design which can cater to the Vertical Gravity loads comprising of dead & live loads and Lateral Loads due to Wind and Earthquakes.

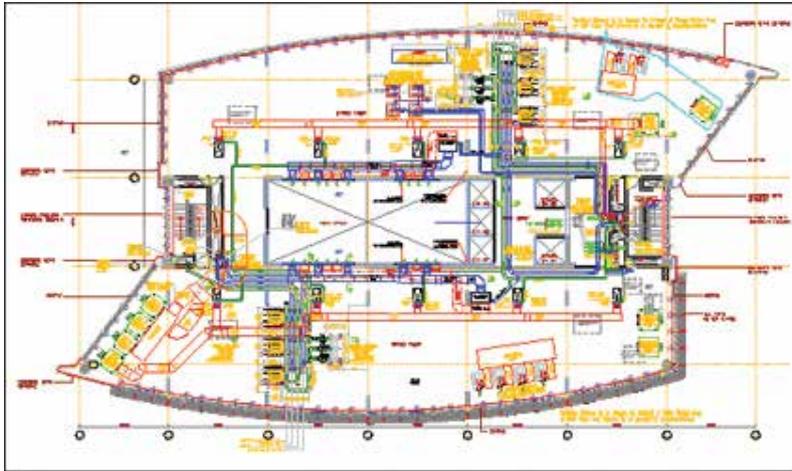


Reverse stack effect



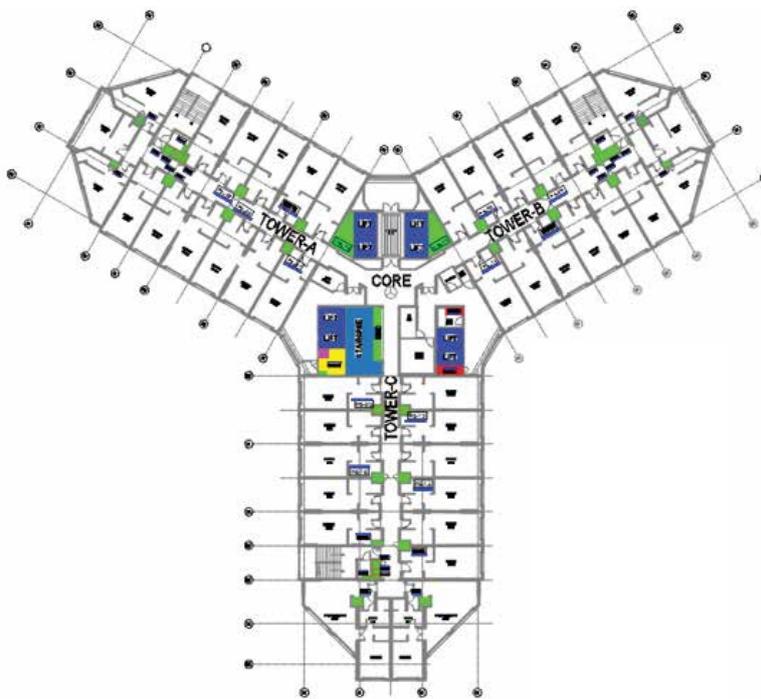
Temperature distribution over the height of Burj Khalifa

Floor	height	OSAT		Floor	height	OSAT	
197	1988	87.03	Hotel	197	602	30.57	
190	1890	87.38		190	573	30.77	
180	1792	87.88		180	543	31.05	
170	1694	88.38		170	513	31.32	
160	1596	88.88		160	484	31.60	
150	1498	89.37		150	454	31.87	
140	1400	89.87		140	424	32.15	
130	1302	90.37		130	395	32.43	
120	1204	90.87		120	365	32.71	
110	1106	91.37		apartments	110	335	32.99
100	1008	91.87			100	305	33.26
90	896	92.36			90	272	33.54
80	798	92.86			80	242	33.81
70	700	93.36			70	212	34.09
60	602	93.86			60	182	34.37
50	504	94.36		offices	50	153	34.65
40	406	94.86			40	123	34.93
30	294	95.35			30	89	35.20
20	196	95.85	20		59	35.48	
10	98	96.35	10		30	35.75	
1	14	96.80	1		4	36.00	



CORE DESIGN:

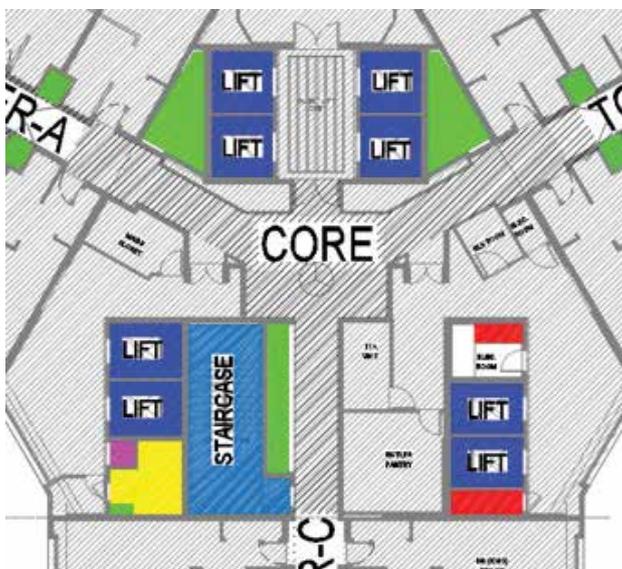
The core design is extremely critical since it impacts the usable floor area so often planned in tightest possible manner which can affect provision for mechanical and electrical services. Core Area has to be sufficient enough to accommodate: Fire Stairs, Elevators, Electric & communication closets, Toilets, Fan rooms, Shaft space for HVAC risers, space for HVAC & plumbing piping & electrical cables along with BMS and Fire alarm system.



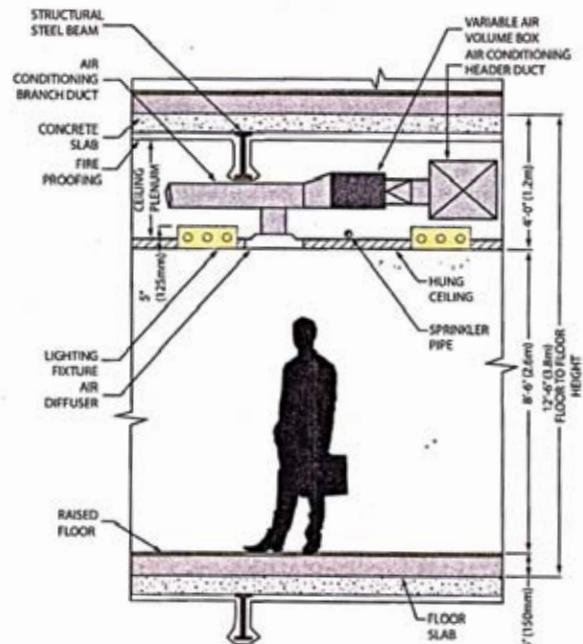
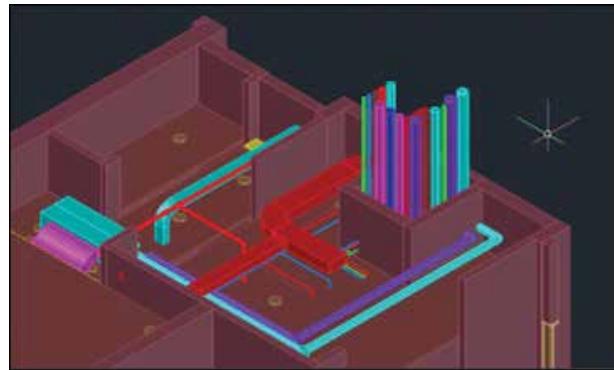
Central Core provides maximum flexibility in terms of services design and also has structural advantages, but if the floor plate is large multiple cores may be provided in a tall building. In hot and humid climate, the cores on east and west and glazing on the north and south façade can minimize the cooling loads.



Central Core provides maximum flexibility in terms of services design and also has structural advantages



HOTEL LEELA, GANDHINAGAR TYPICAL FLOOR SHAFT DETAILS			
Abbreviation			
PS	Plumbing Shaft		
MS	Mechanical Shaft		
FS	Fire fighting Shaft		
LOCATION	DESCRIPTION	SHAFT SIZE IN MM	
Wing A	PS - 01	1200	850
	PS - 02	1200	650
	PS - 03	1200	1000
	PS - 04	1200	1000
	PS - 21	1200	1000
	PS - 22	1200	1000
	PS - 23	1200	1000
	PS - 24	900	575
	FS - 01	1250	900
	MS - 01	900	525
	MS - 02	900	425
	MS - 03	1000	400
Wing B	PS - 05	1200	1000
	PS - 06	1200	1000
	PS - 07	1200	650
	PS - 08	1250	900
	PS - 09	900	575
	PS - 10	1200	1000
	PS - 11	1200	1000
	PS - 12	1200	1000
	FS - 02	1250	900
	MS - 04	900	425
	MS - 05	900	525
	MS - 06	1000	400
Wing C	PS - 13	1200	1000
	PS - 14	1200	1000
	PS - 15	1200	1000
	PS - 16	1200	1050
	PS - 17	1200	1050
	PS - 18	1200	650
	PS - 19	1200	1000
	PS - 20	1200	1000
	FS - 02	1250	900
	MS - 07	900	425
	MS - 08	900	525
	MS - 09	1000	400
CENTRAL CORE	MS - 10	Near Lift	
	MS - 10	Near Lift	
	MS - 12	2000	800
	MS - 13	3000	1000
	MS - 14	3100	3000
	MS - 15	6400	900



Floor To Floor Height:

The overall cost of a building is affected by Floor to Floor Height of each floor so entire focus is on keeping the height to a practical minimum which can become very challenging for designing & selection of HVAC system, Lighting fixtures, Sprinklers etc.

Space constraint poses challenges for designing & selection of MEPF system & Close coordination required.

MECHANICAL EQUIPMENT ROOM (MER)

Planning and design for proper and appropriate mechanical system and MERs is an important part

of the architectural design. Overall design should provide for proper headroom, access and reach, as well as gauge lighting and display visibility, location within the building, ceiling height, ductwork design, shaft placement and location, zoning, sufficient floor space and, most importantly, clearances and service access points. This will ensure the mechanical system design performs as required and will optimize overall space requirements.

Since the MER is typically adjacent to other spaces – vertically or horizontally, it is important to consider the containment of sound. The equipment removal and replacement routing should

also be shown on the architectural design plans for new and future equipment placement.

In most buildings, the MER is not considered prime area so it is usually given leftover space in a basement or a lost corner somewhere. However, The location of the MER is very important since it will affect the architecture of the space. Creating space for access to and maintenance of equipment is an important consideration to keep the system in good working condition.

An Air Handling Unit (AHU) requires outside air and plumbing / electrical services have to be near the perimeter of the building. Shaft placement and location is key to

minimizing and right-sizing of main distribution and cost.

ositioning the MER too far will result in longer duct runs, larger trunk lines and, ultimately, lower ceiling heights. However, keeping it near public spaces may not be the best acoustically, as the units are usually very loud. Zoning the mechanical systems into multiple MER locations adds redundancy in the system and also gives the ability to interconnect, providing backup capabilities to the MER plants.

LIFE SAFETY

Super-tall buildings are vertical cities. Occupant safety and evacuation are major factors. The trend is to direct people to refuge areas and use elevators to move people from these areas.

Super high-rise buildings must comply with building code requirements for increased structural integrity and additional sprinkler risers.

From a life-safety standpoint, the primary engineering challenge is enabling safe egress over the extended period of time it takes to evacuate a super high-rise building.

Unlike a typical low-rise building, where full evacuation usually is accomplished in as little as 20 to 30 min, evacuation from a super high-rise can take more than two hours.

Fire and smoke alarm, sprinkler system, method of evacuation, refuge area and lifeboat concept, egress stairwell pressurization, fireman elevator lobby pressurization, and elevator lobby pressurization are challenging key elements.

High-rise building will require intermediate tanks and pumps to fill the tank at the highest level to provide gravity feed for the suppression system.

Water booster pumps at the intermediate level are provided

for fire department use. For safety, dual risers are provided with cross connection at the floors.

For multi-use buildings that include office, hotel, residence, retail, a fire command center is provided for each entity in addition to the central command.

Provision of an emergency voice communication system in addition to an audible fire alarm system in super high-rises will improve occupant notification

Control of smoke migration through the building is another challenge

Advances in high-pressure/high-efficiency water pumps are allowing sprinkler systems in much taller buildings to be served using ground-level water supplies.

Use of high-pressure water mist sprinkler systems can result in a substantial reduction in the amount of water needed to suppress a fire and can greatly reduce the quantity of water that needs to be supplied to the uppermost

portions of super high-rises.

The other aspects of critical importance for Tall & Super Tall buildings are also - Vertical Transportation; Electrical Systems & Plumbing Systems which require a lot of expertise and factoring of multiple issues. Since these are detailed subjects in itself, these are not covered over here.

Planning for Fire and Life safety in our buildings is very important and it is based on three major components:

1. First is an understanding of potential threats to occupants and the building itself
2. The second component is building design which includes:
 - Defensive Architectural design
 - Efficient Engineering systems
3. The third component is the operational plan

An Integrated Design Process, where all the design team members understand each other’s goals, will lead to the development of a SAFE solution.”



Fire Safety Design Solutions

Role of Architects / Consultants

(i) Building description & use:-

No.	Particulars	Responsibility
1	Bulk area location – Site & Geometry + Usage area	Fire Service Engineer / Designer
2	Occupant and Load assessment	Fire Service Engineer / Designer
3	Occupancy type and characteristics	Fire Service Engineer / Designer
4	Hazard based fire load calculation	Fire Service Engineer / Designer
5	Identification of likely fire scenarios and corresponding hazard category	Fire Service Engineer / Designer
6	Site water supply availability and pumping facility needs	Fire Service Engineer / Designer

(ii) Design philosophy

No.	Particulars	Responsibility
1	Design intent and methodology based on compliance needs.	Fire Service Engineer / Designer
2	Legal environment for regulatory compliance	Fire Service Engineer / Designer
3	Record of outcome of key discussions with Fire service dept.	Fire Service Engineer / Designer

(iii) Means of escape

No.	Particulars	Responsibility
1	Number and location of escape routes	Architect
2	Escape route width, capacity, travel distance or time	Architect
3	Extent of fire protection of escape routes	Architect
4	Visibility in escape routes / exit signage	Electrical Engineer

(iv) Fire Safety Systems

No.	Particulars	Responsibility
1	Active Fire Protection systems (Fire alarm, emergency warning and intercommunication system, detection and suppression systems)	Fire protection engineer
2	Smoke control systems	Mechanical Engineer / Electrical Engineer / Architect
3	Fire hose reels, extinguishers, first aid, fire fighting	Fire protection engineer / Architect

(v) Internal Spread of Fire

No.	Particulars	Responsibility
1	Fire resistance ratings, Compartmentation/ separation	Architect & Structural Engineer
2	Smoke Compartmentation/ separation	Architect
3	Penetrations (Building services)	All Building services engineers
4	Internal surface finish limitations	Architect and building services engineer
5	Doors, access panels and other closures in smoke & fire separations	Architect
6	Fire load limitations	Fire Designer

(vi) External Spread of Fire

No.	Particulars	Responsibility
1	Fire separations : fire resistance rating and location	Architect & Structural Engineer
2	Fire Compartmentation (If different for control of external fire spread)	Architect & Structural Engineer
3	Site plan showing property and national boundaries	Architect surveyor
4	Control of external vertical fire spread (elevations)	Architect
5	External surface finish limitations	Architect

(vii) Fire Service Access & Fire Fighting facilities

No.	Particulars	Responsibility
1	Fire service vehicle access and attendance point (this may not be necessary for mirror alterations to existing buildings)	Architect, civil Engineer, fire protection Engineer
2	Facilities in and around the building for fire service use	Architect & Fire protection Engineer
3	Hydrant outlets and hose coverage	Architect & Fire protection Engineer

(viii) Construction monitoring

No.	Particulars	Responsibility
1	For special maintenance or operational requirements (e.g. for improved reliability) : special control systems and/or Interface	Building owner/ project manager

(ix) Compliance schedule

No.	Particulars	Responsibility
1	For all safety related specified systems	Building owner/ project manager

(x) Miscellaneous information

No.	Particulars	Responsibility
1	Information for the BCA for building code compliance	Fire designer/ design manager

Important Role of Architects

Architects play a very important role in the design of a building. During the design process of a building, primary factors that an architect needs to consider for minimizing the risk of incidences of fire & the spread of fire are –

- The functional requirements or purpose of the building.
- The position of various building elements and components.
- The use or specification of building materials.
- Provision for adequate means of escape in the event of fire.
- The protection of structural elements of the building.
- The architect is required to bring together all relevant information in form of acts, byelaws, standards, codes of practice and regulations appertaining to the fire safety of buildings.

It is said that Futuristic Cities are architect's paradise. The developers want architects to be more & more imaginative, innovative and unique in their designs. At the same time, It

is a big challenge for the architects to design buildings, which are not only visually striking but also safe and functional.

However, Architects are getting more and more creative with their designs specially in case of Tall Buildings. Buildings being designed today are more complex with unique façade designs like Double curtain walls, twisted facades, curved glazed surfaces, rotating floor plates etc and also Atriums which have become popular since these allow adequate day light at lower floors, create outdoor atmosphere, are visually attractive, provide recreational spaces for public interaction and also economize the use of cooling, heating and lighting.

However, these new design features come with their own fire risks viz. Fire at Atrium Floor can fill the Atrium with smoke and can spread floor by floor also the risk of Fire spreading through articulated elements of the façade or vertically around the facade due to fire-leap poses new concerns for Fire Engineering Design.

Dubai has hundreds of tall buildings but still the rate of fire incidences and casualties are very low. As per recent statistics, UAE saw 34 incidents per 100,000 people, this number was significantly exceeded by Paris (17,966 incidents per 100,000 people) Toronto (5,673 incidents per 100,000 people), Frankfurt (2,570 incidents per 100,000 people), London (189 incidents per 100,000 people) and Singapore (105 incidents per 100,000 people).

The risk posed by Glass Façade designs can be very well understood by the below example of Mumbai where the glitzy high-rises with glass facades have attained the dubious distinction of turning into deathtraps during fires –

- A fire in a commercial high-rise at Bandra-Kurla Complex in September 2012 had prompted the BMC to come up with regulations for upcoming glass facade structures.
- The civic body was compelled to pay serious attention to the issue after a blaze struck Lotus Business Park, an eight-year-old

skyscraper in Andheri (West), in July 2014.

- The incident had claimed one fireman's life and injured 20. Firefighters struggled for hours to control the fire as the building had violated many safety norms.



In its bid to make these buildings safe, the Mumbai Fire Brigade has drawn guidelines for glass facade structures that came up before 2012:

- Owners must provide smoke seal/ barriers between the building wall and facade on every floor level in the form of non-combustible material/ vermiculite cement.
- People should be able to open glass panes blocking staircases, lift lobby and corridors.



- Pressurized system of the staircase/ lobby should be synchronised with glass facade window opening mechanism.
- The rules also recommended that a minimum 2.5 per cent of the floor area of each compartment on every floor should be utilised in such a manner that they can be cleared immediately in case of emergencies.
- Fire officials want the refuge area to be built above the height of 1.2 metres from the flooring level. If covered with glass facade, one should be able to access it easily.

On the specifications front, the Architects also have the Fire Rated Glass, which is available in the market. This glass is extremely useful because conventional Glass does not offer much resistance when exposed to fire and shatter within minutes. Heat-treated glasses would last slightly longer but not significantly enough. Fire-rated glass can be used as an effective passive-fire protection tool in the following applications:

- Glazed internal and external fire doors.
- Interior partitions and compartments.
- Vision panels in fire doors.
- Roofs, floors and ceilings.
- Façade glazing.
- Escape and access corridor walls.
- Stairways, lobbies and enclosures to protect shafts.

ROLE OF IBMS

IBMS can play important role in Energy Analytics, Predictive Maintenance as a Service, Integrate Energy Meters for Energy Billing, Integrate DG Sets for DG Set Billing, Integrate Water Meter for Water Consumption Billing, Integrate & Control Complete HVAC Plant, Integrate & Control Electro-Mechanical Systems, and Integrate & Control Security & Safety Systems.

Control Command Station (CCS) of High Rise Building

CCS Software would facilitate Interaction-Configuration, Maps,

Display in the form of Video Wall, Touch Interface; Operations -Video Management, Alert Handling, Incident Management, Facility Management, Quick Search, Asset Locator; Communication-Notifications, Dispatch, Reports, Dash Boards; Collaboration-Messaging, Devices, Systems, Operators; Intelligence -Video Analytics, Pattern Analysis, Predictive Analysis.

Fire Alarm & Evacuation System Sequence of Tasks In Case Of Fire Apart From Early Warning of Fire Alarm, the Fire Alarm and Evacuation System, in case of Fire, also Sends the message to nearest fire station using Auto Dialer; generates the automatic SMS, e-Mail to building's Fire officer and Estate Manager; starts the Lift & Staircase pressurisation fans; switches off the AHU Fans and closes the ducts fire dampers; brings the Lifts to Ground Floor so that commuters cannot use the Lifts; opens the Access Control Doors for exit routes to commuters; starts automatic announcement system through Digital Voice Evacuation System and also brings people to refuge areas for safe passage.

FUTURE TRENDS IN TALL BUILDINGS:

3D and 5D BIM Modelling: BIM helps in integration of designs and plans from architects, structural engineers and MEP contractors in a single work environment; With BIM enabled coordination, mostly all major challenges faced during planning, designing, execution and maintenance is removed and smooth coordinated construction project is carried out; Nowadays, experts prefer 3D Models over the traditional 2D Models; 3D Models give a far better approach towards how the Mechanical, Plumbing and Electrical arrangements are going to take place in a design.

Materials: Engineers are constantly developing higher strength steel and concrete or using newer material (like carbon fibre, graphene, hematene

etc.) to make reinforced concrete having superior performance for the construction of tall buildings to make them stronger, more efficient & economically viable.

Pre-Fabricated Modules: There is a growing trend in construction of high-rise buildings from fully modular system. Pre-fabrication can help in speedy completion of the construction largely as whole parts are built in an altogether different place and transported later at the final site. As labour costs escalate relative to material costs and as the construction safety and quality gain increasing attention, solutions involving prefabricated or manufactured structural components and building modules are gaining increasing popularity.

Pre-Fabricated MEP Modules: There are different forms of prefabrication products in the MEP industry. Fully modular products like Plantroom modules, riser modules, distribution modules and corridor modules, Modular components like HVAC equipment, valves and pipes and elements (parts) like nuts, bolts, threaded bars, GI-sheets. In modular prefabrication, all MEP designs shall have to be finalised at the initial design stage prior to construction onsite. Module transportation, onsite handling and assembly are the key factors that govern the modularisation of MEP systems. In case of HVAC Plant Room, quality of a weld connection can be improved significantly if done offsite and it improves the safety as well. Coupling is a difficult task, especially between two heavy modules. Whereas, flange and flexible connections are ideal for onsite assemblies.



Source : pisaatky.com

CONCLUSION

Tall buildings are a matter of pride as vis a vis the vertical development of urban cities is concerned. With integrated safety engineering designs that consist of an amalgam of important facts, if these are duly adhered to, then there is immense scope in terms of expansion of the concept and greater feasibility in terms of mutual co-existence in the city borne scenario. Some points that duly need to be attended to include good quality construction with excellent workmanship; Strict adherence to all National/ International codes; Implementation of high levels

of maintenance; Installation of suitable fire protection system, which is duly commissioned, tested and periodically examined as well as recertified for surveillance; Availability of portable extinguishers of proper standards and approval; Training and mockup exercises involving all occupants or building users (in case of residences or office facilities respectively as applicable); Periodical surveillance audits and certification by independent external experts; Clearance of roads and accesses like walkways, staircases, exit routes etc., without obstruction; and Prohibition on the use of facilities for any unauthorized purpose. ■



Pankaj Dharkar, Fellow in ASHRAE & IGBC, has completed more than 3500 MEP projects & is currently associated with more than 300 projects out of which 60 projects for Green Building Certification with registration footprint of 1.50 crore sq.ft., which include 14 PLATINUM Certified Projects. He has 38 years of rich experience. He is Past National President of ISHRAE & FSAI/ Past Asst. Regional Chair RAL of ASHRAE. He is member of IGBC/ member of USGBC/ IPA/ UL Fire Safety Council/ Solar Society/ NEPA & CTUBH. He is also voting member of Tall building committee of ASHRAE – 9.12 & Residential Comm. of ASHRAE. He chaired super CRC for ASHRAE with participation of 40 countries in Bangkok in 2016. He is currently the International President of FSAI. He is also Chairman for the Council for Green & Eco-Friendly Movement (CGEM).



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Remediation for FIRE SAFETY OF GARMENT FACTORIES in Bangladesh

By Felipe Herrera

The pressures that led to the proliferation of dangerous industrial buildings in Bangladesh are present in developing countries around the world. This article describes how processes of large scale and complexity require private sector expertise to ensure that assessments are rigorous in the context of the first steps towards ‘building back better’. It is argued that for a process such as this to be sustainable, the private sector must act by taking an approach to build capacity by transferring knowledge and practical expertise to both the public and private sector. It is hoped that the approach taken and the lessons learnt within will be applicable to future assessment processes and to design for prevention rather than after damaging events.

BACKGROUND

Bangladesh is a young country with a turbulent history. Formed in 1971 in a war of independence from West Pakistan and prior to that from the

violent partition of British India in 1947 it has since undergone famine, flooding and a succession of military coups with a hopeful democracy reinstated in 1991.

Development of the Ready Made Garment (RMG) industry begun in the 1980’s and has since expanded rapidly to the point where it is the second largest producer in the world, with exports of almost \$20 Billion, representing 80% of national exports. The industry provides a vital source of employment to 4 million people, 80% of which are women. This industry has also improved the economic level of many Bangladeshi people and Bangladeshi companies in recent years.

Construction demand generated by rapid and combined urbanisation and industrialisation exceeded the capacity of the construction industry and quality suffered as a result. There are weaknesses in planning, design and construction. The authorities responsible for enforcing planning

laws and design regulations are anaemic whilst pressure on land has seen unapproved building additions. Site supervision and quality of materials are limited. To compound these vulnerabilities appropriate structural, architectural and of course fire safety design is often omitted or simply evaded due to lack of understanding and lack of professional knowledge.

As an example to show the magnitude of the building industry issue, on April 2013 a multistorey factory building known as Rana Plaza made international headlines when it collapsed killing 1,200 people and injuring another 2,500. From a fire safety filed of focus, just months before on November 2012, a large fire at another factory building named ‘Tazreen Fashions’ killed 112 workers and injured 200 others.

The scale of these two disasters and the international spot light they drew had the potential to cripple the industry and Bangladesh’s economy in turn.



Source: Arup

Workers in a garment factory in Bangladesh, where fire safety design flaws exist in vast majority of factories

On May 15th 2013 a group of mainly European garment brands and trade unions signed a five year legally binding agreement known as the 'Accord' to address building safety. This was followed in July by the creation of the 'Alliance' by a group of North American apparel companies, retailers and brands. The Accord and Alliance committed to assessing the 1800 and 800 factories from which their members sourced from. The remaining 1800 were to be the responsibility of the 'National Initiative', with the International Labour Organisation (ILO), a United Nations agency that deals with labour issues, acting on their behalf. This followed on from a high level ILO mission to Dhaka in early May to agree a response with the National Tripartite. The National Tripartite consisting of the Government of Bangladesh, factory employers and workers organisations. In early July 2013 a plan of action was issued that would later be developed into RMG building safety assessment guidelines.

INITIAL PROJECT – GETTING TO KNOW BANGLADESH

In response to a number of fatal garment factory fires in Bangladesh in 2012 – including the Tazreen

fire – a major international garment manufacturer approached Arup in early 2013 to assess fire safety in factories that are part of their supply chain and to propose ways to develop specific improvements in general and for particular buildings. This Spanish manufacturer with a strong corporate social responsibility division were the first to take concrete steps in response. In this way, a private sector organisation took the lead in taking actions and stepping into a void of uncertainties not only for fire safety but for the general construction safety of many factories in Bangladesh.

The Project

The project involved three main tasks or phases. The first phase resided in understanding the fire safety level of the factories in Bangladesh, providing technical advice and building capacity for local engineers.

The second phase consisted in assessing and giving guidance to the local engineers surveying for fire safety improvement of the factories.

The third phase consisted in gathering data from all surveys, organizing it and producing fire safety reports for further decision

In response to a number of fatal garment factory fires in Bangladesh, the government along with other national and international organisations assessed fire safety in factories and proposed regulatory measures



Emergency exit partially blocked with combustible objects



Day care room within a risky storage area

making. Each factory had an independent report showing the key findings. A benchmark criteria had to be developed based on the Bangladesh building code and further technical and practical criteria. These criteria helped us categorize the problems, understand the overall status of many factories and recommend remedial actions.

Relevant Findings

The first visit to Bangladesh and to a few garment factories in June 2013 was a remarkable and emotional experience for the fire engineers adventuring into a land known to have a low level of fire safety but without understanding the extent, the reasons behind and the complexity of the problem that was causing much damage to the society. In order to comprehend the question and propose solutions we had to understand not only the type of construction and designs of existing buildings but also a culture, an industry, the idiosyncrasy of the people and of the factory workers, the social economy, the building design knowledge, the fire safety approvals process and the entire supply and buy trade chain of garments in Bangladesh.

Every fire safety design or project – no matter if it is small or comprehensive and no matter its

location in the globe – requires a similar exercise. The role of the fire safety specialists is complex and requires the fire practitioner to step aside from points of focus to be able to see a larger picture often missed. These issues are very evident in Bangladesh, but they all exist in many other countries.

Soon after initiating this project, we realised that fundamental fire safety design flaws existed in the vast majority of factories, which would not be quickly addressed with rapid remedial measures to specific factories. The problem had to be tackled on an industry wide basis, which meant getting involved in doing factory inspections, sharing fire engineering experience regarding design good practice, helping to build the capacity of the enforcing authorities and local engineers, and identifying a roadmap to a more sustainable situation.

From a larger sociological perspective, it was noticed that the overall problem was also caused by global influences and that required external international institutions to step in and support Bangladesh.

SECOND PROJECT – TRAINING FIRE-FIGHTERS

After the first initial and insightful

project and after the international and national institutions mentioned above started getting involved for fire safety and structural safety improvements, different action projects since 2013 have taken place, one of these being the improvement of fire safety knowledge of Bangladeshi fire fighters who are also partly responsible of checking that fire safety measures are implemented in existing buildings.

The Project

This project succeeded based on the technical and financial support of ILO. The main goal was to build capacity and provide technical knowledge to key personnel of ‘Bangladesh Fire Service and Civil Defense’ (FSCD). The training was developed by European fire engineers for two 1-week modules at the end of 2014.

The main objectives and desired outcomes can be summarised as follows:

- Improve the understanding of the basic design principles behind fire safety engineering practice as envisaged by the Bangladesh National Building Code (BNBC 2006).
- To enable FSCD to assess fire safety issues on garment factories and understand remedial actions

being proposed by reports of Fire & Electrical safety inspections of RMG factories in Bangladesh.

- Improve the understanding of the design principles behind the requirements for means of escape from buildings in the event of fire.
- Improve the understanding of what an Emergency Action Plan (EAP) should consist of and how responsibilities for its implementation in garment factories should be assigned.

Relevant Findings

The FSCD personnel significantly increased their knowledge and awareness of fire safety design issues.

An area identified for further development and where more training was felt to be needed is to develop their capacity to recognise what's missing in the package of fire safety design measures that they observe on the factory inspections.

Clearly, fire safety principles shall be taught and learned within a longer educational process. It was also noted that some fundamental safety issues were completely foreign in the country and that inspections and design techniques have developed so through the years with a gap in these fundamental topics. The most remarkable example is the 'no-protection' of stairs in multistory

buildings, an entire culture of leaving stairs open in factories has started to change, but it will require a couple more years to become understood by all stakeholders and building designers including owners, architects and engineers.

THIRD PROJECT – ANALYSING FACTORIES FOR OVERALL FIRE SAFETY

As mentioned before, the UN Agency ILO agreed with the National Tripartite to assess building safety improvements for factories during a five year period, the other factories were to be assessed by The Accord and The Alliance. This project was part of the first phase of these assessments which consisted in the inspection, reporting and categorization of the safety standings of the factories. During 2.5 years, a total of 3500 factories were surveyed, with ILO having made the largest contribution with 40% of the factories, approximately 1375 factories.

The Project

This third project was part of this initiative assisting ILO with quality assessments of surveyors from Bangladesh University of Engineering and Technology (BUET) and from private contractors surveying factories not only for Fire Safety, but also for Structural and Electrical

The UN Agency ILO agreed with the National Tripartite to assess building safety improvements for factories during a five year period, the other factories were to be assessed by The Accord and The Alliance



Meeting point after an emergency evacuation plan drill

Source: F. Herrera

safety within the framework of a governmental initiative involving different key stakeholders related to the RMG industry in Bangladesh. The main objective has been to carry out assessments in order to identify factories that are unsafe or require remedial action.

This international economic and educational support was assisted by Arup. It involved a first stage for promoting and help sharing fire engineering and safety knowledge to local engineers, fire safety personnel and private local initiatives. Training and technical guidance was also given throughout the surveying process in order to improve the quality of the reports.



This assessment – in contrast to the first initial project presented – involved a larger effort based on a long-run process to assess, guide, improve and refurbish a large amount of factories for clear set out safety improvements.

Relevant Findings

Four fire safety measures or categories were identified as being a priority in terms of ensuring safe evacuation in the event of fire. These are categories found with typical deficiencies throughout factories in Bangladesh:

- Effective fire detection systems
- Automatic fire alarm systems
- Protected escape routes
- Fire separation of areas with unusually high fire loads

In general, most factories have deficiencies on the design, implementation and installation of passive and active fire safety systems, but the above four categories are considered the most critical ones for the safety of the workers. Housekeeping is also a common issue where combustibles many times are located along protected evacuation routes, blocking the routes or simply creating a risk area at the wrong locations. Probably the most critical issue is the fact the most – if not all – multistory factories, have been designed without fire protected staircases.

Instead of focusing on the above four fire safety measures and other relevant ones, five key ‘risk factors’ were determined in order to have a

reference or ‘rule of thumb’ framework of when a factory could have a higher or lower qualitative fire risk. This was based on an analysis of 75 randomly selected reports, an appropriate representative statistical value.

High Rise Buildings – Higher rise buildings have larger potential fire areas, more levels on which fire and smoke can propagate, and longer evacuation times.

Multi-tenancy – Buildings with multiple tenants generate difficulties in terms of integrating safety systems, and management of those systems. They are also more likely to have inconsistent fire safety measures.

Ground floor mixed use – Buildings where the ground floor is divided due to mixed uses are more likely to have unsafe evacuation routes at discharge (ground) level as well difficulties integrating fire safety systems.

Basement – Basements are typically utilised for operations that have higher than average fire risks.

Mezzanine – Mezzanines are more likely to lack adequate fire separation from floors below and may also have extended evacuation distances.

Relatively few factories had basements or mezzanines, but the majority were multi-tenancy and a significant proportion high rise. It is reasonable to assume that where a factory combines one or more of these risk factors, the overall fire risk for occupants in the building will be greater.

Buildings with 2 or more risk factors could be considered potentially ‘high risk’ factories, although the actual level of risk is also influenced by the fire safety measures provided. Based on this approach:

- 31% were considered ‘high risk’; with 12% of these having 3 or more risk factors present;
- 39% present one risk factor;
- 30% present no risk factors therefore can be considered ‘low risk’ in terms of fire safety and safe evacuation.



Evacuation stair partially blocked with combustibles

Source: F. Herrera



Felipe Herrera training local fire fighters

Source: G. Falle

Ongoing Training Project

An additional ongoing project is presented here to show how the different national and international initiatives are developing and seem to be leaving a legacy beyond the assessment and remedial tasks for factory improvements.

The Accord is interested in delivering a comprehensive training program to their local engineers in the fields of fire, structural and electrical engineering. The idea is to look ahead and build capacity and skills that the engineers will require in the future to successfully deliver projects in Bangladesh.

Different levels of training are being required within the fire course to suit different roles on projects, e.g. technical or project manager, or coordinator.

The training will develop discipline specific knowledge of participants in Structural, Fire and Electrical engineering, but will also aim to give participants a broader multi-disciplinary appreciation of other areas of building design and the regulatory context.

The training will include modules applicable to all 3 disciplines, but most will be specific to a particular discipline. Relevant topics to be covered are:

- Technical surveys
- Design of new buildings
- Retro-fitting and remedial works
- Building Codes and Standards
- Regulatory framework and procedures

Conclusions

These learnings are relevant to Bangladesh and the ongoing initiative, but are also relevant to the international public and fire safety practitioners taking part in the design of new buildings and in the improvement of existing ones in developing and in developed countries.

The projects described above



Source : F. Herrero

Evacuation route partially blocked with combustible objects

exemplify that fire safety implementation in buildings requires the involvement of many stakeholder teams, where each one of the teams involved needs to have certain skills and fundamental knowledge. The stakeholders need to understand their roles and have a clear action route to be provided by a framework of governmental procedures and law enforcement. This has proven to be complex in many developing countries and where a long route of administrative reforms and educational developments are still required.

Fire engineering, computational models, modernization of fire protection systems, technological advances, all have improved a lot in the past three decades. Universities are now more and more involved in interesting research projects to test and rationally understand construction materials and building behavior against fire. This is clearly important for the present in fire safety in developed countries and for the future in fire safety developing countries, too. We shall not stop this, however, a gap appears to exist in low developed and mid developed countries where this existing knowledge and technical advancements are not being used nor implemented due to different reasons.

We should question ourselves, if the international fire engineering community can do something else so

fill a gap in transferring knowledge to the areas of the world that are more or most vulnerable to fire disasters, e.g. developing countries with a high manufacturing culture.

We invite fire safety researchers, practitioners and regulators, to question ourselves whether:

- International fire safety organizations have a direct impact on the entire range of countries, from the highest developed ones to the lowest developed ones in terms of fire safety practices, guidelines and codes.
- Fire engineered solutions or performance-based approaches ARE practical or relevant in middle income and low income countries that are lacking fundamental fire safety practices.
- An international recognized set of fire safety standards would provide value to developing countries in parallel to their local building codes.

The most remarkable conclusions derived as a result of the projects mentioned above are:

Technical knowledge – At the time of assessing, surveying and refurbishing existing buildings to achieve a high level of design and detailing, it is necessary to involve technically skilled people within the teams of all stakeholders.

Currently, a big difference in educational level exists between countries with a tradition in fire safety engineering, and developing countries in general. Developing countries requiring fire safety assessments of existing (and also new) buildings, will need to build capacity from international sources such as private companies and educational and governmental institutions.

Fire safety is more than design – Fire safety design is not just about design; to be meaningful, fire safety designs need to be administratively regulated, implemented and commissioned correctly with ongoing management and maintenance procedures in place.



Source : Arup

Factory workers



Source : F.Herrent

Women workers and assigned in-house "fire-fighter" on duty

Quantitative or Qualitative fire risk based analyses could be oriented to figure out the need to focus more on fire safety measures

Regulatory framework – All fire safety stakeholders need to understand the local jurisdiction and be accountable for their responsibilities.

Fire risks and costs – Building projects in developing countries tend to have more financial limitations making fire safety measures to be perceived as unpractical in many cases. Quantitative or qualitative fire risk based analyses could be orientated

for cost benefit analyses to figure out if some countries or industries need to focus more on some fire safety measures before other measures.

Resilience and safety risks – Some developing countries may undermine fire risks in comparison with other risks, such as seismic risks that usually appear to be – but may not be – higher due to the typical larger event magnitudes.

Design for safety since the beginning

– International companies should take into consideration this major international and national initiatives happening in Bangladesh to mitigate mistakes from the past, and try to involve local governments, organizations and companies to start designing for safety from the beginning. We are seeing examples of this conscious planning already happening in new projects – being promoted by garment companies – in developing countries with building safety practice deficiencies. ■

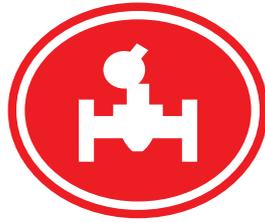
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FIRE EXTINGUISHERS

Selection, Placement, Use & Maintenance

By *M. M. Bhuskute*

BASICS OF FIRE TRIANGLE

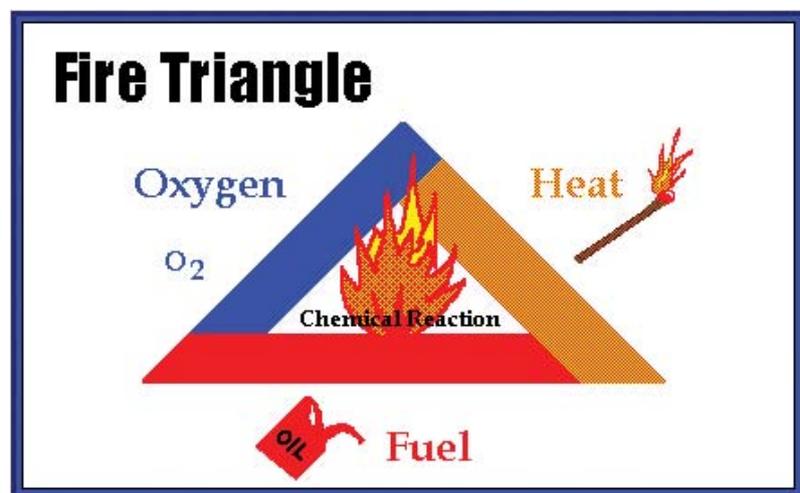
Supply of oxygen is required to support combustion & this is usually drawn from the atmosphere of which it forms about 20 percent, but in some cases the materials themselves (e.g. explosives) contain sufficient oxygen to maintain combustion.

Most solids & liquids require to be heated above their normal temperature before they can emit flammable vapors, though some liquids (e.g. petrol) emit flammable vapors at normal temperatures.

Fire risk of a liquid fuel is mainly dependent on its volatility, or tendency to vaporize and so develop an explosive, combustible mixture with air. The flash point is usually taken as a guide to volatility; Flash points are usually taken as a measure of fire & safety in storage, handling and transport of all the flammable liquids.

Fire extinction consists in the limitation of one or more of the factors mentioned in the triangle of combustion and methods of fire extinction may, therefore, be conveniently classified under the following headings:

1. Starvation or limitation of fuel



2. Smothering or limitation of oxygen
3. Cooling or limitation of temperature

STARVATION

- By removing combustible material from the neighborhood of the fire.
- By removing the fire from the neighborhood of combustible material.
- By sub-dividing the burning material.

SMOTHERING:

If the oxygen content of the atmosphere in the immediate neighborhood of burning material can be sufficiently reduced,

combustion will cease. Following are the methods of smothering:

- Application of viscous coating material i.e. use of foam.
- Application of a cloud of finely divided particles of dry powder from a pressurized fire extinguisher.
- Application of an inert gas, steam or vaporizing liquids from the fire extinguishers.

COOLING:

For cooling principle in fire extinction, water is the one, most commonly employed as it is one of the best extinguishing media available in large quantity at a very low cost.

PORTABLE HAND APPLIANCES AND SELECTION, SCALE OF DEPLOYMENT & USE OF MAINTENANCE

Portable fire extinguishers are called as first aid fire fighting appliances, as they are effective only at the incipient stage of fire. The purpose of the portable fire extinguisher is to enable an individual with minimum training and orientation to extinguish an incipient fire. The portable extinguishers are of great value in controlling and extinguishing a fire in the incipient stage of fire provided right type of extinguishers are readily available nearby and used successfully.

Healthy portable fire extinguisher is a vital tool to protect life and property; it must be considered as a part of the total fire procedure for initiating an alarm. The provision of fire extinguishers is must irrespective of fixed fire protection and fire fighting systems installed at premises.

Various types and sizes of portable fire extinguishers installed at the plant premises. As one type of portable fire extinguishers is not equally suitable for all class of fires, it is necessary to select the right type of extinguisher for a particular class of fire to achieve extinguishments without side effects to people, burning material & environment.

Based on extinguishing agent, there are five basic types of portable fire extinguishers. These are:

- Water (gas cartridge & stored pressure type),
- Mechanical foam,
- Carbon dioxide,
- Dry Chemical Powder (DCP),
- Clean agent fire extinguisher.

People who are not regular fire fighters are likely to make errors in the operation of extinguishers. They could also inflict injuries on themselves. The efficacy of using extinguishers varies from person depending on knowledge, skill, training,

confidence and even will power. Apart from the usefulness of fire extinguishers, several limitations are inherent in the design and the functional concept of portable extinguishers. These are-

- Limited quantity of extinguishing agent,
- The need for special recharging facilities,
- The limited range of the discharge agent,
- The limited discharge time of the extinguisher,
- Designed for specific situations.

CLASSIFICATION OF FIRE & SUITABILITY OF PORTABLE FIRE EXTINGUISHERS:

Portable fire extinguishers are of great help and value to save life and property from fire but all portable fire extinguishers are not equally effective on all types of fires. It entirely depends on type of material involved in fire. Based on material involved in fire, fires are classified into five classes.

Classification	Material	Suitable portable Fire extinguishing Agent
Class "A"	Fires involving solid combustible materials of organic nature such as wood, paper, rubber, plastics, etc, where the cooling effect of water is essential for extinction of fires.	Water, foam, ABC dry power and halocarbons.
Class "B"	Fires involving flammable liquids or liquefiable solids or the like where a blanketing effect is essential.	Foam, dry powder, clean agent and carbon dioxide extinguishers.
Class "C"	Fires involving flammable gases under pressure including liquefied gases, where it is necessary to inhibit the burning gas at fast rate with an inert gas, powder or vaporizing liquid for extinguishment	Dry powder, clean agent and carbon dioxide extinguishers.
Class "D"	Fires involving combustible metals, such as magnesium, aluminum, zinc, sodium, potassium, etc, when the burning metals are reactive to water and water containing agents and in certain cases carbon dioxide, halogenated hydrocarbons and ordinary dry powders. These fires require special media and techniques to extinguish.	Special dry powder.
Live Electrical Equipment/ Panels	Fire involving electrical equipment where the electrical non-conductivity of the extinguishing media is of prime importance.	Special dry chemical powder, Clean agents like FM -200 & CO2

THE LIMITATIONS OF VARIOUS TYPES OF EXTINGUISHERS

WATER TYPE:

- Surface tension - Slows penetration
- Reactivity - With reactive chemicals & metals
- Conductivity - Not suited for fires involving live electrical equipment .suitable
- Freezing temp - Unsuitable for very low temp. area
- Viscosity - Low so runs off quickly-can't form Blanket coating
- Heaviness - Sinks in low F.P. liquids can boil above the surface, overflow causes spill fire.

CO2Type:

- Smoldering embers and hot metal surfaces may reignite after the smothering atmosphere disappears by dissipation.
- Takes longer time to keep O2 level below 6%
- Not effective for oxygen-containing material such as cellulose nitrate.
- Reactive metals and hydrides decompose CO2 – so unsuitable.

D.C.P Type:

- Cannot penetrate deep.
- After smothering the fire, water is needed for 'A' types fires.
- Cannot produce lasting inert atmosphere above surface area of flammable liquids – so no extinguishment capability in case of longer duration.
- Unsuitable for sophisticated electrical /electronic equipment (does not fall under 'clean agent' category).

Foam Type:

- Not suitable for liquefied compressed gases such as butane, butadiene, propane etc.
- High viscosity oils burning for a long period may cause violent frothing and forceful expulsion of burning contents.
- Unfit for electrical equipment.
- Unfit for reactive chemicals & metals.

“FIRST AID FIRE FIGHTING” ARRANGEMENT

Portable fire extinguishers are not expected to deal with large fires since they are essentially first aid firefighting equipment. Nevertheless, they are very valuable in the early stages of a fire when used promptly and effectively. Provision of unsuitable types, incorrect operation, or improper maintenance of the extinguishers have, at times, led to failure in tackling the fire effectively in the early stages, thus involving greater loss of life and property.

If this fire is attacked at the right moment with right type of appliance, a major outbreak of fire can be restricted to a non incident. Here comes the importance of Hand Appliances which comprise of buckets and extinguishers. In order that fire extinguishers are effective, they should,

- a. be portable/wheeled;
- b. instant usability by operator
- c. have adequate throw;
- d. have adequate quantity of extinguisher as per fire rating; and
- e. specified shelf-life from the date of manufacturer

So the most important aspect of the use of hand appliances is the “right moment” meaning minimum loss of time in locating the appliance and fetching it to the source of ignition and the “right type” meaning understanding the source or material involved in fire so that an extinguisher with appropriate characteristics to extinguish that type of fire is selected immediately.

It is needless to say that the person selecting and holding extinguisher must know how to use it. Here comes the importance of training the personnel working in the area regarding use of various types of extinguishers available around him.

However, due to simplicity of operation, as far as possible extinguishers with same type of operating procedure should be used at one location to avoid confusion.

The selection, installation and maintenance of portable first aid fire fighting appliances shall be carried out in accordance with guidelines contained in IS:2190-2010.

It has been seen that the level of maintenance of fire buckets is quite miserable and the buckets are often misused. Hence in I.S.2190-2010 standard the provision of fire buckets has been mentioned.

However, users may provide fire buckets [(see IS 2546: 1974 'Specification for galvanized mild steel fire buckets (first revision)'] over and above the requirements given in this standard. The use of fire buckets, however, is not recommended in today's high tech alternate availability.

.....

If this fire is attacked at the right moment with right type of appliance, a major outbreak of fire can be restricted to a non incident

.....

CLASSIFICATION OF HAZARDS

Light (Low) Hazard

Light hazard occupancies are locations where the total amount of Class A combustible materials, including furnishings, decorations, and contents, is of less quantity. This can include some buildings or rooms occupied as offices, classrooms, churches, assembly halls, guest room areas of hotels/motels, and so on so forth.

This classification anticipates that the majority of content items are either non-combustible or so arranged that a fire is not likely to spread rapidly. Duplicating machines, art departments, offices, training / school classrooms, place of worship, assembly halls, guest room areas etc., are included, where Class B flammable liquids are less than 4 liters and provided that they are kept in closed containers and safely stored.

Ordinary (Moderate) Hazard

Ordinary hazard occupancies are

locations where the total amount of Class A combustibles and Class B flammables are present in larger amounts than normally expected under light (low) hazard occupancies. These occupancies could consist of dining areas, mercantile shop and storage, General manufacturing operations, research labs, automobile showrooms/ service stations, packing garages workshops etc.

Light (low) hazard occupancies, and warehouses containing Class I or Class II commodities where Class B flammable liquids are 4 to 20 liters can be considered provided that they are kept in closed containers and safely.

Extra (High) Hazard

Extra hazard occupancies are locations where the total amount of Class A combustibles and Class B flammables present, in storage, production, use, finished products, or combination thereof, is over and above those expected in occupancies classed as ordinary (moderate) hazard.

These occupancies could consist of

woodworking; vehicle repair; aircraft and boat servicing; cooking area; individual product display showrooms; product convention center displays; and storage and manufacturing processes such as painting; dipping, and coating, including flammable liquid handling. Also included is warehousing of or in-process storage of other than Class I and Class II commodities. The flammable liquids may be more than 20 litres.

NOTES:

- These are minimum recommendations for a specific area. In case, the area is more than specified, high capacity extinguisher may be used based on these minimum requirements, that is proportionately higher capacity can be used.
- In case of dry powder/CO₂/clean agent types, equivalent lower capacities may also be used however total quantum should not be less.
- Clean agent extinguishers shall be used on special areas.



Source : alibaba.com

Requirement of Extinguishers (Capacity and Numberwise)

Class of hazard	LH occupancy	MH occupancy	HH occupancy
Class A Hazard	One 9 liters water expelling extinguisher or ABC 5 kg/ 6 kg fire extinguisher, for every 200 m ² of floor area or part thereof with minimum of two extinguishers per compartment or floor of the building. The extinguishers should be so located as to be available within 15 m radius.	Two 9 liters water expelling extinguishers or ABC 5 kg / 6 kg fire extinguisher, for every 200 m ² with minimum of 4 extinguishers per compartment/ floor. The extinguisher should be so located as to be available within 15 m radius.	Provision as per MH occupancy; in addition to one 50 litre water CO ₂ / 25 kg ABC fire extinguisher for every 100 m ² of floor area or part thereof.
Class B Hazard	One 9 liters foam extinguisher, mechanical or BC or ABC, 5 kg/6 kg fire extinguisher, for every 200 m ² of floor area or part thereof with minimum of two extinguishers per compartment or floor. The extinguishers should be so located as to be available within 15 m radius.	Two 9 liters foam extinguisher, mechanical type, or 5/6 kg dry powder extinguisher (or one of each type) for every 200 m ² area with minimum of four extinguishers per compartment. Extinguisher should be available within 15 m radius.	Provision as per MH, and in addition to one 50 litre mechanical foam type extinguisher or 25 kg BC fire extinguisher for every 100 m ² or part thereof one 135 litre foam mechanical extinguisher for every 300 m ² of floor area or part thereof.
Class C Hazard	One 2/3 kg dry powder of clean agent extinguisher for every 20 m ² of floor area or part thereof; extinguisher available within 15 m radius.	One 10 kg dry powder extinguisher (stored pressure) or 6 kg carbon dioxide extinguisher or 5 kg clean agent for 100 m ² of floor area or part thereof, with minimum of one extinguishers of the same type for every compartment; extinguisher should be available within a radius of 15 m.	Dry powder extinguisher (stored pressure) of 10 kg or 6.5 kg CO ₂ extinguisher, or 5 kg clean agent extinguisher for every 100 m ² of floor area or part thereof, subject to a minimum of two extinguishers of same type per room or compartment. Extinguishers should be available within a radius of 10 m.
Class D hazard			One 10 kg dry powder extinguisher with special dry powder for metal fires for every 100 m ² of floor area or part thereof with minimum of two extinguishers per compartment /room. Extinguishers should be available within a radius of 10m.
Special hazard	One 4.5 kg capacity carbon dioxide or one 2/3 kg capacity clean agent extinguisher for every 100 m ² of floor area or part thereof with minimum of two extinguishers so located as to be available within 10 m radius	Same as LH	Same as MH

DISTRIBUTION OF HAND APPLIANCES

Occupancy could be composed of different building structure which may further be sub-divided in different rooms/ compartments separated by wall/partitions for operational convenience.

The provision for fire extinguisher should be made for each separable area. Prepare list of extinguishers for each separable area and prepare extinguisher schedule.

The following deciding criteria should be adopted.

1. Basic occupancy class of hazard for each separable area.
2. Subdividing the area indicating the respective class of fire with material involved existing there in.
3. Numbers and size of extinguishers in the subdivided area based on class of fire but the provision should be as per basic occupancy class.
4. Including the provision of extinguishers for electrical / electronic panel, platform motors etc.
5. Identified locations for installation based on easy accessibility preferably near entrance/exit and at easily visible inconspicuous position.
6. The location should be so selected that one should not be required to travel distance of 15 meters or 10 meters as specified as per category of hazard of the section. This factor will prevail on the calculated number of hand appliances according to floor area and compartments and limitations of actual access as per the layout conditions.
7. Buckets if provided should be kept on hanger or stand only. The provision of bucket should be as per relevant IS standard.

HYDRAULIC TESTING REQUIREMENT AND PERIODICITY:

Hydraulic testing of body of the

extinguisher must be carried out as per IS 2190-2010. These tests are to be carried out as per IS by Manufactures or Chief Engineer or Chief Fire Officer of the factory and record is to be maintained for each extinguisher.

CHECKS FOR HAND APPLIANCES:

(I) BUCKETS:

- Must be full of water/sand.
- Must be refilled every week and phenyl or sapon creosote must be mixed to prevent mosquito breeding.
- Must be repainted if those are corroded /rusted.
- The buckets are full and hand appliances are accessible.
- Buckets are not kept on the floor. The standard design is such

- Safety seals and tamper proof indicators are not broken or missing;
- Fullness determined by weighing or lifting;
- Examination for obvious physical damage, corrosion, leakage, or clogged nozzle;
- Pressure gauge reading or indicator in the operable range or position; and Condition of tyres, wheels, carriage, hose, and nozzle checked (for wheeled units).
- The location shown in the approved drawing tallies with that provided actually on site. Amend the list if necessary.
- Date of refilling is marked on the body of the extinguisher.
- Operating instructions should be readable.

Type of extinguishers	Interval	Pressure	Time
All types of extinguishers except CO2 type	3 years	35(kg/sq.cm)	2.5(min)
CO2 type	3 years	250(kg/sq.cm)	2.5(min)

that ring type handles are welded at the bottom and therefore they cannot rest on floor to be suspended on upper handles.

(II) EXTINGUISHERS:

- Portable extinguishers are not kept on the floor. Wheeled type extinguishers are located at specified place and not at random.
- Checked weekly for working condition of the movable parts, nozzles etc.
- One third of the total number of water, DCP and foam type extinguisher along with one fifth of CO2 type extinguishers are subjected to operational test annually. This will help to match with hydro test schedule.
- Must be and special Dry Powder type extinguishers must be operationally tested every year. Location in designated place;
- No obstruction to access or visibility;
- Operating instructions on nameplate legible and facing outward;

- Weight of CO2 type extinguisher recorded on the body of extinguisher date wise. CO2 extinguishers must be weighted once a month and if this weight is less than 90% of weight of the fully charged extinguisher those should be recharged.
- Any special type of extinguisher is needed in a particular situation.
- Record of operational test is maintained.
- Record of hydraulic test is maintained.
- 10% spare buckets and 10% spare charges are maintained at the store.
- At random, ask some of the workers whether they are aware of the location and operation of the extinguisher available nearby.
- A board showing the position, type and number of extinguishers in that particular block is recommended to be displayed at the entrance.



1.1 General Safety Precautions for Maintenance

1.1.1 While opening any extinguisher for maintenance,

- Ensure that there is no residual pressure in any hose and/or nozzle assembly;
- Unscrew the cap or valve assembly slowly for two or three turns only, to allow any residual pressure to escape via the vent holes and do not unscrew it further until all pressure is released. Keep away the head and body to avoid injuries;
- Do not depend on pressure indicating devices like gauges (in the cases of stored pressure type extinguisher) to verify whether the container is under pressure or not, as they could malfunction;
- If pressure is not being released after unscrewing the cap or valve assembly two or three turns, then do not unscrew it further

without taking appropriate safety measures; sudden release of pressure may eject parts, cap assembly, or the contents of the extinguisher. The use of suitable clamping arrangements and appropriate personal protection is advisable;

- Under no circumstances should the valves of carbon dioxide or stored pressure type extinguisher of gas cartridges/ containers be attempted to be removed under filled conditions; and
- At all times when attempting to remove parts from extinguisher at the time of inspection/ maintenance, persons, should ensure that they are clear of any parts which may be ejected.

1.1.2 Other Safety Guidelines

- Dry powder extinguisher should be opened only in the driest available conditions and for the minimum time, necessary for examination, to minimize the

effect of atmospheric moisture on the powder. Moisture causes caking of the powder.

- It is even more important that mixing or cross-contamination of different types (BC/ABC) of powder be avoided as it may cause chemical reaction resulting in a dangerous pressure build-up in the container. This reaction may become apparent only after a few weeks.
- All sealing components should be cleaned and properly lubricated to prevent leakage after recharge.
- Check pressure indicating devices to ascertain that it gives proper readings.
- Never connect a stored pressure extinguisher to be charged directly to the high pressure source. Connecting directly to the high pressure source could cause damage or even rupture of the container and may result in the injury.
- Only those gas cartridges which will suit the particular type and capacity of the extinguisher should be used. Do not use higher capacities than recommended.
- Certain recharging materials deteriorate with age, exposure to excessive temperature and moisture. Storage of recharge materials for long periods should be avoided.
- Normal workshop compressors deliver air with high moisture content. Moisture traps will only remove the moisture partly, and may lead to caking of powder, hydrolysis of halogenated agents, clogging of pressure gauges and internal corrosion. Blowers/dryers should be used to clean hose & fittings. ■



M.M.Bhuskute is a Risk Management, Fire & Safety Consultant giving his services to insurance companies, reputed groups of industries & various project consultants. He is an accredited professional for advice & approval of Fire Protection Systems and recognized by all major Government & private insurance companies. He conducts fire safety system efficacy study and fire safety audits for various industrial projects. He is Ex-TAC regional head of U.P. and Gujarat. He has been a visiting faculty at various fire & safety educational institutions at Nagpur, Ahmedabad, Pune, Jodhpur & Indore. He also delivers lectures on various fire protection and fire risk management subjects.

MIND THE GAP

Recent code mandates for health care facilities mean that door gaps are suddenly a big deal—and potentially a big, expensive headache for some hospitals and other health care occupancies

By Jesse Roman

When it comes to fire doors in health care facilities, it could mean spending many thousands of dollars to fix or replace doors that do not meet the tolerances specified by code.

Over the last two years, the space between a fire door and its frame, known as the door gap, has become a key focus of health care facility managers, code consultants, and engineers, many of whom are finding out for the first time that the gaps on many fire doors at their facilities are larger than what is allowed by NFPA 80, Fire Doors and Other Opening Protectives.

When an inspector determines that a gap between a door and frame is too large, sometimes by as little as a sixteenth of an inch, a hospital generally has 60 days to fix the problem. But depending on the problem—whether it be a lopsided door frame, an uneven concrete floor, or a faulty installation—there isn't always an easy solution. "A lot of hospital facility managers are scratching their heads," said Jim

Peterkin, a fire protection engineer and vice president of NFPA's Health Care Membership section. "I hear people saying, 'There are hundreds of doors here—what are we going to do?'"

Depending on the door and its fire rating, a single door could cost a couple thousand dollars or more to replace, meaning some hospitals could be facing potentially massive bills to remedy the problem. Industry concern was evidenced by the robust attendance at a recent NFPA webinar on the topic, which drew a record 1,700 registrants. "A lot of hospitals are asking why," Peterkin said. "They're saying, 'This door has been here 20 years, and now all of a sudden we have to do something about it?'"

STRATEGIC ASSETS

Fire doors are critical to health care facility fire safety and are designed to be a key part of the fire protection strategy that prevents fire from spreading throughout a hospital, allowing patients and staff in other

parts of the hospital to shelter in place rather than attempting a potentially life-threatening evacuation.

For years, NFPA 80 has set the maximum gap that can exist between the doors and the frame on the sides, top, and bottom, with those gaps ranging from an eighth to three-quarters of an inch, depending on the side. The concern is that gaps larger than those permitted by the code could allow heat, and subsequently fire, to penetrate around the door, or could cause the latches to fail if the door, or pair of swinging doors, twists and warps from the heat of the fire.

Ideally, a problem like a bigger-than-allowed door gap would have been identified and resolved during the initial installation, but for a variety of reasons that may not have happened, said Keith Pardoe, the chair of the NFPA 80 Technical Committee on Fire Doors and Windows. One reason is there has traditionally been insufficient emphasis placed on requiring training for workers

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Source: Getty Images

The current concern over door gaps in health care facilities was prompted by the recent move by the Centers for Medicare & Medicaid Services (CMS) mandating that all health care facilities comply with the 2012 edition of NFPA 101, Life Safety Code

who install and maintain swinging fire doors, he said. Additionally, for years NFPA 80 lacked guidance about the criteria inspectors should check on the doors, resulting in many code compliance officers being unaware that they should be looking for larger-than-allowed door gaps. Perhaps most critically, until the 2007 edition of NFPA 80, the standard never specifically mandated annual door inspections at all.

“The result is that we have this whole body of doors that have been installed for decades that have never been inspected or verified” to show

that they are in compliance, Pardoe said. “Now, when an inspector goes into a building, probably one of the top two deficiencies they find is that the gaps around the perimeter of fire doors are too large. This could be dozens of doors in a single building.” For health care facilities, the issue has come to a head in the last couple of years because of the Centers for Medicare & Medicaid Services (CMS) move to mandate that all health care facilities comply with the 2012 edition of NFPA 101, Life Safety Code®—previously, these facilities followed the 2000 edition, with the change to follow the 2012

edition taking effect in November 2016. “Obviously, with a newer code comes with it all the references to other standards, which have also been updated,” Peterkin said. One of the standards referenced by the newer Life Safety Code is the 2010 edition of NFPA 80, which includes a requirement for annual inspections of certain fire door assemblies.

The first CMS inspections following the shift to the 2012 Life Safety Code occurred in many facilities late last fall, which is when many of the door issues first surfaced. “Now everybody is in ‘What we going to do now?’ mode,” Peterkin said. “I’m not sure how many doors are being replaced—obviously that is the last option. There are other options they will get to first.”

Depending on the issue, a contractor may be able to use a steel shim behind the hinge leaves to push the door into the right position and eliminate the excessive gaps between the door and frame. Replacing the hinges can also solve the problem, and there are also a number of aftermarket products available, although those, too, can be expensive and may not be accepted by the local authority having jurisdiction, Peterkin said. If all else fails, the door or frame might need to be replaced at a significant cost—a typical single door assembly in a health care facility could cost upwards of \$2,000, but that price could double or triple depending on installation needs and whether electrified hardware is needed, Pardoe said.

TECHNICAL JUSTIFICATION

What many hospitals are hoping for, however, is some relief via the code. Pardoe, the NFPA 80 chair, acknowledges that there isn’t a lot of technical basis for the gap size recommendations in NFPA 80. In fact, NFPA 252, Methods of Fire Test of Door Assemblies, which is the predominant fire door test that NFPA 80 relies on, uses test criteria where the gaps are a sixteenth of an inch smaller than



Source: Getty Images

HOW MUCH SPACE IS ALLOWED?

NFPA 80, Fire Doors and Other Opening Protectives, contains information on maximum gap allowances for different types of fire doors. In general, those allowed gaps are as follows:

- Clearance for under the bottom of a door: 3/4"
- Clearance between door and frame: 1/8"*
- Clearance for meeting edges for a pair of doors: 1/8"*

For more detailed gap information, refer to NFPA 80, Section 6.3.1.7 and Section 4.8.4.1.

Doors faced with high-pressure decorative laminate material, 1/3-hour wood doors installed in hollow metal frames, and hollow metal doors are permitted a +/- 1/16" tolerance of the nominal 1/8" clearances.

what NFPA 80 currently allows for metal doors. "There's never been any documentation that technically supports the disparity between what NFPA 80 allows and what tests require," Pardoe said. The gap sizes were initially expanded for metal doors under the theory that metal doors expand when heated, he said.

To bring more clarity, the Fire Protection Research Foundation has begun work on a full-scale fire test on fire doors with varying gaps between the door and frame. The tests will first try to verify that the minimum gap sizes mandated for years by NFPA 80 are actually sufficient to prevent door failure—an outcome that committee members are optimistic about. Next, researchers will increase gaps on the top, bottom, and sides of the doors in different combinations to try to determine how large these gaps can be without compromising the door's function.

"Some think that we could have a gap of up to 6 inches under the bottom of the door with no negative effect on performance of door assembly itself—obviously that's a gross exaggeration, we would never do 6 inches of clearance, but if NFPA 80 went to 1 inch of clearance to help mitigate the irregularities in a concrete floor, would that be a safe

change to make?" Pardoe asked. "Those are the types of questions the technical committee has wrestled with. We are very resistant to making a technical change without having justification that this is a safe change to make. This research study is how we're trying to get a handle on it."

Peterkin was candid about what he hopes the tests reveal. "What I'm hoping the testing proves is, first, that the criteria we've been using as a standard for gap sizes the last several decades are good and should not be reduced," he said. "The second thing I would like to see is that maybe we can go a little bit bigger than the current recommendation and still pass the test. That would give everyone a little more flexibility."

The Research Foundation hopes to begin the full-scale fire tests this spring and to have recommendations for the NFPA 80 technical committee by its scheduled fall meeting.

The committee will then review the results during the upcoming revision cycle, in preparation for the 2022 edition of NFPA 80. If committee members feel that the guidance is important enough to include sooner, changes could be incorporated into the 2019 edition of NFPA 80 as a Tentative Interim Amendment. ■

Jesse Roman is Associate Editor for NFPA Journal.



**Electrical safety is no joke,
correct the hazard or go up in smoke**

FSAI BENGALURU CHAPTER FIRE SAFETY AWARENESS PROGRAMME



Panchanathan addressing the students on 'Surakshit Bharat'

Fire Safety Awareness Programme was conducted at BBMP Girls High School, Bengaluru on 28th June 2019. The programme was conducted by Devaraju, District Office Officer, Yeshwanthpur & Anandaiah, Fire Officer and his team. The team visited the school and briefed the teachers and students on fire safety. There were more than 650 students and teaching staff present at the time of the event.

Opening remarks were given by Panchanathan, School Initiative Programme Core Working Member. Thenafter, the team explained elaborately about the different classes of fire and types of extinguishers used for the different types of fire. The classification was given as follows

- Type A Caused due to wood, cloth and coal.
- Type B Caused due to all kinds of inflammable liquids like kerosene & petrol.
- Type C Caused due to all kinds of inflammable gases.
- Type D Caused due to rise in temperature of various metals.
- Type E Caused due to short-circuit in any electric equipment.

Vote of thanks were given by Shashikala, Head Mistress of BBMP Girls High School. The programme was a success with the school authorities and students participating with utmost concentration and curiosity. ■■■



Devaraju & FSAI Core Working Committee handing over the certificate to the school management



This method is used in petrol bunks for dousing of the fire



Anandaiah addressing the students sharing knowledge on fire safety

FSAI CHANDIGARH SUB-CHAPTER TRAINING PROGRAMME ON 'E-SURVEILLANCE & SECURITY SYSTEMS'



Technical Presentation by Ashish Chauhan

FSAI Chandigarh Sub-Chapter successfully conducted 3 hours training programme on “E-Surveillance & Security Systems” on 26th June 2019 at Prama Hikvision India Pvt. Ltd., Chandigarh. Welcoming the participants.. Anuj Aggarwal, Joint Secretary, FSAI Sub-Chapter Chandigarh highlighted the importance of the technical programme. He explained the crucial role that electronics and IoT is playing in every aspect of our life including safety and security. With the support of this advanced and efficient technology, we can undoubtedly make our country, “Surakshit Bharat”

The training programme was delivered by Ashish Chauhan, representative of M/s Prama Hikvision India Pvt. Ltd. They covered the following topics in detail:

1. Importance of ‘E-Surveillance & Security Systems’ in “Surakshit Bharat”
2. Role of AI Technology & other security products in E-Surveillance & Security Systems
3. Application Scenarios of E-Surveillance System to build “Surakshit Bharat”

The presentation was very interactive and participants took keen interest which was evident from the queries raised by them.

Thenafter, Anuj Aggarwal presented the Vote of Thanks. He requested all participants to support the Chandigarh Chapter by such fantastic participation in future programmes as well. It was a successful programme with 20 professionals’ active participation. ■■■



Members engrossed in the intriguing presentation

FSAI GUJARAT CHAPTER TRAINING PROGRAMME ON FIRE EXTINGUISHERS



M M Bhuskute training & explaining to the participants

FSAI Gujarat Chapter organized Training Programme on Fire Extinguishers Selection, Placements, Use and Maintenance at AMA Ahmedabad on 22nd June 2019. The objective of this programme was training the participants and giving them thorough knowledge about the fire extinguishers.

There were 36 participants who attended the event. At the Inauguration Session, all participants were welcomed by Pradip Sheth, President, FSAI Gujarat Chapter and also addressed the gathering on the vision of FSAI and how could it be helpful to society.

The participants consisted of consultants, PMCs, architects, contractors, system integrators, facility managers, gated fire & security professionals, builders, developers, industries, corporate and end users.

M.M.Bhuskute, a veteran and active fire safety consultant conducted

the training programme. He is also Vice Chair on Training, Learning and Development Committee of FSAI. At the end of the session, there was a Question Answer round in which M.M. Bhuskute cleared the doubts raised by the participants. As per regular practice of the training programme, an objective test was conducted and all the participants successfully passed the examination with good performance.

Vote of Thanks was given by Yash Majithia, Secretary, FSAI Gujarat Chapter. He thanked M M Bhuskute for sparing his valuable time to conduct this training programme and also thanked Safex for sponsoring the event. He thanked the entire FSAI Gujarat Chapter team to organize such a training programme for the first time pan India.

The feedback from all the participants was very good and they extended their desire to participate in such sessions more frequently at chapter level. ■



Sponsor Safex - Product display at the venue



Pradip Sheth giving the Welcome Speech

FSAI JAIPUR CHAPTER TRAINING PROGRAMME ON NBC BUILDING CODES & FIRE SAFETY



Training in progress on NBC 2019

FSAI Jaipur Chapter conducted a Fire Training Programme was conducted at PHED office on 25th June 2019 in the guidance of R S Saxena, President, FSAI Jaipur Chapter & Ankit Maheshwari, Secretary, FSAI Jaipur Chapter.

The primary objective of the event was to develop fire safety awareness in offices where employees need proper guidance

for Fire Disaster Management.

It was participated by 55 PHED persons along with 8 FSAI members. The programme was a success as it achieved the target of making people aware about the importance of fire training; to impart people the valuable knowledge and skills, in a way that they can prevent fire at their workplaces as well as at homes during times of emergency. ■



Demo being given by Irfan Zuberi



Hands on demo to the participants

FSAI KOLKATA CHAPTER FIRE & EVACUATION DRILL



Demo of handling hose pipe & nozzle

FSAI Kolkata Chapter conducted a Fire & Evacuation Drill at The Senator Hotel on 19th July 2019 in the guidance of B.M.Sen, Former Director, WBFES & Amalendu Banerjee, Ex. Dy. Director, WBFES, supported by active CWC members of Kolkata Chapter. The objective of the event was to develop fire safety & evacuation awareness in hospitality units where employees need proper guidance for Fire Disaster Management. The staff at the hotel participated enthusiastically in the session.



Explanation & demo of human stretcher by Amalendu Banerjee

It started with the theoretical session in which B.M.Sen explained the dos' & don'ts in case of fire, with fire & safety advices. The queries were answered by the experts in the team. Next was the demonstration of evacuation, rescue & transportation with the help of hands alone. Lastly, the demonstration of using different types of fire extinguishers (Water, Foam, Powder, CO2) took place, followed by the proper handling of fire extinguisher, hose pipe & nozzle.



Demo of use of fire extinguishers

FSAI Kolkata Chapter achieved the commendable target to make people aware of the importance of fire safety, which gave employers and employees of the hospitality industry, the valuable knowledge and skills, required to prevent fire and get

out of building fires, thus handling emergency situations. The presence of the hotel management, security staff & housekeeping staff made it a successful programme. In all, there were 40 participants at the event.

FSAI Kolkata Chapter President, Chapter Executive & Secretary,

namely Jyotirmay Mukherjee, Juyanika Gunin & Gaurav Rajput respectively, made constructive efforts towards making the session, constructive & meaningful. CWC Members including Bejoy Kumar Chakraborty, Krishnendu Sarkar, Jayanta Das & Swati Dhar helped in conducting the event, ably well. ■

FSAI KOLKATA CHAPTER FIRE & LIFE SAFETY AWARENESS PROGRAMME



Demo of holding hose pipe & nozzle



Checking the strength of force of water from the hose pipe

FSAI Kolkata Chapter organized a “Fire & Life Safety Awareness Programme” at Hotel Ibis, Kolkata, on 26th July 2019. It was attended by the hotel management & staff, along with the General Manager of the hotel.

Highlighting the aims & objectives of FSAI by Jyotirmay Mukherjee, President FSAI Kolkata Chapter, in the Welcome Address, he urged more people to join FSAI as members. In an audio-visual presentation, B. M. Sen., Ex Director, West Bengal Fire Emergency Service (WBFES) explained the risks & hazards associated with such starred hotels with reasons for massive deaths in such establishments & highlighted the importance of conducting fire & evacuation drills to reduce the loss of lives in emergency situations.

This was followed by an audio-visual presentation by Anupam Majumdar, FSAI Regional Director (East) FSAI, explaining the importance of regular checking, testing & maintenance

with schedule procedure of the fire & life safety systems & equipment generally installed in such high-risk buildings. As the firefighting system will normally lie idle, they will not operate satisfactorily when the need arises, if not subjected to routine testing and maintenance.

Practical demonstration of the emergency methods of rescue, practical firefighting using all water-based firefighting systems available in the premises was done under the able leadership of Amalendu Banerjee, Ex Dy. Director, West Bengal Fire Emergency Service (WBFES).

Practice of Emergency Evacuation Drill involving the management & staff was done following the procedure & guidelines as mentioned in the NBC-Part IV. The programme was a huge success and the hotel management appreciated the efforts, showing utmost gratitude for such wonderful knowledge-sharing session, especially keeping their safety in mind. ■

FSAI MUMBAI CHAPTER TREE PLANTATION DRIVE 2019



Members of FSAI Mumbai Chapter & Shramnishta Shetkari Bachatgat group

A programme to create awareness towards sustainable green development was conducted by the FSAI Association, at Village Narali Pada, Kosbad on 21st July 2019, where a record breaking 110 saplings were planted, supported by industry leaders of the FSAI Mumbai chapter.

Rupesh Umtol, leading MEPF consultant and FSAI Building Rating Chair led the drive along with, Parag Momaya, Events Chair & Urvashi Shirshat, Chapter Executive, who worked relentlessly towards the drive.

Nisha Jamvwal, Columnist & Author was also Chief Guest at the event. She planted the inaugural sapling at Tal Dhanu, Dist Palghar as well as sportingly participated in the demonstration of the fire extinguisher toward fire safety.

The main mock drill awareness session on 'Basic Fire Extinguishers' operations and guidelines was conducted by Supremex Equipment. The extinguishers were gifted to the village school as a token by FSAI.

Chintu Asher, Chapter President and Shahzed Lehry, Chapter Secretary conveyed their Vote of Thanks, further motivating, encouraging and supporting the team to further such noble causes. ■



Nisha Jamvwal planting tree along with Shramnishta Shetkari Bachatgat members and Mumbai CWC members



Tree Plantation ground work



Rupesh Umtol helping members in planting trees

THEMATIC QUIZ?

SERIES NO. 4

TOPIC

FSAI Journal - Sept. Oct, '19 Edition

1 PACC 2019 will be held at.....

- A) Kuala Lumpur
- B) Hong Kong
- C) Singapore
- D) Dubai

2 All solid fires except that of are classified as 'A'

- A) Cotton
- B) Light Alkali metal
- C) Coal
- D) Wood

3denotes the HAZCHEM code being displayed on Chemical tankers

- A) 
- B) 
- C) 
- D) 

4represents cyber security warning

- A) 
- B) 
- C) 
- D) 

5 Exclusive Helpline No. to seek ambulance service

- A) 999
- B) 888
- C) 108
- D) 555

6 Name of the odorant being blended with LPG (cylinder) or Piped Gas to detect leaks is

- A) Methane
- B) Mercaptan
- C) Hydrogen sulphide
- D) Ammonia

7is the chemical which is not in the banned list (as per Supreme Court order) for using in fire crackers being atmospheric pollutant

- A) Mercury
- B) Potassium
- C) Arsenic
- D) Antimony

8is the major and most vulnerable route with reg. to spread of fire through lift cage.

- A) Conduction
- B) Radiation
- C) Convection
- D) None specific

9 The principle adopted in the use of Dry Chemical Powder is.....

- A) Smothering
- B) Cooling
- C) Starvation
- D) None specific

10 The mechanized equipment which provides access to very tall building for rescue and fire fighting is known as.....

- A) Pitching ladder
- B) Rope way
- C) Stacker
- D) Hydraulic elevated platform

11is not an imaging device which can be used for personal security.

- A) 
- B) 
- C) 
- D) 

Please pick up the most appropriate one from the multiple options and fill in the blanks.

Kindly wait for the FSAI choices in the next issue and compare your answers.

You can mail the answers to murthy@fsai.in

SERIES 3 ANSWER KEY:

1-A | 2-D | 3-A | 4-C | 5-C | 6-B | 7-A | 8-A | 9-A | 10-A | 11-D

READERS

feed

BACK

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 - (I)
 - (ii)
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Key FSAI Initiatives & Membership Benefits



Key Initiatives

- Chapter-level Member Networking Meets
- Seminars & Webinars conducted by Subject Matter Experts
- Training Programs aimed at enhancing skills
- Strategic Initiative Program (SIP)
(Safety awareness for school children – 500,000 children covered till date)
- FSAI Events & Conferences
- Industry Programs, many in partnership with CII, FICCI, etc.
- Strategic Partnership with ISHRAE for ACREX

Membership Benefits

- Be a part of India's premier Fire and Security industry body
- Contribute your professional expertise towards industry growth
- Attend seminars, workshops and exhibitions at preferential rates
- Periodic industry updates and FSAI newsletters
- Opportunity to interact with key industry stalwarts
- Ability to voice your views at Chapter / National levels
- Participate in trade and technical meetings
- Be a part of National Working Committees / Chapter Core Committees
- Increase visibility among fellow professionals
- Sponsorship opportunities at key industry events
- Enhance your skills - opportunity to enroll under educational programs
- Avail of FSAI facilities and benefits at major exhibitions
- Ability to attend international conventions organized in association with FSAI
- Company profile and product categories available on FSAI website (Corporate)
- Three employees eligible to attend seminars & training programs (Corporate)
- Ability to serve as Governing Council member & Voting rights (Corporate)

FIRE SAFETY PRACTICES

How To Use Fire Extinguisher

Remember the **PASS** word (**P**ull - **A**im - **S**queeze - **S**weep)

P	A	S	S
Pull	Aim	Squeeze	Sweep

Emergency eye wash



EMERGENCY SHOWER



SECURITY CHECK



BAG CHECK IN PROGRESS





*Primary
responsibility
of securing our
safety and that
of our kith &
kin lies with us
and we can't
and should not
depend on the
government
beyond a point*

On 5th August, Hon'ble Home Minister Shri Amit Shah announced the most awaited and perhaps, the most complicated move in parliament - abrogation of Article 370 and 35A of the Constitution of India. While talking about this from the ramparts of the Red Fort on Independence Day, Hon'ble Prime Minister Shri Narendra Modi said, it was a key step in fulfilling Sardar Patel's dream. Anyways, this page is neither the forum to say anything 'for or against' this historical move nor am I a 'legal eagle' to pass 'expert comments'.

But I can say that this sudden and swift move by the government has generated mixed feelings amongst people. There were celebrations and humiliations - there were endorsements and oppositions! Social media was abuzz with flying messages expressing wide ranging views on the move, as if everyone was constitutional expert or national security analyst! Well, I am neither constitutional expert nor national security analyst but what I am jotting down here are the views of a layman or one amongst the 130+ billion Indians, so to say. My thoughts and anxieties are towards the threats to internal security.

While we all know that the responsibility to maintain internal security lies with agencies ranging from police to paramilitary forces, and in demanding circumstances, with the army, we must remember the maxim - 'Better to be safe than sorry'. By quoting this, what I would like to express is that the primary responsibility of securing our safety and that of the kiths & kins lies with us and we can't and should not depend on the government beyond a point.

When thinking about security of a large class of people, who are uneducated and ignorant, it is a herculean task to imbibe a sense of self-security and preparedness in them. This ignorance, coupled with careless attitude/*jugaadu* mentality, creates the perfect chemistry and opportunity for anyone, wishing to create disturbances. Whenever I see large crowds, be it at bus depot, railway station or social/religious gatherings, I always pray to God for safety and security in heart of the heart. Now that India is all set for festive season till almost end-December, to me it sounds like a time-capsule, loaded with threats on internal security! In fact, I firmly believe that we need to have comprehensive thought about security, which is beyond the narrow police/army terms. We need to imbibe the feeling of 'Nation First' deep in the heart of all of us so that there is a collective concern for collective safety for all of us. Unless this is done, I am afraid, it will be difficult to create 'Surakshit Bharat' from the internal security threats.

It is in this context, I think a quote by Stephen R. Covey, the author of international best seller book - '7 Habits of Highly Effective People' sounds relevant and appropriate and I quote - "*Security represents your sense of worth, your identity, your emotional anchorage, your self-esteem, your basic personal strength or lack of it.*"

Well, what Stephen Covey has said sounds more suitable in the contemporary context to me. Now, it is your choice to understand your worth and that of your kiths & kins to be careful or carefree...

KAMAL KHOKHANI
Publisher - FSJ Journal



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