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RIGHT TO INFORMATION

ఆంధ్రప్రదేశ్ రాజపత్రము

THE ANDHRA PRADESH GAZETTE

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PART II - MISCELLANEOUS NOTIFICATIONS OF INTEREST TO THE PUBLIC

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NOTIFICATIONS BY HEADS OF DEPARTMENTS Etc.,

ANDHRA PRADESH STATE DISASTER RESPONSE AND FIRE SERVICES DEPARTMENT

I. Notification to include Plunger Pumps, Fire Engine Pumps etc., to Design "De-Centralised Fire Safety" Systems – Reg.

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1) The basis of power conferred on Director General, Fire Services to issue "No Objection Certificate" for Fire Safety:

As per Section 13 of A.P Fire Service Act,1999 Issue of No Objection Certificate: *.(1) Any person proposing to construct a building of more than 15 meters height for commercial/business purpose, 18 meters and above height for residential purpose, and buildings of public congregation like schools, cinema halls, function halls, religious places, which are more than 500 Sq. Meter in plot area or 6 meters and above in height shall apply to the Director General or any member of the service duly authorized by him in this behalf, before submission of such building plans to the authority or officer competent to approve the same under the relevant law, for the time being in force, for a no objection certificate along with such fee as may be prescribed.*

*The Director General or any member of the service duly authorized by him in this behalf, shall within sixty days of receipt of such application, on being **"Satisfied"** about the provision of fire prevention and safety measures as stipulated in the [National Building Code Guidelines, as amended from time to time] or any other law for the time being in force regulating such purpose or activity, shall issue a no objection certificate with such conditions as may be considered necessary and if not so satisfied, reject the same for reasons to be recorded in writing.*

2) The purpose of this notification:

*The purpose is to define or elaborate the word **"Satisfied"** to include "Decentralized fire safety" system using plunger pumps, Fire Engine Pumps as an alternative to Conventional "Centralized Down Comer/Wetriser" system in all types of structures/Occupancies. However, the choice is left to the managements.*

3) The nature of the National Building Code of India:

*The National Building Code of India(NBC), promulgated by the Bureau of Indian Standards, is a comprehensive Building Code containing **guidelines** for regulating building construction activities across the country. Relevant paragraphs of the "Foreword" to the NBC are extracted hereunder:*

"The Code contains regulations which can be immediately adopted or enacted for use by various departments, municipal administrations and public bodies. It lays down a set of minimum provisions designed to protect the safety of the public with regard to structural sufficiency, fire hazards and health aspects of buildings; so long as these basic requirements are met, the choice of materials and methods of design and construction are left to the ingenuity of the building professionals.

The provisions of this Code are intended to serve as a model for adoption by local bodies, Public Works Departments and other government construction departments, and other construction agencies. Existing PWD codes, municipal byelaws and other regulatory media could either be replaced by the National Building Code of India or suitably modified to cater to local requirements in accordance with the provisions of the Code. Any difficulties encountered in adoption of the Code could be brought to the notice of the National Building Code Sectional Committee for corrective action".

*From the above, it is evident that NBC does not have the force of law and is **not statutory in nature**. It serves as a **Model Code** for adoption by all agencies involved in the building construction works.*

4) The intent or objectives behind Part-4 of National Building Code which deals with "Fire and Life Safety":

An extract from the Foreword to Part 4 of the NBC:

"Absolute safety from fire is not attainable in practice. The objective of this Part is to specify measures that will provide that degree of safety from fire which can be reasonably achieved. ***The Code endeavors to avoid requirements that might involve unreasonable hardships or unnecessary inconvenience or interference with normal use and occupancy of buildings*** *but insists upon compliance with minimum standards of fire safety necessary for building occupants and users".*

5) Power conferred on Director General of Fire Services to remove practical difficulties and to prescribe modern technologies for designing fire safety systems:

Yes, there is.

a) *The 'satisfaction' in 13(2) can be defined to include cost effective, Modern Fire Fighting Equipment that is equivalent or better in effectiveness of dousing fires than the existing conventional Fire Equipment.*

b) *As per clause 5.1 Part II of NBC,2016 : the provisions of the Code are not intended to prevent the use of any material or method of design or construction not specifically prescribed by the Code, provided any such alternative has been approved.*

As per clause 5.2 Part II of NBC,2016 : The Authority (Director General of Fire Services) may approve any such alternative provided it is found that the proposed alternative is satisfactory and conforms to the provisions of relevant parts regarding material, design and construction and that material, method, or work offered is, for the purpose intended, at least equivalent to that prescribed in the code in quality, strength, compatibility, effectiveness, fire and water resistance, durability and safety.

c) *In addition, National Building Code Guidelines, give explicit powers to the Director General of Fire Services to remove hardships and practical difficulties in implementing provisions of National Building Code.*

As per Clause 3.4.2 of Part-IV of NBC,2016: Exceptions and deviations to the general provisions of requirements of individual occupancies are given as applicable to each type of occupancy in 6.1 to 6.9. In case of practical difficulty or to avoid unnecessary hardship, without sacrificing reasonable safety, local head, fire services (Director General, Fire Services) may consider exemptions from the Code.

6) The Conventional Fire Fighting System:

(a) Conventional system is designed to have 3.5kg/cm² water pressure in downcomer/wet riser pipe. This pipe is run across all parts of the building/structure and hose reels are kept @ each floor of the building so that we can

get a water jet @3.5kg/cm^2 pressure in case of fire accident. This pressure is accessed by manually attaching hose reel to the downcomer / Wet riser by any person happens to be present in the building on fire. To do it properly, all occupants of the building are expected to undergo training about using the hose reel, fixing to downcomer /wet riser system. This system is designed to have various levels of discharge of water ranging from 180 L.P.M to 900 Liters per Minute.

(b) To maintain this pressure of 3.5kg/cm^2 in Down Comer/Wet riser pipelines, a pump house having combination of i) Jockey Pump of min.10 H.P ii) Booster Pump of min.10 H.P iii) Electrical Main Pump of min.40 H.P and iv) Diesel Standby Pump of of min.40 H.P Capacity is being installed at the basement/Ground Floor of every building. These machines need to kept on always "Auto Mode" or "Live Mode" so that in case of any pressure of water reducing below 3.5kg/cm^2 in Down comer/Wet Riser pipeline, the above mentioned pumps automatically start functioning to maintain the water pressure in thepipeline.

This maintenance of water pressure is to be done even when normal electrical power to the building is switched off, because we don't know when the fire accident breaks out. In addition, the standard advice/Precaution is to switch off main electrical power to the building in case of any fire accident. Therefore, the system of pumps/machines are designed to work continuously (i.e., 24/7 and 365 days non-Stop) so that we can access water jet of 3.5 kg/cm^2 through a hose pipe as and when fire accident happens. This is in short description of "Conventional Centralized Fire Fighting System"

This is the only solution being used or prescribed to meet the satisfaction of Director General, Fire Services as noted in Section 13(2) of A.P Fire Service Act,1999.

As such, this Conventional system is being installed to satisfy the requirements of issuing NOC in all types of buildings ranging from schools, Hospitals, Multistoried buildings, Malls, Office Towers, Star Hotels, Green Industries and even in Chemical factories.

*It is like "**Wielding a hammer and assuming that all fire situations/ problems are like nails which can be solved by single solution of using hammer**".*

7) The practical difficulties /hardships in using conventional Fire Fighting System:

Using the conventional system in all types of buildings has resulted in following hardships and practical problems. Let us examine the following fire accidents that happened wherein the conventional system failed in its basic purpose.

***i).Wal-Mart India Pvt Ltd., Vijayawada**: The Wal-Mart building is a Wholesale shopping mall constructed as a single block in a total extent of approx.5 acres of land with around 6,000 Sq.Mtrs built-up area in prime area of the city. The building was equipped with conventional Fire Fighting equipment as per National Building Code of India like Automatic Sprinkler System, Automatic Detection & Alarm system, Yard Hydrant & Wet Riser system.*

On 10.07.2016, early hours, a fire accident happened, and the entire mall & material turned into ashes. Though the conventional automatic sprinkler system was installed and but not in working condition, as management "turned off" water due to leakages from pipelines and such leakages can spoil the goods stored in the mall. Therefore, the conventional system is not appropriate to this application.

***ii). Sri Kanya Sneha complex** consisting of three theatre screens is located at Gajuwaka Visakhapatnam. The theatre complex was refurbished in the year 2013 with all facilities.*

On 17 September 2018 in the early hours, a fire accident happened. At the time of incident, the automatic sprinkler system, water pump house and detection system were kept on "switched off" 'mode and hence the system did not respond to the fire in the incipient stage. This is done to prevent leakages from fire pipes which got corroded due to coastal environment. This shows that the conventional system is not technically suitable to coastal areas.

***iii).Swarna Palace, Vijayawada** was running as a hotel occupancy since 20 years, which is three star category hotel. Due to corona, the hotel was temporarily converted as Covid hospital in the first wave. The hotel was provided with all the conventional firefighting equipment like the Wet Riser, Sprinkler's system, Terrace Pump and Terrace Water Tank. In the last 20 years, no fire incident occurred in the hotel.*

On 9th August 2020 at 4:50 AM, fire accident happened near electrical panel board and the reception staff noticed the fire and tried to extinguish the fire with the available hose reel system, but the pipelines are not charged with water and hence they could not douse the fire. Consequently, the fire spread to the first floor and second floor, and the smoke engulfed into the entire building. The inmates in the building who tried to rush out due to panic were affected by the toxic smoke and about 10 patients died due to suffocation. The management of the building closed the water valve that is meant for charging the sprinkler system and "down comer" system as the pipes were leaking due to corrosion.

***iv).RAK ceramics Private Limited** is UAE-based Company manufacturing various ceramics like tiles, sanitary ware, tableware commodities and washbasins. The industry is located near Peddapuram in East Godavari district with an extent of hundred acres.*

It is a low hazard industry but installed the conventional equipment like Hose reel, Wet Riser, Hydrant system and pump house.

On 1 November 2018 at 11:30 AM fire mishap occurred near engineering store and maintenance room due to spark while welding work was going on. The fire then rapidly spread to the tile store area where all the staff are available at the site and noticed the fire within time and tried to use hose reel and yard hydrant, however, the pumps were not kept in working condition and hence the whole system failed leading to huge loss of property worth Rs.30 Crores. It shows that the conventional system is very fragile and requires lot of maintenance with qualified technical staff.

***v) Azico Biophore Pharmaceutical Industry, Visakhapatnam**: The pharma firm caught fire in 2016. The Industry is situated near sea coast. The management has provided all conventional Fire Fighting Equipment. However, due to corrosion of MS Pipes, the Fire Pipe Lines was damaged and structurally weakened. It was noticed that, **the MS Pipes got rusted very early before the specified lifetime.** As, replacement was not done leading to huge loss of property as the conventional system failed in its basic purpose. This shows that there is a need for corrosion proof system in coastal areas.*

***vi).Cold Storage Fires**: On Observation of Cold Storages Fires in Guntur District, it was found that once the cold storage catches fire it would result in complete burning of stored material and even the entire structure collapses even though the Conventional Fire Fighting System in good working condition due to the difficult and inaccessible nature of entry into the cold storage building. Further, **the provision of sprinkler system may result in damage of the stored material. (red chilies) in case of any leakage.** This shows that conventional system is not suitable to cold storages.*

vii). Ware Houses and processing units in Pharma/Chemical Industries:** The provision of sprinkler system in Pharma/Chemical industries is not advisable due to presence of water reactive chemicals stored/processed in such industries. Any water leakage incident in such plants may lead to disastrous consequences, which pose the real danger than any fire accident. **Especially in Drug Formulation Units, the water in sprinkler/Down Comer System can foster microbial growth. Hence, the sprinkler system is not advisable in such plants/industries.

8) A better way of having water jet at 3.5kg/cm² pressure (as per table-7 part-IV of NBC,2016Guidelines):

Yes, there is. We can design a decentralized system that can produce 3.5 kg/cm² or even 10 times higher pressure using " Plunger Pumps" and "Fire Engine Pump".

*The new **plunger pumps** can generate 10 times more water pressure at a press of a button in case of any fire accident. These pumps do not need the pump house and it's associated complex machinery. It can be simply connected to normal existing plumb lines of any building and therefore doesn't need any dedicated down comer/Wet Riser pipelines. Therefore, this system is corrosion proof.*

Wherever " Fire Load" is expected to be very high/ Highly hazardous, Fire Engine Pump can be used in design of Fire safety equipment in this Decentralized system in place of Centralized fragile conventional system.

9) The types of decentralized pumps like plunger/Fire Engine pumps:

(a) Plunger Pumps are available from 2 HP to 16 HP and can be driven by corresponding 2 HP to 16 HP petrol engine or electrical motors.
*(b) These pumps can be fitted on to a mobile frame and can be carried from building to building or floor to floor just like a " **suitcase on wheels**" as they don't weigh more than 15KG.*
(c) Fire Engine Pumps of Centrifugal and exhaust ejector pumps.
All the above pumps are ISI certified and widely available in the market.

10) The Decentralized pumps like plunger/Fire Engine pump designed:

The plunger pump system is designed to produce water pressure of 40 kg/cm² to 200 kg/cm² and water discharges of 15 to 80 liters per minute. These pumps discharge water both in the form of mist and jet. Due to high-pressure, these pumps can throw water from 15 feet to 30 feet.

The fire engine pump is designed to produce water discharge ranging 180 to 20,000 Liters per minute. The design of water pressure should be customized by increasing water head based on Fire Load requirements in the building.

This system requires less water storage in buildings, enables firefighting from a distance and more efficient due to high water pressure and ability to generate 'mist'.

11) Water mist – Working Principle:

Water mist system is a fire protection system, which uses very fine water sprays (i.e., water mist). The small water droplets allow the water mist to control, suppress, or extinguish fires by ***cooling both the flame and surrounding gases by evaporation, displacing oxygen by evaporation.***

When water mist is used, it generates several other extinguishing effects that destroy the conditions necessary for fires to burn, and/or which can result in neutralizing the actual combustion.

1. Heat extraction:

The large water surface formed by the small droplets creates the conditions for an optimal exchange of energy between the water mist and the surrounding area. When the water droplets come into contact with the fire, they extract the heat until they evaporate. Of all known extinguishing materials, water has the highest evaporation enthalpy (2442 J / g).

2. Inerting effect:

The water mist is drawn into the fire by the air, where due to the high heat, it quickly evaporates. Due to the enormous increase in the volume of the water droplets as they evaporate, the oxygen is displaced at the source of the fire, and the fire is extinguished.

Additional positive side effects are the precipitation of gas, the leaching of smoke and gas, the increased safety for fire crews and personnel (because water mist lowers temperatures faster than any other medium, neutralizes the effect of smoke and cools down the objects).

12) Effectiveness of water mist in fighting fires:

Water mist has a central advantage over the conventional water jet, in that the mist can penetrate everywhere and thus cool and extinguish very efficiently. The advantage of such smaller droplets is that they create a larger water surface and can therefore, form a larger surface area to transport heat. The fine mist also has a lower sedimentation speed and can envelop the burning object. It can often even reach into hidden sources of fire that cannot be reached with traditional hoses.

The water mist allows more heat to be extracted from the source of the fire and the cooling effect has a very positive direct impact on the ambient temperature. Water mist also quickly binds and precipitates smoke and particles of soot.

13) The decentralized system using Plunger Pumps, Fire Engine Pumps etc., help to resolve the practical problems/Hardships highlighted in para.7:

Yes. It does.

In Fire Fighting, the most important thing for effective fire control is to use water at high pressure and minimize the discharge so that we do not exhaust water quickly. High pressure enables us to spray water in mist form, which is highly effective in controlling fires.

Exactly the plunger /Fire Engine pump is having such features.

1) ***In the case of Walmart India Private Limited Fire incident at Vijayawada****, the sprinkler system was not activated and that has affected the other fire protection systems, which failed due to system complexity in conventional system.*

Alternatively, if the plunger pump was in place, the staff could have used it immediately after noticing the fire and control it at the incipient stage only. The Plunger pump is flexible and easy to operate and can be put into operation at each floor thereby making firefighting very effective in controlling the fire at initial stage itself. Thereby, such a huge loss of property could have been avoided.

2) ***In the case of Sri Kanya theatre fire accident at Visakhapatnam****, the conventional fire fighting system components like Sprinkler Line & Hydrant Line were cut off from Water and Detection system was switched off and pump house was not in 'auto mode'. Therefore, all fire safety systems were ineffective and the fire could not be controlled by the conventional system.*

If we use Plunger pump system, after noticing the fire, it would have controlled the fire quickly with less quantity of water by Mist as it covers more surface area in fire when compared to water jet of conventional system.

3) ***In Swarna Palace fire accident and RAK ceramic incident****, the management noticed the fire and tried to douse with the available Conventional Firefighting equipment but due to non-availability of water in the pipelines, as the pumps were in working condition, the fire spread to the entire building.*

In those situations, if the New Plunger pumps are available at the site, the maintenance staff themselves operate the pumps easily to extinguish the fire at incipient stage, as each plunger pump is independent. Given that these are multiple pumps in any factory, failure of any one pump wouldn't have hampered firefighting efforts.

*4) **In Azico Biophore Pharmaceutical Industry fire accident**, the MS pipeline used in Wet riser system got rusted and small holes formed due to close proximity of industry to the Sea Coast, and the charged water was not effective, as it could not reach the fire spot with required pressure due to leakages in the pipe.*

The new technology Pumps like plunger or fire engine pumps are made of non-corrosive steel material and the suction/delivery of water is also through plumbing pipeline made up of plastic, which never gets rusted and very effective during fire. These pumps are more resilient and resist corrosion, hence effective for firefighting.

14) Comparison of Centralized system with Decentralized system using plunger pumps:

***(a) Cost Effectiveness:** The Decentralized system using New Plunger Pumps costs about 20% of the cost of installation of the conventional Fire Fighting Systems.*

***(b) Ease of Operation:** The Plunger Pumps are easy to operate and does not require technical training whereas Conventional Fire Fighting System requires technically trained persons for operation.*

These New Plunger Pump systems can also be useful in day-to-day activity such as Floor Cleaning, Wash Room Cleaning and Gardening etc. This day to day familiarity with new system, leads to better maintenance and "ease of use" in time of Fire Accident, which is a high stress event causing panic. Due to everyday use, people will not be afraid to use in case of fire. The conventional equipment is coloured red, can't be used for other purposes and designed to be used with trained persons only in case of fire accident.

As the Fire Accidents are low frequency events or happen rarely(less than once in 10 years), exclusive usage led to poor maintenance of the installed equipment.

In fact, in the recent major fire incident at Swarna Palace, Vijayawada in which 10 people lost their lives, the conventional system didn't function at all due to poor maintenance.

This malfunctioning can be clearly avoided in the Decentralized plunger pump based system as it can be regularly used for maintenance purposes.

(c) Maintenance: *The maintenance cost to replace the parts and peripherals in conventional Firefighting System is high and takes time but where as in the Decentralized System, the maintenance cost is low and doesn't required qualified engineers.*

(d) Resilience: *In case of Fire emergency/incidents at adjacent/nearby Buildings/Blocks, a mobile fuel Plunger pump of 5 or 16H.P, is flexible to be shared from neighborhood buildings in the area due to its mobility. In addition, it enables easy sharing of water from neighboring premises, if any additional requirement of water is required, whereas, the conventional system is not mobile as it is rigidly fixed to the buildings and can't be shared.*

(e) System Complexity: *In Conventional Fire Fighting Systems, two or more pumps were interconnected with various peripherals. In such complex system, if any component fails the whole system become futile. Decentralized plunger pump system, the pumps are independent units and can be mobile. So, even if some of them fail, other pumps can be used to douse fires as any building has multiple pumps.*

(f) Corrosion: *The conventional Fire Fighting components were manufactured with MS (Mild Steel) it leads to the corrosion due to the hardness of water and the atmospheric conditions, where the system is charged with water under the pressure of 3.5 Kg/Cm2 all the time. Further it will lead to leakage in various components thereby sometimes the input valves were shut off manually. In such cases, during any fire emergency the conventional system cannot be operated instantly.*

The Decentralized system using plunger pumps is made with non-corrosive materials. Hence, the above problems don't occur.

(g) Discharge Water and pressure*: The pumps in the conventional Fire Fighting systems were 450/900/1620/2280/2850 LPM (Liters per minute) water discharge with a single impeller, but the water pressure is 3.5 kg/cm² .So the volume of water discharge is very high but pressure is low. Hence it can discharge water only in Jet form, thus requires large storage of water.*

But in the Decentralized system using plunger pumps, the volume of water discharge is low (20 LPM to 80 LPM). However, the pressure of water discharge is very high (40 Kg/cm² to 120 kg/cm²) which can generate mist which is very effective in dousing fires, thus requires less storage of water.

In case more water discharge is required for any application , then more than one pump (16 HP) can be installed. It further enhances reliability and is still very affordable as it costs less than 20% of Conventional system.

In Decentralised system, for very high fire load applications, fire engine pump can be included that can produce water discharge ranging 180 to 20,000 Litres per minute.

(h) Power Consumption: *This pressure of water is maintained 24/7, 365 days so that water is available @3.5kg/cm² pressure when any fire accident happens. For maintaining such pressure, lot of technical equipments such as Electrical Pump, Diesel Pump and Jockey pumps etc., are installed. They need to be 'ON' all the time and hence this centralized system consumes power every hour, whether there is accident or not.*

Whereas, plunger pumps generates 40kg/cm² and upto 200 kg/cm² water pressure whenever required. There is no need to operate the pumps 24/7 and 365 days but they can be made operational when any fire accident breaks out instantaneously. Therefore, there is no wastage of power continuously in this system.

(I) Availability:

Various plunger pumps with ISI mark are available in the market from 0.5 Hp capacity to 200 Hp respectively. Indian Companies like Greentech, Kisan, Ultra Jet, Pressure Jet and Ambica Tools are the leading manufacturers of these Plunger Pumps.

These plunger pumps are same as the mist generating pumps which are widely employed in Indian Railways in the cleaning of coaches, Tracks, Wash room and Platforms etc.,and also used in Hydro Jetting, Hydro Blasting, High pressure Cleaners, Hydro static testing, Sewer Cleaning, Drain Jetty pumps and Wet sand blasting. Therefore, they are widely available and affordable.

(II) Fire Engine Pumps:

The Fire Engine pumps manufactured by leading companies like Wadia, Firex, Fireply, kirloskar, Grandfos and godiva , which are ISI certified pumps and widely available in the market. Different water discharge capacities of pumps ranging from 180 to 20,000 LPM are available. Most of the Fire Engines in India are mounted with these pumps only.

15) Experts:

The following experts have tested the plunger pumps and Decentralized system.

Sl.No.	***Name***	***Name of the University***	***Qualification***
i.	*Prof. K.N.Satyanarayana*	*IIT, Tirupati*	*PhD Civil Engineering*
ii.	*Sri P.C.Ramesh Kumar*	*R & B Chief Engineer*	*M.Tech, LLB*
iii.	*Prof. S. Srinivasa Prasad*	*V.R. Siddartha Engineering college*	*PhD Mechanical Engineering*
iv.	*Prof. Manas Kumar Pal*	*VIT – AP Campus*	*PhD Mechanical Engineering*
v.	*Prof. N. Venkata*	*SRM University*	*PhD Mechanical Engineering*
vi.	*Sri D. Seshi Reddy*	*KL University*	*M Tech, EEE*

They have opined that the "Decentralized system" is better than conventional "Centralized system"

16) In view of the circumstances as explained above and in accordance with section 13(2) of AP Fire Service Act,1999, the Director General, Fire Services clarifies that the word 'Satisfaction' includes Decentralized fire safety system using Plunger pumps, Fire Engine Pumps as an alternative to conventional Down Comer / Wetriser system in all types of structures / Occupancies. However, the choice is left to the managements.

PRATAP MADIREDDY,
Director General,
AP State Disaster Response
and Fire Services.

ANDHRA PRADESH STATE DISASTER RESPONSE AND FIRE SERVICES DEPARTMENT

II. Notification of Alternatives to Water Sprinklers in Design of Fire Safety Systems–Reg.

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1) The basis of power conferred on Director General, AP Fire services to issue No Objection Certificate for Fire Safety:

(1) As per Section 13 of A.P. Fire Service Act, 1999 Issue of No Objection Certificate: *(1) Any person proposing to construct a building of more than 15 meters height for commercial/business purpose, 18 meters and above height for residential purpose, and buildings of public congregation like schools, cinema halls, function halls, religious places, which are more than 500Sq. Meter in plot area or 6 meters and above in height shall apply to the Director General or any member of the service duly authorized by him in this behalf, before submission of such building plans to the authority or officer competent to approve the same under the relevant law, for the time being in force, for a no objection certificate along with such fee as may be prescribed.*

(2) *The Director General or any member of the service duly authorized by him in this behalf, shall within sixty days of receipt of such application, on being* ***'satisfied'*** *about the provision of fire prevention and safety measures as stipulated in the [National Building Code Guidelines, as amended from time to time] or any other law for the time being in force regulating such purpose or activity, shall issue a no objection certificate with such conditions as may be considered necessary and if not so satisfied, reject the same for reasons to be recorded in writing.*

2) The purpose of this notification:

The purpose is to define and elaborate the word ***"satisfied"*** *to include the following six alternative technologies to conventional water sprinkler system in all types of structures /Occupancies. However, the choice is left to the managements.*

1. *Installation of Temperature and Heat Sensors connected to hooters.*
2. *Aerosol Automatic extinguishing devices.*
3. *Dry Chemical Powder modular system.*
4. *CO_2 flooding system.*
5. *N_2 flooding system.*
6. *The clean agent flooding system.*

3) Nature of the National Building Code of India:

The National Building Code of India(NBC), promulgated by the Bureau of Indian Standards, is a comprehensive building code containing ***guidelines*** *for regulating building construction activities across the country. Relevant paragraphs of the "Foreword" to the NBC are extracted hereunder:*

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"The provisions of this Code are intended to serve as a model for adoption by local bodies, Public Works Departments and other government construction departments, and other construction agencies. Existing PWD codes, municipal byelaws and other regulatory media could either be replaced by the National Building Code of India or suitably modified to cater to local requirements in accordance with the provisions of the Code. Any difficulties encountered in adoption of the Code could be brought to the notice of the National Building Code Sectional Committee for corrective action".

From the above, it is evident that ***NBC does not have the force of law and is not statutory*** *in nature. It serves as* ***a Model Code*** *for adoption by all agencies involved in the building construction works.*

4) The intent and objectives behind Part-4 of National Building Code which deals with "Fire and Life Safety":

An extract from the Foreword to Part 4 of the NBC:

*"Absolute safety from fire is not attainable in practice. The objective of this Part is to specify measures that will provide that degree of safety from fire which can be reasonably achieved. (****The Code endeavors to avoid requirements that might involve unreasonable hardships or unnecessary inconvenience or interference with normal use****) and occupancy of buildings but insists upon compliance with minimum standards of fire safety necessary for building occupants and users".*

5) Power conferred on Director General of Fire Services to remove practical difficulties and to prescribe modern technologies for designing fire safety systems:

Yes, there is.

a) *The 'satisfaction' in 13(2) can be defined to include cost effective, Modern Fire Fighting Equipment that is equivalent or better in effectiveness of dousing fires than the existing conventional Fire Equipment.*

b) *As per clause 5.1 Part II of NBC,2016 : the provisions of the Code are not intended to prevent the use of any material or method of design or construction not specifically prescribed by the Code, provided any such alternative has been approved.*

"As per clause 5.2 Part II of NBC,2016 : The Authority(Director General of Fire Services) may approve any such alternative provided it is found that the proposed alternative is satisfactory and conforms to the provisions of relevant parts regarding material, design and construction and that material, method, or work offered is, for the purpose intended, at least equivalent to that prescribed in the code in quality, strength, compatibility, effectiveness, fire and water resistance, durability and safety."

c) *In addition, National Building Code Guidelines, give explicit powers to the Director General of Fire Services to remove hardships and practical difficulties in implementing provisions of National Building Code."*

"*As per Clause 3.4.2 of Part-IV of NBC, 2016: Exceptions and deviations to the general provisions of requirements of individual occupancies are given as applicable to each type of occupancy in 6.1 to 6.9. In case of practical difficulty or to avoid unnecessary hardship, without sacrificing reasonable safety, local head, fire services (Director General, SDR & Fire Services) may consider exemptions from the Code."*

d) *NBC-2016, 6.7 Industrial Building , 6.7.2.3 The following shall apply to high hazard industrial Occupancies:*

NOTE : All high hazard industrial occupancies shall have automatic sprinkler system or ***'such other protection'*** *as may appropriate to the particular hazard.*

e) *In place of water-based sprinkler system by treating the alternative system under* ***'any other'*** *indicated in sl.no.12 of the form no.10 under rule 26(1) of A.P. Fire and Emergency Operations&LevyofFeeRules,2006.*

6) About Water sprinklers:

Activates automatically with in the first few minutes of a fire breaking out. Sprinkler systems are designed to Limit damage to the building and Property, in case of unmanned/unnoticed areas. Otherwise, the fire exposed areas of building get over heated and decomposes concrete material leading to structural failure.

As per Table-7 part-IV of National Building Code guidelines prescribes installation of water sprinkler system in the following places:

i. *Any Building having the Basement/Cellar area exceeding200m^2.*
ii. *Residential Buildings height more than45meters.*
iii. *Hotel Buildings, where Floor area exceeding 1000 m^2 on any floor and Hotel Buildings height more than 15meters.*
iv. *Institutional Buildings height morethan15meters.*
v. *Assembly Buildings height more than 15meters.*
vi. *Business Buildings height more than 15 meters.*
vii. *Mercantile Buildings height more than15meters.*
viii. *Industrial Buildings comes under Moderate Hazard and High Hazard.*
ix. *Storage Buildings, irrespective of area and height.*
x. *Hazardous Buildings, irrespective of area and height.*

So, National ***Building Code (NBC)*** *Guidelines prescribe Sprinklers to protect buildings and their occupants from fire in almost all structures/ buildings.* ***However, these systems are typically intended to protect structures, not building contents or the ongoing operations of the business inside a building. Therefore, Hardships/Practical difficulties have arisen in various applications.***

7) The Conventional water Sprinklers System:

Automatic Sprinkler System is a Water Based System with water pipes fitted with sprinkler heads at suitable intervals and heights and designed to actuate automatically, control and extinguish fire by the discharge of water". This requires installation of centralized Down comer/Wet riser system so that we maintain and get required water pressure 24/7 and 365 days in the pipes that connect to sprinklers, as and when the sprinklers get activated due to heat or rise in temperature.

The disadvantages of such centralized system of maintaining water pressure, we have discussed and to overcome the practical difficulties/Hardships involved such system, we have notified "decentralized system" in Gazette.

8) The practical difficulties/hardships faced with water sprinklers:

i. Installing Sprinklers in Urea Go-down at Nagarjuna Fertilizers Limited:

The Nagarjuna Fertilizers and Coromandal Fertilizers Company, Kakinada is a manufacturer of fertilizer products like Urea, Ammonium Phosphate, Potash...etc. The plant is located right near the seacoast of Kakinada. As per NBC, it is required to provide Automatic Sprinkler System at storage warehouse as per table-7 part-IV. If any of the water sprinkler malfunctions and water gets leaked, the stored material gets damaged. ***Because of these technical reasons the company hesitated to install sprinklers in their go-downs. But the department denied to issue No Objection Certificate on this account for '4' years. Thus, in those areas, the traditional Automatic water Sprinkler System technically is not appropriate.***

ii. Installing Sprinklers in ITC Virginia Tobacco Godowns:

The ITC, Guntur is a leading tobacco buyer and quality tobacco exporter. They store Virginia tobacco (highest quality tobacco in the country, a premium product) at their go-downs. As per the National Building Code guidelines, the fire department personnel have insisted upon installation of sprinklers system in their godowns. But the Company hesitated, so the NOC was denied for two years on this account. If any malfunctioning of Automatic Sprinkler system occurs, the quality of the tobacco meant for export purposes will be degraded and it leads to huge damage to the value of the stored material. ***Therefore, mandating installation of sprinklers system causes genuine hard ship to the company.***

iii. Installing Sprinklers in Electronic Industry:

Foxconn and Cell one, electronic manufacturing Industries are situated at Sri city, Tirupati respectively in the State. Every Electronic Industry has a process to deal with the semiconductors, which are highly water sensitive in nature. As per the NBC guidelines, Automatic Sprinkler System has been insisted upon by the fire department, however, it is not technically appropriate to install. If Automatic Sprinkler System provided in the said Industry malfunctions, it may lead to vigorous and violent reaction. ***Therefore, it is a genuine practical difficulty.***

iv. Installing Sprinklers in Cold Storage Godowns:

There are about 278 Cold Storage Godowns existing in the State. Every Cold Storage Godown maintains the ambient temperate between (-2°c to 6°c). As per NBC guidelines, Fire Department insisted upon installation of sprinkler system. If Automatic Sprinkler System is provided, the water inside the Sprinkler system pipes gets frozen as the temperature inside the Cold Storage Go-down sometimes goes below 0°c and the purpose of the Sprinkler system will not be served.

Most godowns are used for storing red dry chilies, any water leakage from sprinklers will result in discoloring/damage to the red chilies. In addition, the sprinkler system occupies lot of economic space of the go down. ***Due to the above two critical reasons, which present genuine practical difficulties, none of the cold storages godowns in the State have installed such sprinklers and are functioning without obtaining any 'NOC' from the fire department unable to meet impractical conditionalities.***

V. Corrosion Environment: *Andhra Pradesh is having 981 KM of coastal line and major cities and industrial Occupancies are located near to sea. The corrosive nature of atmosphere near the sea, results in development of holes in iron pipes used in down comer or wet riser system that is necessary for working of water sprinklers system. Therefore, it is challenging to maintain the water sprinklers in working condition as they require continuous maintenance and frequent replacement.*

In fact, to overcome such leakages in pipes, may managements be closing valves to stop circulation of water at pressure in those pipes thus defeating the very purpose of installation of the system.

In fact, in 2020, in Swarna Palace @ Vijayawada, the management unable to maintain the frequently rusting/leaking pipelines, have stopped water from circulating in the fire pipes. For many days, nothing happened. But when, the fire accident happened on 9th Aug, 2020, the inmates tried in vain to get water from the preinstalled pipes, as there was no water, resulting in death of 10people.

Therefore, in corrosive coastal environment, we need to reduce/eliminate use of iron/GI pipes and find alternatives to this genuine and serious practical difficulty.

Vi) Pharmaceutical/Chemical Industries:

1. Solvent yard:

Solvents include different volatile chemicals like toluene, ethanol, methanol, benzene etc., and toxic chemicals like ammonia, chlorine..etc. These solvents are Poisonous and corrosive. Any water leakage results in chemical reactions with the solvents and chemicals stored. In fact, water is not the right medium to fight Fires in such chemical storage areas technically. Still Fire Department has been insisting on Sprinkler system installations citing NBC Guidelines. ***The pharma industry managements have given representation citing it as a genuine particular difficulty.***

2. Processing/Manufacturing areas:

In all pharma manufacturing blocks, most of the chemicals used in the manufacturing process are water reactive chemicals. Any accidental release of water from the sprinklers may cause spontaneous fire / explosion. In view of that, it is not recommended to provide the sprinkler system in these processing blocks and ***hence it needs to be removed supplanting with better system.***

3. Formulation unit:

Especially in Drug Formulation Units, the water in sprinkler/Down Comer System can foster microbial growth, which is dangerous for safe making of drugs as per FDA regulations. Hence, the sprinkler system is not advisable in such plants/industries.

Vii). In Addition, the Conventional automatic sprinkler system are not Technically feasible to be installed in the following premises:

1) where the water reactive materials are stored.
2) where crane movement up to roof level of the building.
3) Where Electrical Traction with testing process is carried out.
4) Where, Electronic goods/Servers are located.
5) Where painting process is undertaken.
6) Where the ambient temperature is maintained below4°C.
7) Where processing of non-metals which are water reactive, is carried out.
8) Where Boiler areas/Silos areas are located.
9) Where the height of single roof building is more than17meters.
10) Where the Operation theatres, X-ray theatres and Radiation related Activities are carried out.
11) Where Cable galleries, Electrical Transformer are located.

9) The alternatives to Water Sprinkle system:

The following are the alternatives to water sprinkler system:

a. Installation of Temperature and Heat Sensors connected to hooters.
b. Aerosol Automatic extinguishing devices.
c. Dry Chemical Powder modular system.
d. CO_2 flooding system.
e. N_2 flooding system.
f. The clean agent flooding system.

10) Temperature or Heat Sensors work during Fire conditions:

"Temperature Sensor" *is a device that will trigger the alarm whenever it sense the temperature above a designed temperature and also sends alerts and messages to the concerned people including the Fire Service Department.*

11) The aerosol extinguishing system:

The aerosol employs a fire extinguishing agent consisting of very fine solid particles and gaseous matter to extinguish fires.

Aerosol Equipment can be used in all class of Fires in confined Area. It has different models:

- *Manual Model*
- *Electrical Model*
- *Thermal Model (Which can also be used with Sprinkler Activation as an alternate to water Sprinkler System)*

Advantages:

- *Installation is very easy*
- *Do not require Pipe, Pumps & Water etc.*

12) Dry Chemical Powder modular system works:

(i) Smothering, cooling and shielding heat transfer contribute to the fire extinguishing characteristics of dry chemical agents. Dry chemical suppression not only offers protection for local areas or specific pieces of equipment but can also be used as a total flood system for enclosed rooms or spaces. These chemical agents are nonconductive and are used to protect a variety of fire hazards such as electrical transformers, flammable liquids and fuel truck loading racks.

(ii) Pharmaceutical industry:

In the process, where water reactive chemicals are used, Dry Chemical modular System built with temperature sensitive bulb can be very effective alternative to water sprinkler system.

13) N_2 flooding system works:

It uses nitrogen gas to displace oxygen from the fire source to put off the fire. Due to its inert and lightweight physical properties, Nitrogen gas is an excellent choice for use in closed electrical systems.

14) Co2 flooding system:

A fixed installation designed to displace the oxygen with Co2 in the enclosed buildings/ godowns and thus extinguish the fire.

15)Clean agent fire suppression system:

Clean agents as electrically non-conductive, volatile, or gaseous fire extinguishing agents that do not leave a residue upon evaporation. Clean agent fire suppression systems help extinguish fires in their incipient stages. They use gas instead of water to put out the fire without causing damage. When heat or smoke is detected, a signal is sent to the system that sends the clean agent directly to the hazardous area, usually within 10seconds.As the clean agent fills the room, the heat is absorbed which suppresses the fire.

Some examples of facilities that commonly use clean agent fire suppression systems include:

- *Laboratories and medical facilities with equipment*
- *Spaces that house critical building infrastructure*
- *Flammable liquid storage areas*
- *Museums*
- *Digital data repositories and record repositories*
- *Libraries*
- *Telecommunication centers*
- *Server rooms*

16) In view of the circumstances as explained above and in accordance with section13(2) of AP Fire Service Act,1999,the Director General, Fire Services clarifies that the word 'Satisfaction' includes the above six alternatives to conventional Water Sprinkler system as mentioned in Para.9 in all types of structures/Occupancies. However, the choice is left to the managements.

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