The Daily Star

AGENDA FOR URBAN CONCERN

Dhaka, Friday, July 19, 2002

Fire alarm for real life drama

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THEATRE houses, by their very nature are prone to fire accidents. Soft wall surfaces necessitated by room acoustics, cushioned seats, carpeted floor and drama sets are all highly combustible.

Electromechanical equipment and gadgets, as are common these days, are all potential sources of fire. Poor maintenance of aged plant and conduits can be a major cause of fire.

Dark and congested interiors, wall surfaces closed for lighting, sound and air-conditioning, inadequate doors in relation to number of persons to b served, and an audience engrossed in the proceedings will make escape from the hall difficult.

It is because of this inability of the users to find themselves in a safe place within the first few crucial minutes of a fire that will cause high casualties in many of the existing auditoriums.

Fire-fighting measures are grossly lacking. Even in situations where there are some extinguishers almost as an apology, they are not maintained regularly, meaning they may not function when required. Even if they do, there may not be any person well versed in operating the device.

In Bangladesh the installation of a 'No smoking' sign is often considered as the beginning and the end of a fire fighting design. People can get away by smoking in such designated areas, although it appears that the sign is well abided in our theatres, perhaps because of the type of clientele. Unfortunate though it may seem, I have seen uniformed Biman officials smoking publicly in 'no smoking' areas at ZIA just in front of the boarding dock.

It is often expected of the Fire Services to do miracles. It is not that they have not. But, under no circumstances, the Fire Services should be expected to save lives within the early stages of a fire. If people die in a fire, it is common to assign many reasons including the 'often-popular' late arrival of the firemen, but the only cause is that there was no means of escape from the smoke and fire.

Presently we are being rather complacent in view of the fact that fire accidents have not been that serious in our theatres. But, given the conditions, unless the situation improves there is all likelihood that a sever fire will strike one day.

In preparing today's piece, Architecture graduate Nesfun Nahar, has studied some theatres in the City, well-known more for what they stage and not necessarily for the setting of what could be a tragic real life drama.

Studying more examples would have been more convincing but given our observation, the findings would possibly have been worse because the surveyed theatres are among the better ones in the City and definitely from that in the rest of the country.

It is sincerely hoped that the concerned authorities, inclusive of theatre owners, RAJUK and DCC, and design professionals (architects, engineers and interior decorators) will pay heed to our fire alarm that we have been ringing for several years now.

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BUET

Guide House auditorium ceiling in alarming condition

Another view of Guide House ceiling

Fire extinguishers out of order at Public Library auditorium

Bare electrical wiring behind viewers at balcony of Guide House

Dhaka theatres should be made fire-safe

NESFUN NAHAR

IN Bangladesh the traditional forms of performing art are *jatra* and *palagan*, seasonal and open-air. But, modern theatre (or drama) is being practiced from the 18th century following the European cultural invasion. In these days when the very essence of our urban culture is being torn apart by Western influence and traditional performing arts are decaying, it is inspirational that a number of dedicated souls are striving to mould a new culture by giving importance to both the traditional and contemporary forms of theatrical arts.

Theatres, in fulfilling a socio-cultural requirement, mean the assembly of a group of people to witness a planned performance. In the developed countries, with the development of sophisticated building technology, increased population and higher living standards, designing of a theatre has become specialized and complex. Today in developed countries the involvement of a large number of people audience, performers, backstage crew and ancillary staff ensures that theatres are designed and executed with special regard to fire safety in every aspect. People have become increasingly conscious about health, safety and security. As a result, designers are compelled to incorporate fire safety measures within theatres. Continuous researches in developed countries have helped to discover measures of preventing fire, newer equipment to control fire and provide effective means of escape in all buildings.

Dhaka has a glorious cultural heritage. Bengali stage celebrated its 100th anniversary in 1972. The first Bengali play to be staged in Dhaka was *Nil Darpan*, in 1872, when for the first time audience bought tickets to see a play. This served as a great impetus to commercial performances. In the nineteen fifties Minerva Theatre was the only professional theatre group here. New theatre groups were formed in the 1960s. Experimental dramas were performed regularly at the USIS auditorium at Segunbagicha. During the War of Liberation in 1971 many veterans of Bangladesh theatre sought shelter in Calcutta, India. There they were very much impressed with the City's theatrical activities and crowd appreciation of stage performances. When these people returned home they dedicated themselves very energetically to the cause of the theatre movement in Bangladesh. Some of the plays by young playwrights were performed with high degree of skill and earned the admiration of both the audience and the critic. The first professional performance on commercial basis was by the Babubachan Natya Goshti, followed by Nagorik, Dhaka Theatre, and Theatre Group. The theatre movement in Bangladesh has not looked back since.

The very nature of theatre involves some special hazards, including safety hazards, fire hazards and chemical hazards. Backstage crew, performers, and sometimes even the audience can be at risk. Within the theatre, there is lifting of heavy scenery, and manipulation of this often-large scenery, props, and lighting or special effect equipment takes place in a very small space. The hours of work are irregular and the backstage is often very cramped, especially in older theatres, and there is the pressure that the 'show must go on'. Because theatres are so cramped, there is a great potential for general fire hazards such as blocked or locked exits, insufficient exits, or unlabeled exits, unsafe storage of scenery and other combustibles, lack of training in procedures if there is a fire, the use and storage of solvent-based materials such as hair spray, cleaners, or paints, the use of pyrotechnics or open flames, and sometimes a lack of fireproofing on items such as props, curtains, and scenery.

The designer must not allow the pursuit of artistic achievement or other objectives to obscure the need for safety. The public in general expects not to be put at risk unnecessarily in the buildings they use. It is the designer's duty to meet these expectations. Design that does not accommodate safety is not responsible design.

This building type has increased use of electricity and electromechanical equipment, combustible materials for acoustics and interior decoration, and as curtains, seats, floor covering.

Adequate fire safety measures are necessary prerequisites for enjoying a play. Most of these theatres lack adequate means of escape, fire extinguishers, fire alarm system, and users are without any fire drill. Fire prevention, precaution and control measures are generally lacking in all buildings, including this public building type.

The issue of fire safety in theatres of Dhaka is therefore a matter of great concern. Five theatres in Dhaka City were surveyed to identify the present condition of the theatres, which require improvement in terms of fire safety aspects.

It is not necessary to afford sophisticated safety measures for public buildings like theatres. But it is the obvious responsibility of the legislators, bureaucrats, architects and planners to draw appropriate plans for a fire-safe theatre within the supply of existing infrastructure and the given constraints. The immediate objective should be to reduce as much as possible the fire hazard so that the possibility of loss of human life and property may be greatly minimized.

The rapid urbanization in Dhaka city, has contributed to the recent trend of development of compact design and planning. These volumetric and congested building masses have multi-dimensional implications with regard to adjacent buildings, areas, traffic generation, parking and service utilities. But what is most neglected and ignored in such volumetric structures in Dhaka city are prevention, precaution and control with regard to fire.

No known research work has been undertaken to study fire safety measures of theatres in Dhaka city. Safety was apparently not a prime consideration for theatres built prior to the 1980s. In recent years there has been a growing concern about the need for more sophisticated theatres, which has been reflected through articles, published in the print media. In another positive development, Bangladesh National Building Code 1993, although not enacted by law, provides codes for fire safety and security in each type of buildings.

There are a number of theatres running without the provision of fire safety. Despite the deplorable conditions regarding fire safety and the high-risk environment in theatres of Dhaka city, as yet, no authority is concerned enough to provide adequate safety to the public and the regular users of the buildings.

The present study does not attempt to set up safety standards rather it is only intended to study the existing condition and the deviation from the BNBC code. However, considering time and resource constraints, the sample size and selection of variables were limited.

Fire is a chemical reaction that has four basic components: fuel, source of ignition, oxygen and the process of combustion, commonly referred to as the 'fire tetrahedron'. Any fire protection programme is designed to control or eliminate one or more components of the tetrahedron, thereby reducing the probability that fire will occur. Fire is classified into four risk classes based on the character of the combustible materials. It is important to understand the pattern of fire and also the mechanism to protect a building from the possible fire damage. The factors influencing fire severity maximum temperature reached and duration of burning are the size and shape of the theatre, the nature, arrangement and amount of combustible materials, the area and shape of openings and the thermal insulation of the walls and ceilings. The ability of the building to resist from collapse, resistance to flame penetration and resistance to excessive temperature on the exposed face are also important aspects. Most fires in buildings, including theatres, are caused by electrical equipment of some kind, including wiring faults.

There are two worlds of the theatre performance and backstage. While the audience can see some aspects of the backstage production (for example, the lights hanging from the lighting grid), for the most part it is hidden from audience view. One important concept to remember is that the theatre has various physical levels. There is the stage itself, where the actors perform, the trap doors, pits, stairs, and balconies.

Currently, computer runs many lighting systems. However, there is a potential for electrical hazards because of the high power used by many of the lights. Electrical and lighting equipment can be a source of heat and sparks which can create a fire. Examples of electrical and lighting hazards include proximity of hot lamps to combustibles and sprinkler heads, shorting of electrical wiring or equipment, inadequate wiring, deteriorated cables or equipment, carbon arcs, and inadequate grounding of equipment.

Other causes of fire are: smoking materials and matches, defective or improperly installed and operated electrical equipment and services, friction and static sparks, repairs and alteration hazards, increased use of combustible materials for interior decoration, improper instalment of air-conditioning equipments.

Fire extinguisher should be chosen depending on the severity of fire. Portable fire extinguishers can be divided into five groups: water extinguisher, Carbon Dioxide extinguisher, vaporizing liquid extinguisher, dry powder extinguisher, and foam extinguisher. Ê

The automatic sprinkler system is the most widely installed automatic extinction system, and covers a wide range of fire risk. It is used when the hot gases arise from the fire and spread beneath the ceiling or roof of the affected part of the building. A sprinkler system in theatre may include a water-spray system.

Carbon dioxide systems are generally used where it is not desirable or safe to use water, e.g. where there is a predominant electrical hazard (which is the main cause of fire in theatres).

According to the Fire Protection Association (UK) guidelines, the procedure to be followed in the event of a fire should include the following:

Raising the alarm and summoning the public fire brigade.

Immediate action with first-aid fire-fighting equipment.

Evacuation via a pre-arranged plan. Repeated practice of fire drill, at least once and preferably twice a year is desirable.

A person should take charge at the sense of the outbreak, pending arrival of seniors and the fire brigade, according to a pre-set allocation of responsibility.

Bangladesh National Building Code 1993:

The Bangladesh National building Code includes a very comprehensive set of regulations for fire protection. The BNBC includes among other matters on fire, clauses on precautionary measures, means of escape, open spaces, ceiling height, staircase, detection system, fire fighting equipment and built-in mechanisms.

The BNBC also includes matters related to theatre design, such as seats, obstruction-free aisles, exit requirements, length of travel, stage, rigging loft, foot lights and stage electrical equipment, trim, finish and decorative hangings, proscenium curtain.

There is a need to develop awareness among owners, architects, engineers and users that, there is genuine cause for concern about the prevailing situation in legislation regarding fire prevention, precaution and control. Rules should be enacted to enforce design and administrative actions for fire prevention, precaution and control in different building types, including theatres. Pending that the BNBC can be used voluntarily.

Five theatres in Dhaka were surveyed:

A. **Guide House Auditorium**, Natok Sarani

Owner: Bangladesh Girl Guides Association. Capacity: 360, including balcony.

Construction period: 1964. Rent basis started: 1983. Leading auditorium for commercial performance of dramas, preferred location by many. The present condition of the hall is alarming. Materials of the ceiling and wall are in deplorable condition. Close proximity to police station, fire station, hospital and clinics.

Materials: building RCC structure, brick wall, perforated plaster of Calcium Carbonate mixed with jute mat, partial 'bontile' finish; ceiling plywood, paint; floorpatent stone, stepped floor; door wood; stage floor wood; seats fixed type made of plastic.

B. **Nat Mandal,** Dept. of Theatre and Music, University of Dhaka.

Owner: Department of Theatre and Music, University of Dhaka.ÊCapacity: 200 persons. Construction period: Approx. 1960. As a theatre: since 1998.

Circular building designed by Architect Muzharul Islam as a part of the University Library. In 1998 allotted to the Department of Theatre and Music. Acoustic condition was so poor that it was used as a store of the library for the previous eight years. Architectural acoustic design, including air-conditioning, was incorporated by Architect Dr. Nizamuddin Ahmed to prepare it for the definite purpose. Presently used mainly by the department/university students. Rented out on festivals. Close proximity to police station, fire station, hospital and clinics.

Materials: building half-treated with absorbing panel, half with wood/plaster on the wall; ceiling 1/3 of the ceiling treated with absorbing panel of glass-wool topped by perforated mineral board and fixed 2" from the brick-wall. Two-thirds of the ceiling is treated with rough plaster finish; floor patent stone, flat floor, no carpet; door wood; stage floor wood; seats not fixed, cushions of foam and fabric; stage curtain heavy fabric.

C. **Showkat Osman Smriti Auditorium**, Sufia Kamal Public Library, Shahbagh

Owner: Ministry of Cultural affairs, Govt. of Bangladesh. Capacity: 525. Construction period: 1965~70. Consultant: Engineering Associates and Consultants Ltd. Rent basis started: 1972.

Throughout the year, among other festivals, theatre festival and film festival are held. About 25 seats are broken at present. Recent initiative for its renovation under the auspices of the Department of Architecture, Govt. of Bangladesh.

Materials: building partly treated with absorbing panel of perforated mineral board, painted and partly treated with wood as decorative material; ceiling ceiling treated with perforated mineral board with rough plaster finish; floor patent stone, stepped and sloped floor, covered with carpet (mat); door: wood; stage floor wood; seats fixed type made of cushion of foam covered with rexine.

D. **Nilima Ibrahim Auditorium**, Bangladesh Mahila Samity, Natok Sarani

Owner: Bangladesh Mahila Samiti. Capacity: 300 including balcony. Construction period: 1968. Rent basis started: 1968. Opening after renovation: 8 November 2001. Leading theatre for commercial performance. Previous capacity was 240 but after the recent renovation increased to 300. Only theatre with modern fire fighting equipment. Close proximity to police station, fire station, hospital and clinics.

Materials: building treated with absorbing panel, wood/plaster on the wall; floor patent stone, stepped floor, no carpet; door wood; stage floor wood; seats fixed type made of plastic; stage curtain heavy fabric.

E. **National Theatre**, Segun Bagicha, Dhaka.

Owner: Shilpakala Academy, Ministry of Cultural affairs, Govt. of Bangladesh. Capacity: 750 persons. Construction period: 1996~2001. Consultant: Prokalpa Upodeshta Ltd. Rent basis started: not yet commissioned.

Complex of two auditoriums built to meet the increasing demand for a modern national theatre in Bangladesh. The smaller experimental theatre with 300 seats was inaugurated by the then Prime Minister Sheikh Hasina on 14th June 2001. The main auditorium is yet to be completed, as work on stage, acoustics, interior finish and lighting remain. The. According to the Consultant the auditorium will be equipped with the most modern facilities and special fire safety consideration.

Materials: building exterior RCC structure, brick wall, curtain glass, acrylic sheet; floor marble tiles, neat finish.

Findings and related discussion:

Theatre	Entry/exit		Fire extinguishers		Sprinkler system	'No smoking' signs/symbols		Accidents	
	Number	In use	Type	Status	Status	In words	In picture	Number	Cause
Guide House	5	4	Foam	Unknown to the authority	--	3	1	Twice a year	Electric al spark
Nat Mandal	1	1	CO_2	Active	--	3	3	--	--
Public Library	6	2	CO_2	Out of order	--	3	2	Once a year	Electrical wiring fault
Mahila Samity	5	5	FOE & CO	Active	Working	3	1	Twice a year before renovati on	Electrical fault
Nationa l Theatre	6	--	--	--	--	--	--	--	--

Material: For decorative purpose it is recommended that less flammable materials should be used, but they are least concerned. Gypsum board is preferable to mineral board. Brick and concrete are less flammable than either mineral board or gypsum. Paper and fabrics used should be treated with fire resistant chemicals. But this is not generally practiced, as design and construction professionals are not at all conscious about fire hazard. In Guide House shows are regularly staged within a store of flammable materials. It can be hoped that after the renovation work the situation will improve.

Entry/exit: Number of entry/exit is satisfactory except in Nat Mandal, which has only one. In case of a fire at Nat Mandal, 200 persons will have to come out using only one exit. If the exit is on fire, there may have a catastrophe. Although people may escape through the backstage, they have to pass adjacent to the main. In the Public Library auditorium the secondary exit has become a dumping area and it remains locked all time. But there are sufficient a number of exits through the dressing room and that may help, although Means of Escape should not pass through another space.

In Guide House and Mahila Samity it is possible to reach a safe point within the recommended time of 2.5 minutes. Exits are properly marked and illuminated during show time. In the Public Library auditorium it is marked but not illuminated, whereas in the Nat Mandal it is not marked on both the doors.

Access to the telephone: Telephones in the administrative offices are not accessible to the public. During show time most of the offices remain closed, as most performance are in the evenings. Although in most cases there are phones in some adjacent shops but it may be difficult to contact the Fire Service because of the following:

There is no provision of public phone within the theatre complex.

The telephone number of fire service is unknown to the security guard and the authority.

It will require time to reach a public phone in case of emergency. The situation will be particularly problematic when shops will be shut during holidays and late at night.

The telephone system in Dhaka remains out of order especially in these public buildings.

Layout of service lines: Among the five categories of services electricity, water, gas, sewerage and telephone, half the theatres surveyed have the service lines exposed as opposed to them being concealed/covered.

This exposed wiring type has been found as one of the major causes of fire. In Nat Mandal and Mahila Samity the lines are now concealed. The situation in others will improve after their respective renovation works. No large theatre fire has as yet been reported to the fire service. Incidents of electrical sparks have taken place but were tackled by the management.

Fire Incidents: No record of fire incidents were found in any of the theatres although there have been some fire incidents.

Safety Measures: Most of the theatres surveyed have fire extinguishers. But many of them are out of order due to poor maintenance. They may not work in an emergency. In the Public Library all the extinguishers are dumped out side the hall. Only the Mahila Samity auditorium has automatic fire sprinkler and alarm system. The BNBC code requires the installation and regular inspection of automatic fire detection and alarm systems, and portable fire extinguishers as well as fire drill at least once a year.

Safety Signs and Symbols: In all the theatres the 'No Smoking' sign, both in words and picture, is displayed and strictly practiced. According to the Fire Service office, one of the major causes of fire accidents is burning cigarette ends.

In a country with only 20% literacy, special consideration should be given to pictorial safety signs and warnings in this and other building types.

Fire Safety preparedness entails

- Written emergency procedures
- Routinely scheduled fire drills
- Accessibility and clear marking of emergency exits
- Functional sprinkler system
- Appropriate fire extinguishers in good condition and maintenance
- Adequate training for use of extinguishers
- Working fire and smoke alarm systems
- Fireproof curtains, props, sets, and scenery. Fireproof costumes if there are any fire effects
- Active fireguards or fire fighters at each performance if extensive pyrotechnics are used
- Storage of combustibles, waste materials and rubbish in approved containers or disposed of properly
- Keeping oily rags, paint rags, oily waste or similar materials susceptible to spontaneous combustion in approved oily waste cans and empty daily
- Keep stored combustible materials away from exits and fire equipment
- Electrical work and wiring in accordance with code by licensed electricians. Electrical connections to distribution boxes only by members of the electrical crew

The number of fire incidents and its losses are increasing by the day. A good number of small fires, which did not develop or were extinguished by effective immediate action, are not recorded but could be significant in any serious study on fire. If it were possible to know how many small fires were prevented from becoming large and why, then it would be possible to make a study of the circumstances which were favorable for reducing the severity of accidental fires and the effectiveness of the fire prevention measures required in buildings could be assessed. Continued study of fire incidence is, therefore, important and it is to be hoped that eventually some of this information, which is lacking may emerge.

New theatres will be established and the dilapidated ones will be renovated adopting modern technology. The whole subject matter of fire prevention, precautions and control needs to be reviewed in theatres of Dhaka City. Laws should be enacted and guidelines provided so that it may be possible for the professionals to adopt practical measures to counter the potential threat of fire. Cause of fire must be ascertained so that faults may be corrected.

The basic requirement of a theatre is for the audience to enjoy every aspect of a show including maximum comfort, minimum distraction and complete safety.

Simultaneous to all other design considerations, the architect must take into account the need for a fire-safe theatre so that the passive and active measures may be integrated with the structure, and not added as an afterthought.

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Public Library secondary exit has become a waste dump and remains closed during show time.