

An Analysis on Fire Prevention and Fighting Act, 2003: Dhaka City Perspective

Md. Nayem Alimul Hyder

Assistant Professor, Department of Law, Khwaja Yunus Ali University, Bangladesh

Corresponding author: lawmnahyder@yahoo.com

ABSTRACT

Fire Protection and Detection system is an important and essential event in modern life to protect the wealth, life, and other valuable assets. Previously, people used sand, and bucket of water to kill fire manually. But these techniques are backdated and risky that it could not work properly in past and in today's life. In a developed country no building is designed without building safety code of firefighting. People in under developed countries like Bangladesh safety awareness is increasing rapidly now a day. Presently, more than 11 million people are living in Dhaka City. The development trend of Dhaka is deliberately shifting vertical direction to cope with the extensive population pressure. Nowadays, high rise buildings are being constructed in every part of the city but in most cases the dwellings are being constructed without maintaining the planning rules and regulations. This research tries to explore the existing provisions regarding Fire Service and Civil Defense activities in Dhaka City and to assess people's preparedness in case of combating fire accident. Fire hazard vulnerability of Dhaka City dwellers has been increased due to reckless building construction and nonconformities of Fire Protection Act, 2003. Dhaka City has been experiencing many fire accidents at present and in most cases lack of proper precautionary measures along with the institutional inefficiency, insufficient equipment support and lack of public awareness are causing this situation more complex. Existing planning rules and laws are also insufficient to the present context of Dhaka City. As most of the dwellers do not know how to use the firefighting equipment, in most cases all the precautionary measures for combating fire generally go in vain. Therefore, institutional reforms, strengthening of capacity at individual and institutional level are needed in order to reduce fire hazard risks of Dhaka City.

Key Words: *Fire Prevention, Fire Service, Civil Defense, Fire Protection Act, 2003 and Dhaka City.*

INTRODUCTION:

Fire is the rapid oxidation of a material in the exothermic chemical process of combustion, releasing heat, light, and various reaction products. Slower oxidative processes like rusting or digestion are not included by this definition. The flame is the visible portion of the fire. If hot enough, the gases may become ionized to produce plasma. Depending on the substances alight, and any impurities outside, the color of the flame and the fire's intensity will be different. Fire in its most common form can result in conflagration, which has the potential to cause physical damage through burning. Fire is an important process that affects ecological systems across the globe. The positive effects of fire include stimulating growth and maintaining various ecological systems. Fire has been used by humans for cooking, generating heat, signaling, and propulsion purposes. The negative effects of fire include water contamination, soil erosion, atmospheric pollution and hazard to life and property. Fire protection is the study and practice of mitigating the unwanted effects of potentially destructive fires. It involves the study of the behavior, compartmentalization, suppression and investigation of fire and its related emergencies, as well as the research and development, production, testing and application of mitigating systems. In structures, be they land-based, offshore or even ships, the owners and operators are

responsible to maintain their facilities in accordance with a design-basis that is rooted in laws, including the local building code and fire code, which are enforced by the Authority Having Jurisdiction. Buildings must be constructed in accordance with the version of the building code that is in effect when an application for a building permit is made. Building inspectors check on compliance of a building under construction with the building code. Once construction is complete, a building must be maintained in accordance with the current fire code, which is enforced by the fire prevention officers of a local fire department. In the event of fire emergencies, Firefighters, fire investigators, and other fire prevention personnel are called to mitigate, investigate and learn from the damage of a fire. Lessons learned from fires are applied to the authoring of both building codes and fire codes.

METHODOLOGY:

This Paper is descriptive and suggestive in nature. This is a short research. It was almost difficult to do wide fieldwork because of lack of time and opportunity. This paper is based on secondary data collected from Fire Protection Act, 2003, text-books, journals, Newspaper, websites. The collected data have been processed and prepared in the present form in order to make the study more informative, analytical and useful for the users.

FIRE PROTECTION:

Fire Protection and Detection system is an important and essential event in modern life to protect the wealth, life, and other valuable assets. Fire protection is the study and practice of mitigating the unwanted effects of potentially destructive fires. It involves the study of the behavior, compartmentalization, suppression and investigation of fire and its related emergencies, as well as the research and development, production, testing and application of mitigating systems. In structures, be they land-based, offshore or even ships, the owners and operators are responsible to maintain their facilities in accordance with a design-basis that is rooted in laws, including the local building code and fire code, which are enforced by the Authority Having Jurisdiction. Previously, people used sand, and bucket of water to kill fire manually. But these techniques are backdated and risky that it could not work properly in past and in today's life. In a developed country no building is designed without building safety code of firefighting. People in under developed countries like Bangladesh safety awareness is increasing rapidly now a day. Fire protection has three major goals:

1. Continuity of operations - on a public scale, this is intended to prevent the interruption of critical services necessary for the public welfare (e.g., a 911 emergency call center).
2. Property protection - on a public scale, this is intended to prevent area wide conflagrations. At an individual building level, this is typically an insurance consideration (e.g., a requirement for financing), or a regulatory requirement.
3. Life safety - the minimum standard used in fire and building codes

When deciding on what fire protection is appropriate for any given situation, it is important to assess the types of fire hazard that may be faced. Following are the types of fire;

1. Fires that involve flammable solids such as wood, cloth, rubber, paper, and some types of plastics.
2. Fires that involve flammable liquids or liquefiable solids such as petrol/gasoline, oil, paint, some waxes & plastics, but not cooking fats or oils.
3. Fires that involve flammable gases, such as natural gas, hydrogen, propane, butane.
4. Fires that involve combustible metals, such as sodium, magnesium, and potassium.
5. Fires involving cooking fats and oils. The high temperature of the oils when on fire far exceeds that of other flammable liquids making normal extinguishing agents ineffective.

FIRE SAFETY:

Fire safety refers to precautions that are taken to prevent or reduce the likelihood of a fire that may result in death, injury, or property damage, alert those in a structure to the presence of an uncontrolled fire in the event one occurs, better enable those threatened by fire to survive in and evacuate from affected areas, or to reduce the damage caused by a fire. Fire safety measures include those that are planned during the construction of a building or implemented in structures that are already standing, and those that are taught to occupants of the building. Threats to fire safety are referred to as fire hazards. A fire hazard may include a situation that increases the likelihood a fire may start or may impede escape in the event a fire occurs. Fire safety is often a component of building safety. Those who inspect buildings for violations of the Fire Code and go into schools to educate children on Fire Safety topics are fire department members known as fire prevention officers. The Chief Fire Prevention Officer or Chief of Fire Prevention will normally train newcomers to the Fire Prevention Division and may also conduct inspections or make presentations. Some common fire hazards are:

1. Kitchen fires from unattended cooking, such as frying, broiling, and simmering
2. Electrical systems that are overloaded, resulting in hot wiring or connections, or failed components
3. Combustible storage areas with insufficient protection
4. Combustibles near equipment that generates heat, flame, or sparks
5. Candles and other open flames
6. Smoking (Cigarettes, cigars, pipes, lighters, etc.)
7. Equipment that generates heat and utilizes combustible materials
8. Flammable liquids and aerosols
9. Flammable solvents (and rags soaked with solvent) placed in enclosed trash cans
10. Fireplace chimneys not properly or regularly cleaned
11. Cooking appliances - stoves, ovens
12. Heating appliances - fireplaces, wood burning stoves, furnaces, boilers, portable heaters
13. Household appliances - clothes dryers, curling irons, hair dryers, refrigerators, freezers
14. Chimneys that concentrate creosote
15. Electrical wiring in poor condition
16. Batteries
17. Personal ignition sources - matches, lighters
18. Electronic and electrical equipment
19. Exterior cooking equipment - barbecue

A GLIMPSE OF THE FIRE PREVENTION AND FIGHTING ACT, 2003:

Definitions

- 1 Workshop: Building or place which is used for processing combustible materials.
- 2 Combustible Materials: Chemical or any materials which is declared by the Government as Combustible materials.
- 3 Processing: Transformation, change, repair and manufacturing of Combustible materials.
- 4 High-rise Building: Any building which is minimum 7 stories or 24 meters high.
- 5 Commercial Building: Building which is used for Bank, Insurance or other financial institutions, commercial and industrial purposes, Government related jobs and shopping complex.
- 6 Building: includes any establishment, high-rise building, tin-shed room, semi-paka room, Room, muddy room, small tent.
- 7 Warehouse: includes any establishment and building which is used to stoking, preserving and pressing, shorting, selling and buying combustible materials.

Establishments which needs Fire License under this law:

1. Workshop
2. Warehouse
3. High-rise building
4. Commercial building and establishment

Responsibilities for getting Fire License:

The owner or the person in possession of the following shall be liable to get fire license under this law:

1. Workshop
2. Warehouse
3. High-rise building
4. Commercial building and establishment

Renewal of License:

The license shall be renewed annually by providing renewal fees. The Director General (DG) of the Fire Service and Civil Defence Authority or his designated officer will renew license subject to there is no further recommendations for the establishment applied for license renewal.

Transfer of License

The license is not transferable. If the ownership of an establishment or building is changed then the new owner will get the license for the establishment under the law.

PROCESS TO GET FIRE LICENSE

Following Documents are needed for getting a fire license;

1. Application on the “prescribed form” addressing to the Deputy or Assistant Director-Fire Service & Civil Defence Authority.
2. If the business runs on its own building/premises- “Assessment Certificate” of tangible and intangible assets of business by the City Corporation or Pouroshova.
3. If the business runs on hired building/premises- “Rent Agreement”.
4. “Lay out or Floor Plan” approved by the Rajuk or Pouroshova.
5. If the institution is Limited Company- “Memorandum of Articles”.
6. “No Objection Certificate” from the local Govt. Authority (Mayor/Counselor of Union, Pouroshova, City Corporation)
7. If it is High-rise or Commercial Building- “Clearance Certificate” from the Fire Service & Civil Defence Authority. To download “Clearance Certificate” click here.
8. “Duplicate Copy of Treasury Chhalan” addressing to D.G. Fire Service & Civil Defence Authority by which License fees is deposited.
9. “Detailed descriptions” of Combustible materials will be preserved or processed in Warehouse or workshop.
10. If Garments- Additional information will be submitted as per Fire service requirement.
11. “List and Lay Out” of specific measures for fire prevention and fire safety taken in the establishment.

PROCESS TO GET CLEARANCE CERTIFICATE FOR HIGH-RISE BUILDING

Papers are required to submit for getting Clearance Certificate for High-rise building or Commercial building:

1. Proposed building name, address, owner(s) name and developer's Name and address if any.
2. Details description of the proposed building- number of floors and size of each floor.
3. Lay out of each floor.
4. Proposed stairs, lifts and emergency evacuation routes description.
5. Description of Fire Detection System.
6. Location of Control room and mode of Communication for internal and external communication.
7. Description of Public Address (PA) system.
8. Description of Electric overhead line in front of the proposed building?
9. Description of front road of the proposed building.
10. Sources of water to extinguish fire at the proposed building.
11. Description of Water Tank(s)- overhead and underground both.
12. Is the proposed building free from Antenna or such installation?
13. Description of Fire compartment(s) and Fire Resistance Door(s).
14. Description of Fire Hydrants and wet/dry risers.
15. Building Safety Management System.
16. Description of Fixed Fire Fighting System if any.
17. Description of Fire Extinguishers to be used in the building.
18. Building design and drawing Lay out
19. Fire Fighting Plan.

POWER OF THE FIRE SERVICE & CIVIL DEFENCE AUTHORITY:

During Fire Fighting Department have following power;

1. Can instruct any person to leave the place
2. Can displace any establishment
3. Can stop water flow to the nearest locality for fighting fire
4. Can disperse mass people gathering.
5. Can take any necessary steps to fight fire.

Power to access:

Any officer of the Fire Service and Civil Defence Authority can enter into an building or an establishment, inspect, visit, exam, scale and collect information.

Power to investigate:

Can investigate any fire incident, summon any person during investigation period and seize any evidence.

Punishment under this Law

If anybody operate any building or establishment as a workshop and warehouse without Fire License then following punishment may be applicable:

1. Three (3) years of imprisonment.

2. Financial penalty
3. May seize all material of that building or establishment

If anybody fails to comply terms in relation to License then following punishment may be applicable:

1. Six (6) months of imprisonment.
2. Financial penalty

If anybody violates the rules of this law and store, process, press and sort combustible materials or chemicals in any building or an establishment then following punishment may be applicable:

1. Two (2) years of imprisonment.
2. Financial penalty
3. May seize all material of that building or establishment

BANGLADESH FIRE SERVICE AND CIVIL DEFENSE:

Fire Service and Civil Defense Directorate is an important service providing Organization of the Government People's Republic of Bangladesh. The present Fire Service and Civil Defense has been established in 1982 with amalgamation of the then Fire Service Directorate, Civil Defense Directorate and The Rescue Department of Roads and Highway. At present the department is running with the Agni Protirodh O Nirbapon Ain 2003 (Fire Prevention and Fire Fighting Law 2003). The department is flourished by the motto Speed, Service and Sacrifice under the Ministry of Home Affairs. The employees of this department always keep themselves standby as first responder for fire fighting, fire prevention, search & rescue, to render first aid, to send the serious casualties to hospital and to provide fire safety for the VIP's. The employees of this department remain stand by round the clock following the motto Speed, Service and Sacrifice. Fire Service and Civil Defence Authority provide following support to the citizen of Bangladesh:

1. Fire Safety Consultancy
2. Fire Prevention and Fighting Training
3. Fire Drill.

FIRE ACCIDENT IN BANGLADESH:

It is assumed that over 500 RMG workers die in factory fires in 22 years. At least 500 workers have been killed in factory fire in the readymade garments sector in last 22 years, according to Bangladesh Institute of Labour Studies. The BILS statistics showed that from 1990 to 2012, 431 workers had died in 14 major fire incidents in several RMG factories. A BILS official said the statistics was based only on major fire incidents and might not be the accurate number of deaths in RMG factory fires. Besides this, there are a number of incidents where one to six workers had died, which were not integrated in the statistics, he said. The BILS official also said they prepared the report according to the statistics of the government and Bangladesh Garments Manufacturers and Exporters Association. The number of deaths in factory fires varied between the statistics of BILS and BGMEA. BILS statistics showed that 431 workers had died in only 14 major fire incidents in last 22 years while BGMEA showed that a total of 388 workers were killed in factory fires in the sector during the period. Labour leaders, however, rejected both the statistics prepared by BILS and BGMEA and observed the number of deaths from factory fires in RMG sector would be more than thousand.

They termed the BGMEA statistics 'completely fake and unacceptable'. Labour leaders said after all the incidents, many probe committees had been formed but none was punished or even identified as responsible for those incidents. In most cases, findings of the probe committees were not published. The major incidents include killing of at least 111 workers in the latest fire incident at Tazreen Fashions, 51

workers in fire at Garib and Garib, Matrix Sweater and Ha-Meem Group in 2010, death of 65 workers in factory fire at Chitagong KTS composite textile mills in 2006, death of 20 workers at Narayangonj Sun Knitting in 2005, 48 workers killed in a fire at a garment factory in Narshingdi in 2004, 53 workers killed in 2000 in a fire at NarshingdiChowdhury Knitwear, death of 22 workers at Mirpur Rahman & Rahman Apparels in 1997, death of 27 workers at Mirpur Tamanna Garments in 1997, and 27 killed in fire at MirpurSareka Garments in 1990.

Moshrefa Mishu, president of Garments Workers Unity Forum, told New Age that they have a study on workers' death in factory fire and the number of victims is 1,225 since 1990. She said none can say the correct number of victims in factory fire in Tazreen Fashions at Ashulia. The administration announced the number 111, but the real number is more, she observed. Moshrefa alleged that the factory owners and BGMEA claimed that Tazreen Fashions was a compliant factory, but the reality did not support their claim. Mahbubur Rahman Ismail, president of Bangladesh textile Garments Workers Federation, said major 80 fire incidents took place in last 22 years and the number of the deceased was not less than thousand. He alleged the factory owners were mainly responsible for the incidents as they were not complying with the rules and regulations. Though probe committees had been formed after all those incidents, people do not know who were responsible for those tragic incidents.

NIMTOLI TRAGEDY: THE WORST NIGHTMARE

The havoc caused by the devastating fire at Nabab Katra, Nimtoli in old Dhaka on the night of June 3 has sent shock waves across the country and beyond. Never before, as the burn unit chief of Dhaka Medical College and Hospital said, had the burn unit of DMC or for that matter any other hospital in the country seen so many burnt people coming for treatment at a time. Nor had Azimpur graveyard ever seen so many coffins at a time. 117 people were instantly burnt to death, and at least another 150 received critical burn injuries. 38 of them are still fighting for life in hospital. Among the dead are thirteen dear and near ones of a bride and bridegroom who got together in the bride's house at Nimtoli to attend an engagement party. All the 21 people residing in one of the seven houses caught in the blaze were burnt alive. It was impossible for anyone who had been either eyewitness or watching television coverage or reading newspaper reports of the incident to hold back their tears. Ferdousi, a 28-year old woman, tried in vain to save the 2-year old baby of her sister by holding the baby tightly in her lap. Both were burnt alive. It was difficult for the domes at morgue to separate the dead bodies of the two held so tightly against each other.

Babu, a small trader of Nimtoli, sacrificed his life in a vain attempt to save a 10-year old girl from the inferno, leaving behind his young wife to mourn his death and deliver their first baby at any moment.

It was good to see that the entire nation, profoundly shocked as it was, stood by the victims with all the support and sympathy. A national mourning day was observed throughout the country with due solemnity. Flags were kept at half-mast atop all official, semi-official buildings and establishments at home and Bangladeshi embassies abroad. Special prayers were held at mosques, temples, churches and pagodas all over the country for salvation of the departed souls. The heads of governments of several foreign countries, including the USA and Great Britain, instantly sent their condolences.

There can be no argument that a chemical warehouse situated on the ground floor of a five-storied residential building was the main source, if not the origin, of the fire, which erupted like a volcano and spread like wildfire, engulfing the entire building and the neighborhood in a flash. It is estimated that 80% of residential houses in old Dhaka have some kind of factory or warehouse on the ground floors and residential flats on other floors. Most of these warehouses or factories are either of chemicals or plastic materials. Both are dangerously toxic and inflammable. It is also reported that 50 thousand houses of old Dhaka are risky for living. Among them, 22 thousand are at high risk. Nearly 3 million people living in old Dhaka face the risk of death. It is also reported that most of the houses in old Dhaka grew in clusters. The roads there are very narrow. So narrow that ambulances or fire brigade vehicles find it

extremely difficult to approach the place of occurrence for any rescue operation. That is what happened in the Nimtoli incident.

Now the point is, every business concern, whether it is a warehouse or a factory, needs a trade license. The license is issued by Dhaka City Corporation. If it deals with toxic or inflammable materials, like chemicals or plastic, it certainly needs clearance from at least two other departments -- environment and industry. In addition, probably all warehouses and factories need an inspection certificate from the Fire Brigade authority. The question is, did the Nimtoli chemical warehouse have the required clearances? If they had, how did they get them? If they didn't have them, then what were all these agencies doing all these years?

The law is that there cannot be any commercial organisation, let alone a factory or chemical warehouse, in a residential building. How is it that there was a chemical warehouse in a residential building? It is the job of the Rajdhani Unnayan Kartripakha (Rajuk) to see that the city grows in a planned way with due regard to the comfort and safety of the city dwellers. Did they do their jobs properly? If they did, how is it that the fire brigade could not easily approach the site because of narrow roads? Why do we talk about Nimtoli or old Dhaka? What about new Dhaka? Has it grown the way it should have? The answer is a big NO. Even some of the city experts who were at one time or other entrusted with the job of development of the capital now agree that Dhaka has grown in a most unplanned manner, so much so that it has now become an almost inhabitable city. The main reason behind all these anomalies and lapses is the lack of accountability, the presence of all-pervading corruption to be blunt. The government has ordered an official investigation to find out the causes and persons responsible for the incident. There is nothing more to gain from these investigations. The reasons are all apparent. The persons or agencies responsible for these happenings are not also unknown. What is required now is direct action. The first step would be a thorough cleansing of the related agencies followed by establishment of accountability in every tier of administration.

CHALLENGES REGARDING FIRE PREVENTION AND FIGHTING SITUATION:

1. **Huge Numbers of Death:** It is assumed that over 500 RMG workers die in factory fires in 22 years. At least 500 workers have been killed in factory fire in the readymade garments sector in last 22 years, according to Bangladesh Institute of Labour Studies. The BILS statistics showed that from 1990 to 2012, 431 workers had died in 14 major fire incidents in several RMG factories.
2. **Narrow Roads:** It is reported that most of the houses and factories in Dhaka grew in clusters. The roads there are very narrow. So narrow that ambulances or fire brigade vehicles find it extremely difficult to approach the place of occurrence for any rescue operation.
3. **Dangerous chemicals everywhere:** It is estimated that 80% of residential houses in old Dhaka have some kind of factory or warehouse on the ground floors and residential flats on other floors. Most of these warehouses or factories are either of chemicals or plastic materials. Both are dangerously toxic and inflammable.
4. **Lack of accountability:** Lack of accountability is one of the main reason, the presence of all-pervading corruption to be blunt. The government has ordered an official investigation to find out the causes and persons responsible for the incident. There is nothing more to gain from these investigations.
5. **Insufficient Punishments:** There are no hard punishment provisions under existing Act. Such as if anybody operate any building or establishment as a workshop and warehouse without Fire License then he or she will get only three (3) years of imprisonment.
6. **No special Court or Tribunals:** There are no special Courts or Tribunals for speedy trial against fire accident disputes in Bangladesh.
7. **Inadequate knowledge:** There is inadequate knowledge of govt. officials, concerned departments and citizen regarding fire prevention and fighting.

SUGGESTIONS:

1. The city authority should take necessary steps to preserve the natural water bodies. Already many water bodies of Dhaka City have been subjected to the encroachment. An urgent initiative is necessary to recover them.
2. In the unplanned areas, government may take necessary steps to widen the road. Community motivation for participation in this regard is highly encouraged.
3. Ensure strict enforcement of the existing legal provisions. The manpower of the development control authority and Bangladesh Fire service and Civil defence Authority (BFSCDA) could be increased gradually in order to proper monitoring of the law enforcement.
4. Modern training program should be provided for the staffs of FSCDA. Experts should be appointed to demonstrate the efficient rescue service and the handling process of emergency situation. Also the quality of training on Medical First Responder (MFR) and Collapsed Structure Search and Rescue (CSR) should be improved. Also experienced consultants can be appointed for effective management of fire fighting.
5. There should be some assigned monitoring team for monitoring the fire fighting preparedness of different industries and garments and the team should be empowered to cancel the license of the concerned agency. For the convenience, the team should visit the buildings under construction to inform about the issue.
6. The government can construct artificial reservoir on the roof of public buildings and mosques in the locations where natural water sources is very limited.
7. Media is one of the most powerful sources for awareness generation. The electronic media as well as the newspapers could be an effective source to make people aware of fire hazards. Recently 'Fire Hazard Week' has been observed in many cities of Bangladesh and undoubtedly such initiatives are the great sources of generating awareness among the people.

CONCLUSION:

The real city is a safe city that ensures the security of living and livelihood of its citizens. Safety issues should be given high priority in the urban areas because of the involvement of huge population in a limited geographical space. At present BFSCDA is working as the emergency service providing organization and the authority has very limited involvement to the planning decision. The city authorities like RAJUK, City Corporation etc. are also characterized by weak institutional capacity. The existing legal provisions are also limited and needed to be modified for proper enforcement. Dhaka is growing in an unplanned manner and unfortunately the authorities have very limited control over the development trend. Urban fire hazard management is not only an institutional issue; rather it is much more a planning issue as it involves safety concern of the city dwellers. It would be very difficult for a single organization to provide necessary support for fire hazard management of Dhaka City. Fire safety issues should be addressed from the individual building premises to the city planning level.

REFERENCES

1. Alam, H. 2005. 'Fire Law Aside in Most High Rise Buildings', The Daily New Age, New Age Metro, Dhaka, 10 February 2005.
2. BBS. 2001. Bangladesh Population Census 2001: Community Series, Zila Dhaka, Bangladesh Bureau of Statistics, Government of Bangladesh, Dhaka.
3. BFSCDA. 2007. BFSCDA Annual Report 2001-2007. Published by Bangladesh Fire Service and Civil Defense Authority, Dhaka.
4. Hye, H.A. 2006. 'Sky is the Limit?', The Daily New Age, Sunday Column, New Age Editorial, 10 September 2006, Dhaka.
5. Khan, M.H. 2007. 'Dhaka this Week', Holiday Metropolitan, 16 February 2007.

6. Maniruzaman K. M. and Haque, Q. M. F. 2007. 'Fire Hazard in Dhaka City: A Case Study of the Service Area of M ohammadpur Fire Station', in S. Jahan, and K. M. Maniruzzaman (ed.) Urbanization in Bangladesh-Patterns, Issues and Approaches to Planning. Dhaka: Bangladesh Institute of Planners (BIP).
7. Rouf, M. A. and Jahan, S. 2007. 'Spatial and Temporal Patterns of Urbanization in Bangladesh', in S. Jahan, and K. M. Maniruzzaman (ed.) Urbanization in Bangladesh-Patterns, Issues and Approaches to Planning. Dhaka: Bangladesh Institute of Planners (BIP).
8. Sayeeduzzaman, M. 1990. 'A Fire Hazard Assessment Model and Fire Hazard Zone in Dhaka SMA in M. A. Islam (ed.) Environment, Land Use and Natural Hazards in Bangladesh. Dhaka: University of Dhaka.