

Fire: Shoppers' right to escape

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THE fast growing multi-storied shopping centres with their dazzle and splendour may appear to be specks of paradise for shoppers in a bowl of rubbish that passes as capital Dhaka City, but in truth most of them have been and are being constructed and operated with little heed to calls for a safer environment.

A shopping centre caters to a mixed crowd of young and old, the aware and the unaware, the able and the unable, whose behaviour in a fire situation will at best be chaotic. It is therefore important to provide for as unambiguous as possible a floor layout with provisions of finding a way out in case of a fire even for those who are not trying to. In that stipulation a Means of Escape for the large number of visitors, many in that building for the first time, which is typical in a shopping centre, shall be ensured.

The problem is multiplied in a multi-storeyed shopping centre because it is many times more difficult to find timely accommodation to escape through a vertical circulation, limited as they are.

In the absence of legislation that relates floor area with height, there is a *carte blanche* to inflate a building, shopping centres included, to the limits of its site (even beyond if the neighbour is weak or unwatchful) and as high as money can afford, the respect to the approach road as entailed in the Building Construction Rules 1996 having been raped since long.

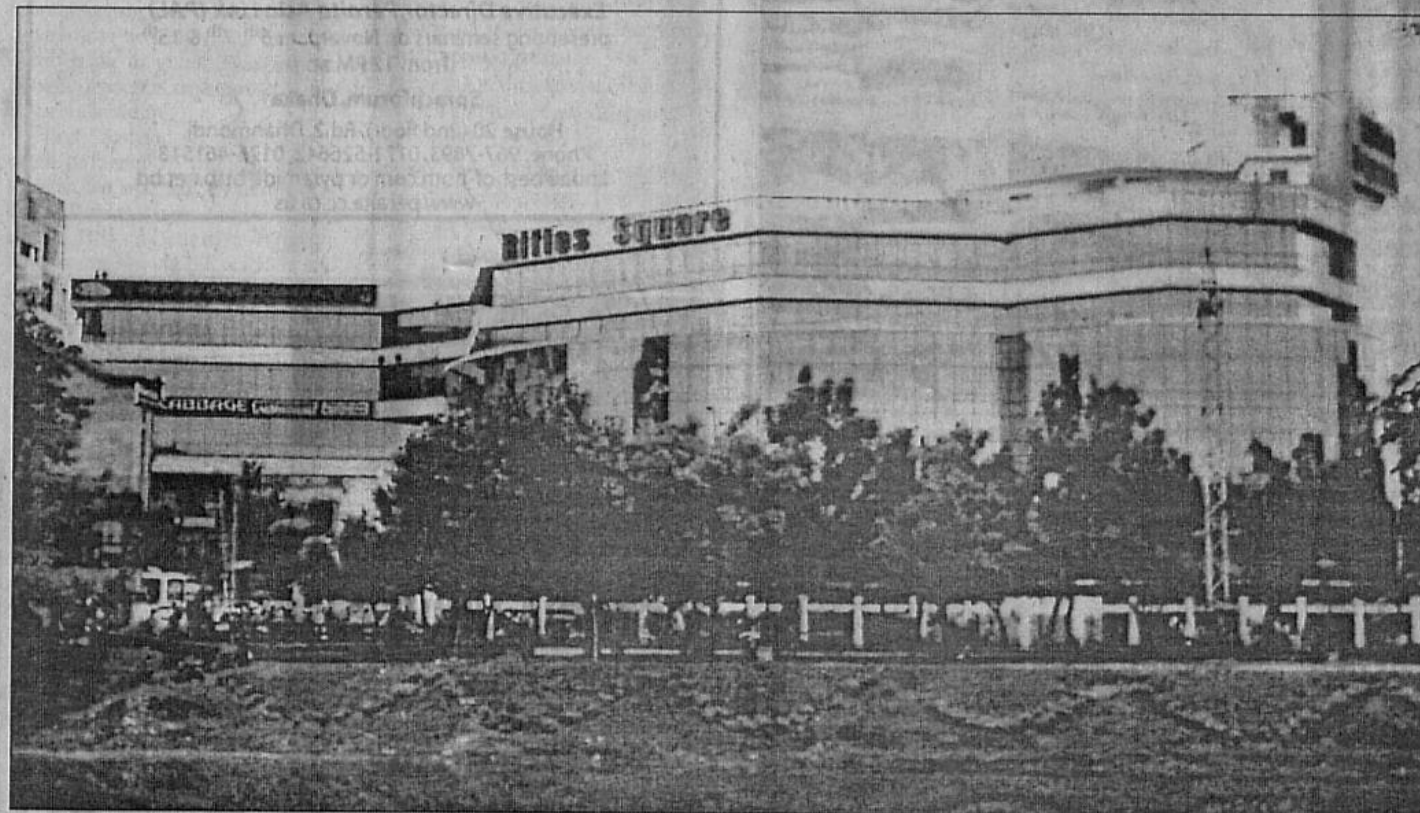
In a shopping centre we are dealing with shoppers whose thoughts are obviously dominated by product quality, availability,

affordability and consumer surplus rather than escape from a fire. It is this off-guard situation that makes this diverse group so vulnerable in a fire condition.

In today's piece Architect Mohammad Habib Hasan points out some relevant factors to raise awareness among architects and building owners involved in developing large-scale multi-storeyed shopping centres. The situation can be gauged to some extent from the study, but in reality most shopping centres (small, medium and large) are worse off.

It is unfair and immoral to expose customers to the dangers of fire, particularly when attention at the design stage by the architect and less greed for retail space by the owner could make the difference between life and death.

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Rifle Square

Vertical circulation in multi-storeyed shopping centres in Dhaka city

ARCHITECT MOHAMMAD HABIB HASAN

OVER the last ten years Dhaka City has become more familiar with multi-storeyed shopping complexes. Vertical circulation (stairs, lifts, escalators and ramps) is a vital element on which the efficiency of a multi-storeyed shopping complex mostly depends, inclusive of the incorporated safety factors. The types, use, location, merits, demerits, safety measures and standards followed in different shopping complexes will throw light on their present status.

Introduction
Capital Dhaka City, having a rate of urbanization of 30% and 50% respectively in 1974 and 1991, has impacted on the growth of multi-storeyed shopping complexes. Notwithstanding their encroachment into residential areas of the city, this new trend for obvious reasons is dependent on mechanized services, such as lift, escalators, central air conditioning system. In these introvert

Dewan Bazaar. There was a business centre at present Bangla Bazaar location, which was the main commercial zone before the Mughal period.

In 15-16 C. AD Murshid Kuli Khan became the Mughal Governor of Bengal and transferred its capital from Dhaka to Murshidabad (now India). As a result the importance of Dhaka declined a little bit.

In the latter half of the 19 C., Dhaka's major export items were cloth, indigo, betel nut, saffron flower, soap, animal hide, shell bracelets and jewellery. By 1930 Chawkbazaar became a wholesale market from a retail centre. New retail areas came to be established along Nawabpur Road and Islampur Road. Bangla Bazaar also developed into a retail trading centre in the latter part of the British rule.

In 1947, Dhaka became the capital of East Pakistan which to some extent boosted its trade and commerce. At that time Imamganj, Chawkbazaar, Mitford, Islampur, Patuati, Bangla Bazaar, Farashganj, Badamtali, Postagola areas



Rapa Plaza

In a multi-storeyed shopping complex vertical circulation may be divided in two groups

- Traditional - Stair and ramp
- Electromechanical - Lift and escalator

Nowadays the term 'stair', 'stairs', 'staircase' and 'stair way' all have the same meaning. According to Ralph Sinnott in 'Safety and Security in Building Design' 'stair' is the term preferred in conversation; 'stairway' seems to be preferred for technical use.

Lift (elevator) is a machine designed to transport persons or materials between two or more levels in a vertical or substantially vertical direction by means of a guided car or platform.

Escalator is also power driven but an inclined, continuously moving, stairway used for carrying passengers from one level to another.

Safety measures for stair
a. Directing user's attention: people should be warned about

- The presence of a stairway
- Change of floor surface of stairway and its lobby

iii. An inclination in wall decoration along the inclination of the steps

- An extended hand rail of stairway
- Focusing attention on, and defining, steps

i. Steps must be clear

- Shadow, lines parallel to the edge of the treads must be avoided

iii. Handrails should be provided to clarify the presence of the steps

- Steps with open riser may be harmful: glare, lack of attention toward steps, vertigo may occur in such type of staircase

c. Proportion of steps:

i. In about 1672 Francois Blondel, director, Royal Academy of Architecture in Paris devised the formula, twice the rise (r) plus the going (g) equals twenty four inches (2r+g=24"). Minimum going = 9.5"

ii. The requirement of building regulations of England and Wales are met if 2r+g lies between 550 and 700mm (21.5-27.5")

iii. In Britain, for residential buildings

* maximum pitch for stairways serving only one dwelling is 42 degrees

* maximum pitch for stairways serving two or more dwellings is 38 degrees

* consensus of opinion prefers 30 degree

d. Minimum headroom requirement is 2000mm in Britain and 2030mm in the USA

Code and legislation (Building Construction Rules 1996 and Bangladesh National Building Code 1993)

a. Pedestrian ramp

i. The minimum width of a ramp shall not be less than

* 1.1m for occupancy of more than 50

* 0.9m for occupancy less than 50

ii. The slope of an exit ramp shall not exceed 1:8 but for slopes steeper than 1:10 the ramp shall be surfaced with approved non-slip material or finished such as to effectively prevent slipping.

iii. Guards or handrails shall be provided on both sides of a ramp having slope steeper than 1:15.

b. Stair

i. In a building the maximum distance of an emergency exit (stair) will not be more than 25m and it will be separated from stair lobby and lift lobby and will be connected with the ground floor.

(Note: Elevator or escalator is not considered as an

emergency exit)

ii. Minimum width of stair in Small Shops and Markets is 1.5m

iii. Minimum width of stair in Large Shops and Markets is 2.0m

iv. Combination of riser and the tread dimensions shall be such that the sum of the riser height and tread depth shall be between 400mm and 425mm with a minimum tread depth of 215mm and a maximum riser height of 215mm. The tread depth includes the nosing and any increase due to slant riser face. The variation between depth of adjacent tread and height of adjacent riser shall not exceed 5mm. The difference between the largest and smallest riser or between the largest and the smallest tread shall not exceed two percent of the respective average dimensions in any flight of stair

v. The number of steps in a single flight shall be limited to 15

vi. The minimum clear headroom between flights of stair shall be 2.15m. The clear headroom may be reduced to 2.03m for not more than three flights in any staircase

vii. The minimum clear height of any passage below landing providing access to non-habitable and service space shall be 2.03 m. The minimum clear height of all other passages and spaces below landing shall be 2.15m

viii. Handrail shall have a minimum height of 0.9m measured from the nose of stair to the top of the handrail. When children are likely to use the stair, the balustrade design shall incorporate

ix. Escape stairways should be completely enclosed with fire resisting construction, and doors should be self-closing and fire resisting, according to Nizamuddin Ahmed in 'Industrial Architecture for Developing Countries'.

x. Each stair and elevator shall be identified by an alphabet in Bangla and posted with a sign and securely placed preferably on the wall of stair side

Escalator

i. Escalators shall be located in the main line of circulation and in such a way the most persons entering the building can see it. Care shall be taken to eliminate interference to traffic movement.

ii. Escalators shall be discharged into an open area with no turns or choice of direction necessary. Ample space for people must be provided at the entry and exit landing of an escalator, space between the newel and the nearest obstruction in front of the escalator shall be a minimum of 3m.

iii. If an unloading area is restricted, such restriction as doors or gates shall be interlocked with the escalator to insure that the restriction is removed before the escalator can be run.

iv. The escalator shall have provision to run in both upward and downward directions. However it shall not run in one direction for one trip and reversed for the next. Starting, stopping or reversal shall be controlled only by an attendant and with the assurance that no passenger riding at that time.

v. Minimum headroom above escalator (minimum vertical clearance between the line of step nosing and the lowest edge of ceiling opening) shall not be less than 2.3m.

vi. Near the place of escalator installation, one lift with wheel chair facility shall be installed to facilitate vertical movement of disabled persons.

Present status

A look at some shopping centres in the city shall enable a better understanding of the present situation.

In this study six major shopping centres of the present time were taken into consideration. They are:

1. Rapa Plaza at Dhanmondi
2. Rifles Square in Dhanmondi
3. Eastern Plaza at Hatirpul
4. Century Arcade at Maghbazar
5. IDB Bhaban at Agargaon
6. Basundhara City at Panthapath

Survey & Findings	Rapa Plaza	Rifle Square	Eastern Plaza	Century Arcade	IDB Bhaban	Basundhara City
Name of Market	Dhanmondi	Dhanmondi	Hatirpul	Moghbar	Agargaon	Panthapath
Location	12000 St	22000 St	32000 St	28000-30000 St	18000 St	18000 St
Area/Floor	2	2	3	4	3	7
No Of Stair	2	4	3	2	3	21
No Of Lift	2	4	3	1	4	35
No Of Escalator	4	4	5	1	4	35
No Of Ramp	2	1	2	0	02	0
Maximum Distance of on Between Two Stair	120/100	89/128	280/140	68/100	100/100	200/200
Maximum Distance of OA A Stair From Any Point	1:8	1:8	1:8	No Ramp	No Ramp	1:8
Slope Of Ramp	No Railing	No Railing	No Railing	No Ramp	No Ramp	No Railing
Railing On Ramp	2	2	3	4	2	7
Fire Exit Stair						

of the lift door from which egress is to be made. The letters shall be 75mm square and shall be posted on a contrasting background, e.g. black on a white background.

Conclusion

a. In most of the surveyed shopping centres the stairs are not properly designed for escape during a fire

b. Stairs or even those earmarked as emergency stairs are not enclosed for fire protection in some of the shopping centres

c. In some cases the distance between the stairs is more than the recommended distance of 45m; legislation demands 25m.

d. In most cases no fire door is provided

e. In most cases no provision for vent flow in staircases to create positive pressure in the stairs to stop fire flow from outside

f. No fire hood for escalators

g. Signs and symbols are not used to give direction and location of the escapes

h. Slip-resistant tiles are not used in the corridors, lobby and staircases

Recommendations

There is wholesale negligence and ignorance in the design of vertical circulation in the shopping complexes in respect to fire, safety and security. If this be the situation in major designed complexes, the dangerous situation in the other shopping centres is not hard to imagine. In most cases no standard is followed in designing of the vertical circulation to protect against fire. Even the details are sometimes ignored, such as the direction of door swing, tread-riser ratio, finish material, and provision of single side railing.

As multi-storeyed shopping centres are becoming unavoidable and essential aspects of our city life, Architects and building owners should be more careful about the very vital vertical circulation. It may be pertinent to mention that the safety of a multi-storeyed shopping complex in a fire situation, that is Means of Escape, is primarily about its vertical circulation.

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Basundhara City

planned multi-storeyed shopping complexes the means of vertical circulation becomes very vital in terms of safety, security and efficiency.

History of commercial growth of Dhaka City

In the 9 C. AD Dhaka was a small market town lying between the Dolai Khal and Buriganga River near present Bangla Bazaar during the reign of Sena kings of Vikramapur.

On the arrival of the Muslim rulers commercial growth increased, and the city became to be known as 'Bahanna Bazaar-o-Tippanna Goli' (52 markets and 53 lanes).

After its establishment as the Mughal provincial capital in 1610 with the name Jahangirnagar, Dhaka attracted foreign individual merchants as well as organised European companies.

The Afghans, the Persians, the Armenians, the Dutch, the Greeks, the French, the Portuguese and the English all had trade and commerce links with Dhaka.

Commodities like the famous muslin, pottery, and various art and crafts products flourished. At times the main business zone was near the old fort area (present Central Jail). Chawkbazaar was the principal market then, known as Badshahi Bazaar.

For ministers and high officials, and the elite of the city there were two different and colourful residential-cum-shopping complexes (unlike anything we know now) at Bakshi Bazaar and

developed as wholesale market areas with warehouse facilities. The retail areas were located at Islampur, Patuati and Bangla Bazaar, and from Sadarghat to Jinnah Avenue (present Bangabandhu Avenue) along Nawabpur Road.

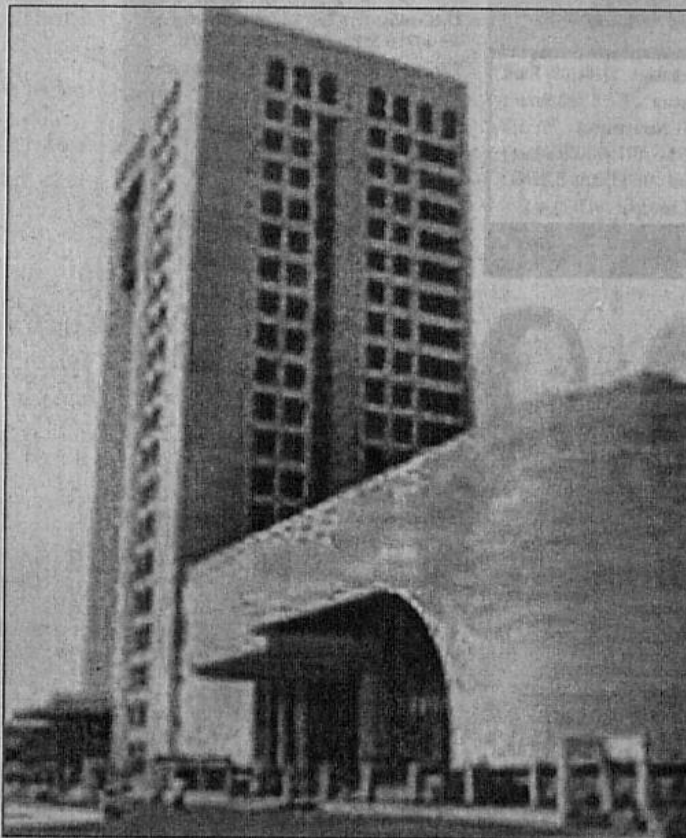
New Market was constructed in the early 1950s. Baitul Mukarram and Stadium Shopping centres in the early 60s. The retail sale also took place along some portion of Mymensingh Road, Old Airport Road, Mirpur Road and some other main roads of the city.

In 1971, following the War of Liberation Dhaka became the capital of a new nation. Overnight Dhaka rocketed in importance and grew rapidly as a prominent centre of international and national activities including that of trade and commerce.

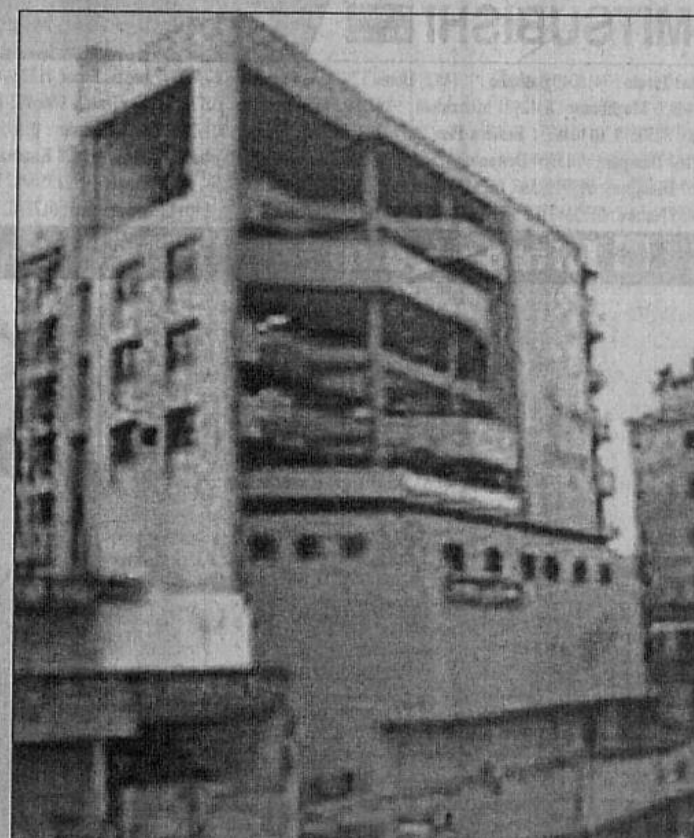
In 1993 Dhaka had 106 markets for grocery shops under the management of DCC. The rest of retail trade has evolved as ribbon development along the main roads forming arterial shopping centre.

Over the last decade the trend in shopping has changed dramatically. Multilevel shopping with luxurious facilities is becoming more popular in the city. As life was becoming fast, time and services became more valuable than money. This demand has been the driving force for the development of multi-storied shopping centres all over the city.

Vertical circulation



IDB



Eastern Plaza