

## Designing for fire safety: Case study Dhaka IV

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We have embarked on this 4-part series so that awareness about the dangers of fire coupled with poorly designed and/or operated buildings can grow so as to save human lives. That is the only intention of the information being disseminated, including on actual buildings because these are buildings where members of the public venture unaware of the lurking danger. No building owner has the right to put human lives to such risk, often resulting in fatality.

Among other matters, emphasis at the design stage should also focus on

- **Fire Load:** Determined by building and finish materials
- **Emergency Lighting:** to make escape possible when power is cut off in a fire
- **Sprinkler system:** depending on risk, space should have an overhead sprinkler system
- **City traffic:** location of the building, its surroundings, neighbouring land-use, traffic congestion, pattern and behaviour, width and turning radii of roads, overbridge clearance, etc.
- **Water requirement:** availability of water, size of reservoir, type of riser (dry/wet)
- **Assembly Point:** place for escapees to assemble so that every person supposed to be in the building can be accounted for, drill.

Bangladesh Fire Service & Civil Defense, in brief referred to as Fire Service, despite the fact the organization is financed by public money, should NOT be relied upon to save lives. This matter should be borne in mind in designing for fire safety.

As it is, in the context of Bangladesh, Fire Service may be difficult for the unaware common man to contact because (a) its telephone number may not be known, (b) a telephone set may not be accessible (gradually becoming a lesser problem), and (c) the telephone system at either end may be out of order.

As a quick test, ask yourself whether you know the telephone number of the fire service. As a minimum requirement, every school, hospital, office, housing, apartment, club, cinema, hall, shopping centre administration should have the telephone number written in a visible manner. Try the number when not on fire and see if it works. You never know when you may need it, even if to save a neighbour.

Even if contacted, it will never be possible for the fire personnel, dedicated as they are, to arrive and attack a fire in time to save people from asphyxiation, burn injuries and death. Therefore, a building owner or user must develop built-in arrangements to attack the fire in the first instance, and flee to a safe area, which could be fire refuge cell/lobby, a protected (from heat, fire and smoke) staircase, or the outside of the building at ground level.

The task of the Fire Service shall be to douse a fire, even with built-in provisions, and to rescue people, who are stranded accidentally or by design in a fire refuge



Figure 2 Attached buildings could make fire fighting very difficult.

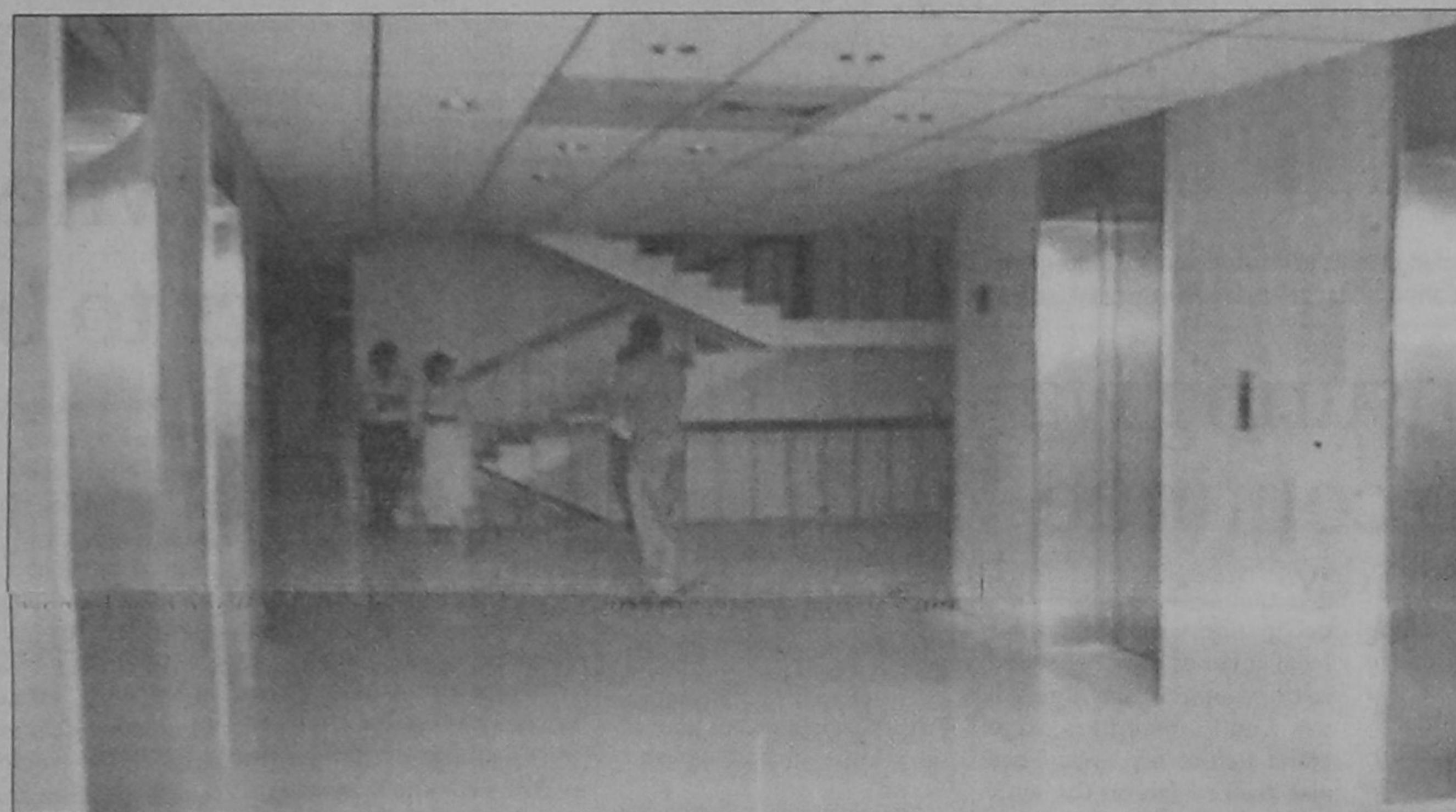


Figure 4: Sena Kalyan Bhaban lobby is exposed to an open staircase which will allow smoke and heat to travel to all floors.

cell/lobby that should be available on each floor of a multi-story building.

To add to our woes, and this is quite common, fire engines may find it difficult (a) to reach a factory building in time through growing traffic congestion, (b) to locate the address of an affected building, and (c) to access an attacked premise, as many of our roads are narrow for fire tending vehicles. The requirement is road width of 4.5m and height clearance of 5m.

The efficiency of the Fire Services may further be impeded by (a) shortage of water in the vicinity, (b) their inability to reach their equipment to the place of occurrence, and (c) panic-stricken people/agrieved public hindering its activi-

ties. The lines were scripted many years ago, but did not all three occur during the recent fire at Bashundhara City?

As a rule, buildings at close range are congenial for fire spread. Also attached or closely-built buildings can hinder fire-fighting, because clearance between buildings or boundary wall is inadequate. (Figure 2) This is a common phenomenon. Man and equipment shall not be able to move and work.

In some buildings, the architect does provide enough outlets for Means of Escape, and the building is thus constructed, but for security reasons, the owner/user walls up/fences the building in such a manner that outlet becomes very congested, often as narrow as the width of one door, good enough for escape by say 40 persons per minute as per code, but not adequate for safely flushing out large number of people in a state of panic, as is the case in a fire situation.

The situation inside a building is equally deplorable in terms of finding an escape route. We pick up the case of a garment factory (Figure 3), which has locked its corridor end and, as that was not enough, has allowed storage of rubbish at its approach. This is certain death: signed, sealed and delivered.

In Bangladesh many architects have not come to terms with the design requirement for fire safety of enclosing a staircase, as otherwise the same will become a vertical chimney and attack all the floors, the upper ones first and then gradually working downwards, ultimately engulfing the entire building in deadly smoke, and if combustible materials are available by fire. The Sena Kalyan Bhaban in Motijheel has such an unprotected staircase, as does most other buildings in this country. (Figure 4)

The architect "is responsible for the fire safety layout, traffic, density, population, and organisation of the whole as well as for each individual building involved". The architect "requires a wide understanding of the basic principles of fire prevention and protection, and should be conversant with recent findings and research on the subject".

The so-called fire exits in our buildings are badly conceived and worse by maintenance.

Firstly, all the staircases in a building must be considered as 'fire exit', and NOT the one dedicated as such and thus designed as narrow as 55cm (22 inches). It must be assumed that a dedicated 'fire exit' may become inaccessible in a fire, and then the so-called 'normal' staircase will become the fire exit. All staircases should be normally used, enclosed for smoke/fire protection by fire rated wall and door, mechanically pressurised to

keep away smoke, and remain as far apart as possible from each other. It should be remembered that human psychology is to leave by the way that one has entered a room or a premises. Therefore, an unused 'dedicated' fire exit is a myth and may actually cause problems due to unfamiliarity.

Sometimes one has to approach staircases through other rooms. This can be disastrous in a fire situation. Often that room is under lock and key.

One may appreciate the argument in favour of discarding dedicated fire exits if one observes the state of such unused and thus neglected staircases. Most often they are locked from inside a usable space (outside the staircase), again for security reasons, although a panic bolt that opens from only inside would have sufficed. Often rubbish is dumped on the outside of the staircase, which shall impede escape.

The most common mistake that architects make is to continue a staircase from the roof to the basement. This is dangerous and not allowed by code, as an escapee shall not realise in panic when to stop going down to leave a building at ground/plaza level. Returning from the basement may become difficult by others coming down the opposite direction. All staircases coming from above must stop at ground/plaza level. There should be separate staircase/s to the basement from the ground/plaza level.

In Dhaka staircases are often barricaded by grille/gate at any floor where the user is threatened by security fears. That is a wrong and dangerous approach. Security must be enhanced by employing more personnel, not by endangering human lives. (Figure 5)

In fact there are several types of 'fires escapes' in the buildings of Dhaka City. For example:

1. NO FIRE ESCAPE BUILDING: The BTA Tower in Banani (it is NOT the only one) has one staircase, although it is a 15-story building. The stair landing is shared with the lift lobby, another wrong architectural standard in this country. The lobby is unprotected and the lone staircase not enclosed. The building owner must build a second staircase and find space for it, as per regulations. The building is used by university students, among others. How will they escape?

2. WHAT-FOR FIRE ESCAPE BUILDING: The 17-storyed Al-Amin Centre at Dilkusha, constructed 2001, has two staircases and that is quite good. Unfortunately, the so-called dedicated 'Fire Escape' is only up to the 10th floor (and not in regular use). Therefore the users from 11 to 17 floors have ONE staircase, which is not acceptable. Moreover, the staircases are separated by a distance



Figure 3: Corridor end of a garment factory

of 3m (10 feet) and both the staircases continue up to the basement. One wonders what the protection is for the people in the building if the common lobby for lifts and staircases catch fire. How will they escape?

3. YES-NO FIRE ESCAPE BUILDING: The Sheltech Tower at West Panthopath is a 12-storyed building and has two staircases, the so-called 'Main' and the so-called 'Fire Exit'. Unfortunately, the 'fire escape' is closed (by brick wall) on many floors and the 'Fire escape' remains always locked.

There are many such buildings all across Bangladesh. The problem is we only focus on a building after it is on fire, not before. This is to urge every building owner to survey their respective buildings, private and public, corporate and educational, medical and entertainment, residential and industrial, to see if the issue of fire has been addressed, whether sufficient preparation has been taken to prevent fire from starting, whether there is water and other arrangements to fight fire, and MOST IMPORTANTLY, whether people can escape from the building to safety (Figure 6). If not, it is the responsibility of every individual to use his position to take the message across to those who will execute the plan. Please remember, none is above the fire.

Some bare minimum measures that owner/user of every building should (as

applicable) design, install and maintain:

1. Enclosed staircase
2. Floor-wise compartments
3. Fire refuge cells in tall buildings
4. 'No Smoking' sign
5. Electrical equipment and wiring
6. Heating apparatus
7. General cleanliness
8. Fire Drill for all
9. Detection and Alarm systems
10. Escape route
11. Extinguishers and other equipment
12. Water retention
13. Relationship with Fire Service

The adopted measures will tax the building budget to some extent no doubt, although a fraction compared to the building costs, but it is definitely better to spend before a disaster than to pay out inadequate compensation to families of victims. Life can never be compensated.

Let us not find out after injuries and fatalities in a fire that some basic measures were lacking in a building. It is of no use to the dead then. Let us implement proper designed measures now, in existing and new buildings, in all types of buildings, low and high, such that if attacked by fire we can say that lives were saved thus.

### THE SERIES CONCLUDES WITH THIS INSTALMENT

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Figure 5: Barricaded staircases. This one is on the 14th floor of 20-storyed BSB Building on RAKJUK Avenue taken some years back. Today there is a floor-to-ceiling fencing in addition.



Figure 1: Despite lacking in manpower and equipment, the role of Fire Service is commendable. (Photo bdnews24)

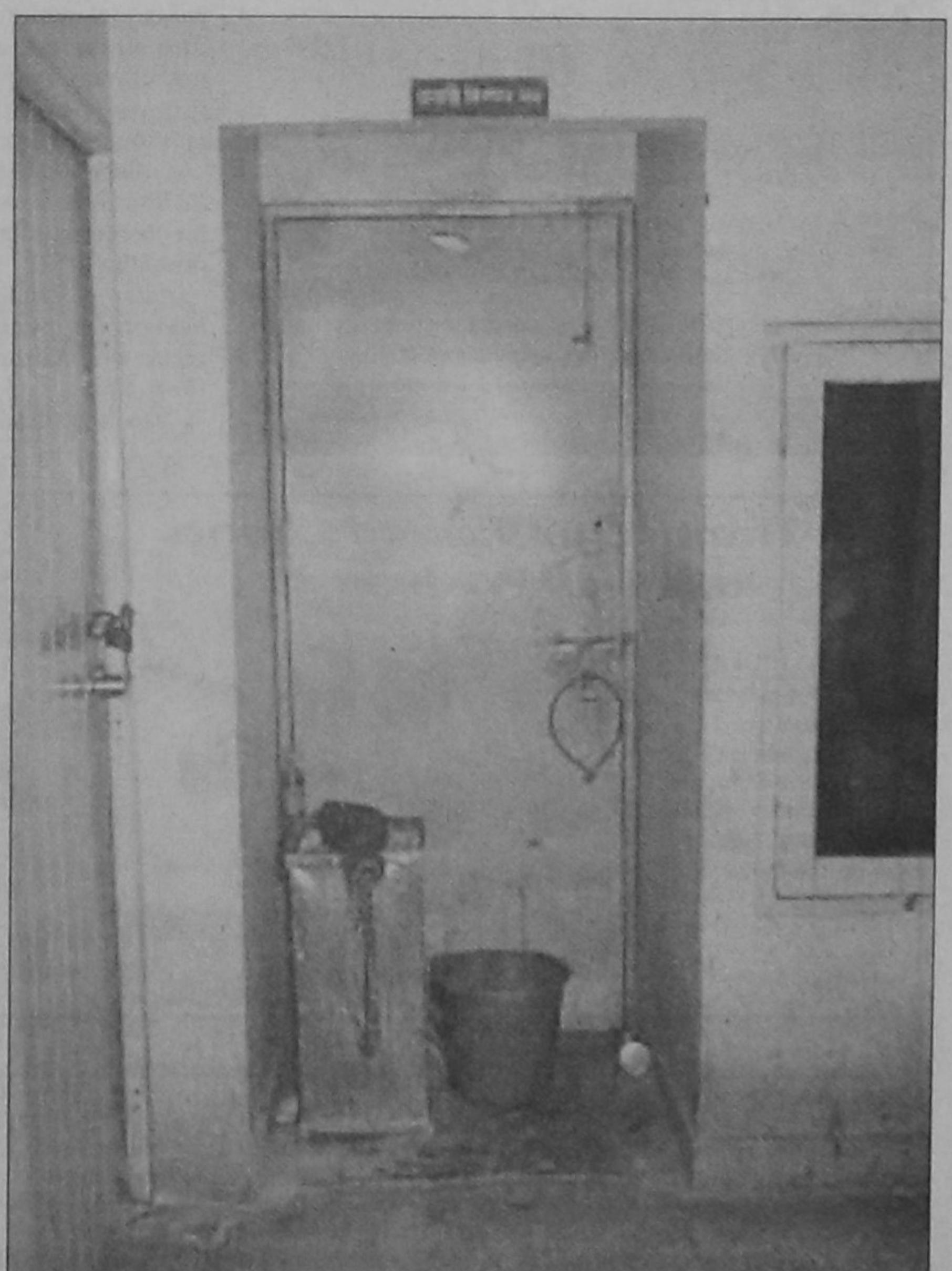


Figure 6: Useless Fire Escape at Dilkusha's BCIC Bhaban, as the final door is locked from outside it.