

## Children first and always

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AS with other aspects of our life in this country, we are caught in a nasty loop vis-à-vis primary schools and their compelled location in residential buildings. With state provisions clearly undersupplied, private entrepreneurs with exceptions found the situation right to cash in.

Parents were hardly left with any choice but to even battle for a place for their ward in any of the umpteen schools that have sprouted in the city in buildings not designed as schools.

Residential buildings with three-four bedrooms, a living room that can be split into two, the dining room, kitchen, veranda and imaginable space have been transformed into classrooms for the tiny tots.

The philosophy perhaps is that if you have 20-25 children crammed in a room, a teacher and a blackboard of whatever size you will argue that it is a school. Who wants to argue about the lack of basic human needs?

Considering that the provision of basic education is non-existent or insubstantial at best for a vast majority of the children in Bangladesh, city schools are by comparison a luxury.

Nevertheless, whether housed in a shack in a remote village or cooped up in a lavish house in one of Dhaka's posh residential

areas, the safety of the children cannot be compromised with.

Architecture graduate Nurun Nahar delves into this important matter in today's discussion.

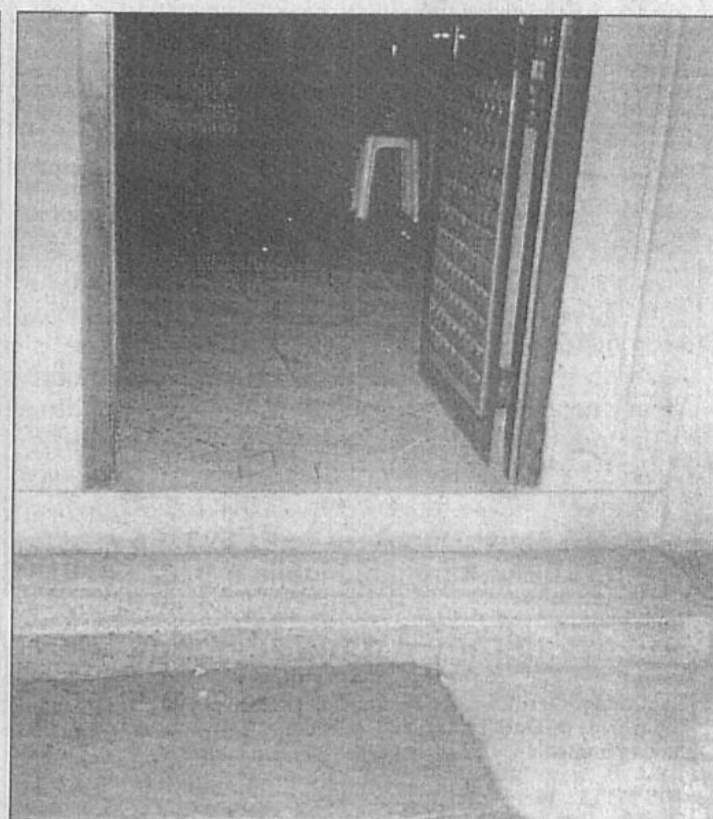
It is not a matter of how many children have already been accident victims in schools located in converted residential buildings, what with reporting and statistics forever lacking, but perhaps more of a timely warning from the researcher that there are lurking dangers into which school administration and parents should look into.

For the sake of the innocent children let this be one of those occasions when we should not wait for a tragedy to happen before taking up appropriate measures.

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Horizontal bars of railing invite children to climb and cause accident



Location of steps and number of riser may cause confusion and accident.

## Our schools: Safe or secure?

In reference to schools accommodated in residential buildings in Dhaka City

NURUN NAHAR

THE need for educational facilities in Dhaka City for an increasing number of children and the lack of appropriate buildings have necessitated the conversion of residential buildings into schools. In these buildings the living room, bedrooms and even the kitchen are being used as classrooms. A residential unit designed for only five or six persons of a family is being used by scores of young children.

Children are more liable to meet with accidents because of physical and psychological reasons. The tight space and varied fixtures in a residential building may cause accidents. Moreover, the residential buildings in Dhaka generally occupy most of the site and there is no open space. Environmental aspects such as light and ventilation are usually lacking, and noise may be a hazard for the number of children that use the building. Healthy physical and mental growth of the children may be restricted by the situation. The real needs and aspirations of the children are often neglected while making this kind of uses where their safety and security are not ensured. Since the converted schools are not purpose-built there may be some safety and security problems.

Schools need higher standards of safety and security than all other buildings. A school should facilitate the learning activities of a child that may be enriched by a good functional arrangement within a hospitable environment. The school plays a vital role in the mental and physical development process of a child as well as exploring community spirit.

Residential buildings lack the full contribution to the process in many ways. Some safety and security aspects should be taken into account before starting a school in a rented residential building. Some effort and little changes in design of the building can contribute to a good school environment.

School design requires considerations of various safety factors. According to Chiara and Callender, "commonsense planning and aesthetic consideration may make a school safer". An aura of serenity may be imparted by particular use of colours and materials. Clarity of layout and clear circulation pattern can minimize confusion. But a residential building layout is not suitable for a school. The circulation pattern and planning are different from that of schools. Therefore, there may be some safety and security problems in relation to density, crowding, circulation route, space use, entry and exits.

In Dhaka city, the residential areas of upper-income group to middle-income group provide schools in residential units. The necessity of educational facilities has encouraged owners to privately establish schools in residential buildings, often for commercial gain, without usually considering the real needs of the schoolchildren.

It may be pertinent at this point to mention some safety and security aspects of a school building.

**Exits:** There should be two or more exits. Exits should be frequently used such that users are familiar with them for use in emergency without hesitation. It should be possible to open all doors from within in the designated escape route, even after school is closed. Proper corridor widths and corridor lengths should be ensured.

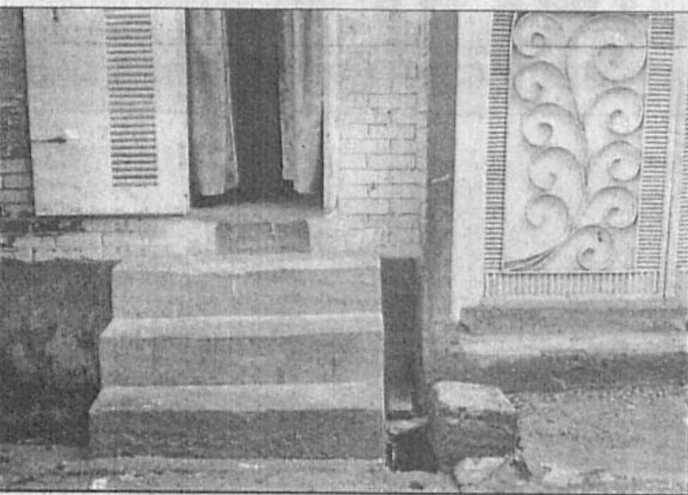
**Stairways:** Staircases that are connected with more than two levels should be enclosed. Width and tread-to-riser ratio should conform to the code. Overall traffic pattern of the school should be considered. Students should be able to walk without creating congestion. Stairways should lead directly to the outdoors. Stairways should provide double handrails on both sides; low level for children and high for the elderly. Spiral or helical stairways are not safe. Low pitch steps often cause accidents. Busy pattern, shadows parallel to tread and sharp edges should be eliminated.

**Corridors:** Corridors should ensure 'free and informal' movement of the children. The side-walls of the corridors should not have any projection or open panel of window or door openings. Lockers, fire extinguishers should be placed in the recesses for the safety of the students.

**Doors:** A vision panel and placing door in a niche reduces the hazard of striking students. Glass doors pose additional problems. Children at play may push one another, slip or stumble. Loss of balance may cause accident with glazed doors or normal doors. Doors sometimes are slammed by the wind. For swing doors transparent panel is needed.

**Wall:** Rough-textured wall surfaces and sharp edges should be avoided. Children attack the wall where surface is soft enough to scratch with nails, penknife or mark with pencils. Hard wall finishes should be used.

**Floors:** Non-slip floor finishes should be used. Ramps need particular



Unsafe entry for children

attention in the choice of floor finish. Slipping of toes causes accidents when descending or ascending.

**Roofs, Balconies:** Access to roofs and balconies should be prevented. Railing and balustrade should minimise the risk of falling from a height. Railing of the roof should be higher if accessible by children. Railing should be free of any horizontal elements. External pipes to walls should be concealed or may be of square section to prevent climbing.

**Toilet:** An attractive target and damaged by water or flooding due to vandalism by children. The fixtures and pipe-work must be well supported. WC compartments should allow tending of children and the toilet should have sufficient space. The arrangement of bath washbasin and other appliances may not be so that a small child can climb from one to another. Pull switches should be outside the bathroom and within reach. Otherwise they would be at the risk of climbing. Door bolts should be operable from outside in an emergency.

**Safe Route:** Cross traffic between pedestrians and vehicles should be eliminated. Main entry should be free from service vehicles or can be used as service areas when children are not present. Walkways should non-skid and well delineated. A ramp is preferred for little changes in levels and the inclination should not exceed 5 percent.

**Parking:** Parking areas should be located considering visitors, uses of school-related or community events within the school building and various outdoors events. Conflict between automobile and pedestrian should be minimized.

**Lighting:** According to Gutkin and Reynolds "Classroom lighting affects children's overt behaviour, cognitive performance, visual fatigue and possibly their overall physical health". Natural light improves visual acuity and decreases visual fatigue. Glare directly influences performance by creating discomfort and causing fatigue, says Veitch and Arkhelin

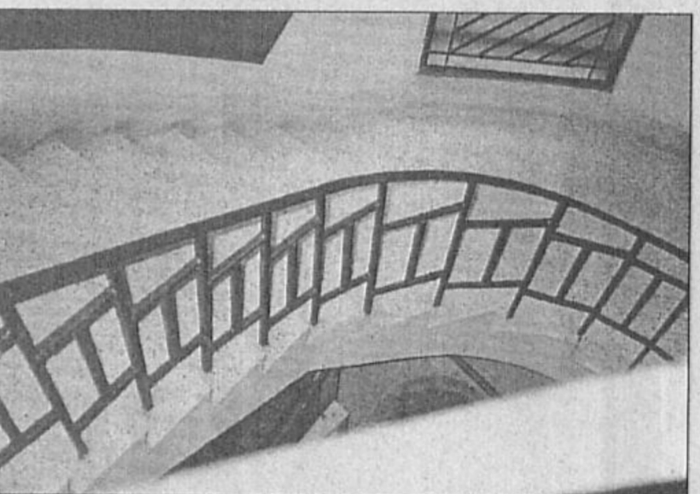
**The Site:** Trees with branches near the boundary wall should be avoided. Strangers should not be allowed to get into the school.

**The building:** Zoning is needed to control the access. High risk areas should be grouped to minimize physical security measures. In school, office and teachers room where records and cash are kept are at risk from vandalism and theft. This place may not be accessible by the children or unauthorized persons. Administrative zone should be secured. There may be a supervisor to handle the students' affairs and safety. The doors, walls and the building envelope are vulnerable to vandalism and theft, and requires higher grade of security construction. Zoning should ensure that public function is confined to specific part of the building. Climbing routes providing easy access to roofs, balconies should be avoided.

**Entrance and Exits:** Entrance and exit doors should be under close observation to restrict illegal entry. Sometimes children may get out by the exit door provided for fire safety. Door furniture should be on the inside, key holes should be only on the inside. Emergency exit should be located in plain view but not where the thief has a clear gateway. Emergency exit doors should discharge on to a grassed area.

**Secured Office:** Potentially hostile people should be outside the office and staff should be able to communicate without risk of being attacked. Cash and valuables should be kept protected. Transfer of cash can take place through small window. Secure area and public area should be separated by counters and screens.

**The Perimeter:** The walls and fencing may be climbed or penetrated by



Unsafe spiral stair

children. They should be at least 1.5-1.8m above the ground. If they are lower children may climb and get trapped or injured. Upright fence members should be closer to prevent children to penetrate.

### Situation in Dhaka City

Several schools accommodated in residential buildings in the city have been studied in relation to various aspects of safety and security. The following are some of the observations:

**Entry:** The most critical part of these schools is the entrance. Schools occupying only the ground floor do not use the staircases and the schools create a separate entry. Often steps are found just after the entrance door. There is no preparation space may create accidents. The steps have often uneven risers. The preparation spaces should be created at the entry.

**Staircase:** Schools which occupy upper floors along with the ground floor need to use the staircase. For the occupants of the upper floors the access of the strangers is not restricted. Security hazards may arise from this.

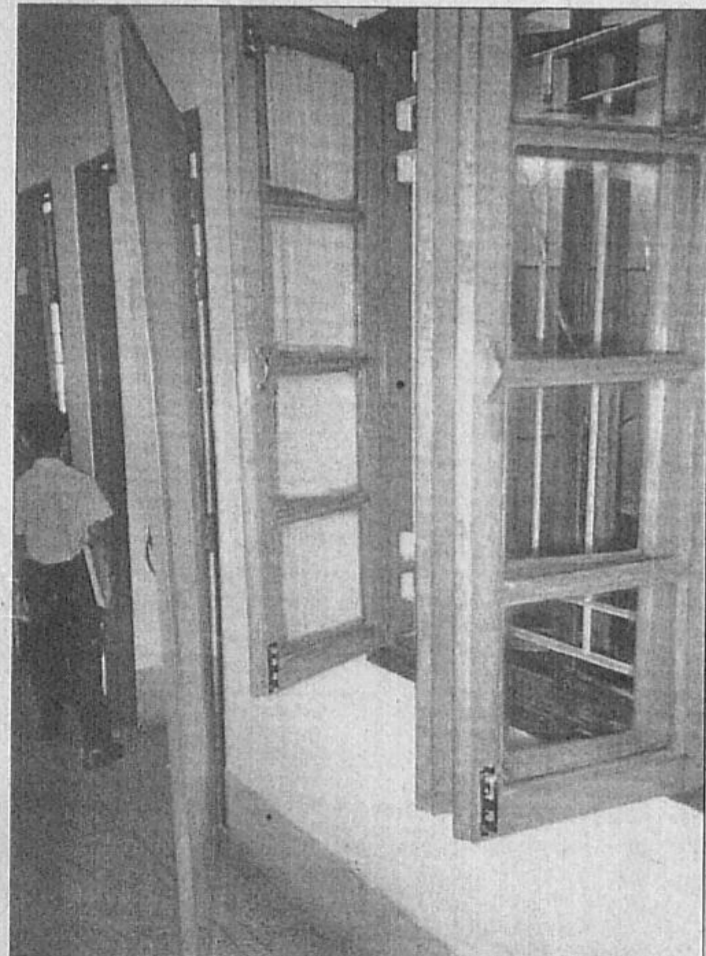
Some older buildings have oval-shape stairs, and the uneven risers that may cause accidents. The shadow parallel to the tread resulting from the light coming through the glazing should be avoided. The light coming through the window straight towards the eye may lead to accidents. The location of the window may be changed. The stair railings often have horizontal members and wide gaps. The horizontal members should be eliminated. Low-level balustrade should be avoided for the children.

**Corridors and circulation route:** In most of the schools circulation spaces are not defined. Often the passageway is through the classroom. It is common for children to go to their classroom through another classroom. Window and door open towards the narrow corridor. The corridors are often dark. The doors opened towards the corridors should be reversed or rotated 180 to be kept parallel and in a close contact with the wall. If possible, doors should be eliminated where the place is secured. In some cases, it is not possible to avoid passing through one classroom to another.

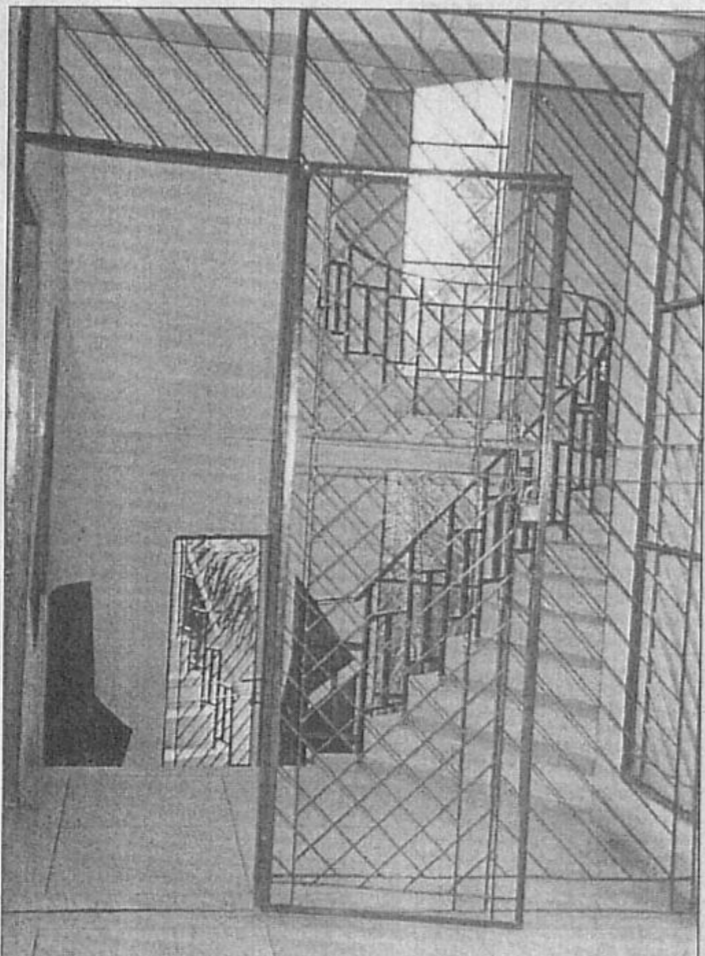
**Roof:** The door of the roof should be closed and locked so that children cannot go there. If the roof is taken as a playing area the railing should be taken into account. The railing should be high enough and free from elements that may be scaled. Roof may be used as playing area where there is no open spaces around.

**Boundary Wall:** The boundary wall should be high and free from elements that may be climbed. The top of the boundary wall should be free from spikes or glass pieces because naughty children may climb the boundary wall, get trapped and injured.

**Open space:** Some of these schools have open spaces. But there are pieces of broken bricks and other hazardous materials here and there to cause accidents while the children play. The open spaces should be kept clean and



The swing of doors and windows in the corridor may cause 'stuck-by' or 'stuck-against' accident.



Bottleneck situation in the circulation path near the stair or entry.

free of these materials. If there is no open space, there should be games room and enough climbing equipment so that they may use their limbs playfully to ensure their healthy growth. But the activities in this room should be monitored.

**Window:** In some classrooms there are windows in more than one wall. The blackboard should be placed where there is no window opposite to it. The window opposite to the blackboard should be screened. The windows of the residential building are not adequate for a classroom. In some classrooms there is no window opening at all and artificial lighting is used for these classrooms during the day.

**Electric hazards:** There are some power outlets within reach of the children. It may be a point of interest for them and they like to prod with their fingers. They should be relocated, disconnected, inactivated or covered with child-safe plugs. The pull switches should be within reach where necessary. Otherwise, the children tend to climb and cause accidents. The switches of the light of the toilet should be outside and within reach of the children. All electric wiring should be concealed.

**Toilets:** The toilet fixtures are of usual size as used in residential buildings. The toilet fixtures should be suited to the ergonomics of the children. It may not be possible where there is only one toilet. Children may make the floor slippery with water. Unnecessary toilets furniture should be removed from the residential toilet. The basins should be at a lower height for easy access of children.

**Storage:** The storage area for books, colour pencils and other classroom equipment should not be stored on a place above the head height of the children. Some equipment and paper may be kept under lock and key to avoid accidents and vandalism.

**Veranda:** The grill and railing of the veranda should not have horizontal members. Some schools have open veranda with horizontal members in the railings. The children may climb and fall down. The veranda, especially on the upper floors should have grill protection.

**Gas outlets:** The kitchen in some of the residential units is used as classrooms. The gas outlets should be removed.

**Vertical pipes:** Vertical pipes should be enveloped and concealed so that children cannot climb or may be of square section.

**Fire Safety:** There are no fire precaution or prevention measures observed in these schools. Electric hazard may cause fire accidents. Telephone facilities should be available to call the fire services in case of an emergency. Buckets of water and sand should be kept at strategic locations for use in case of fire. The veranda and exit should not be used as store as that may impede escape. The bottleneck situation in the circulation space is most common in these schools. But this situation cannot be avoided in most of the cases and so movement of children should be regulated by proper supervision. Most of the schools have only one exit door. There must be two. But because of the layout of the residential building two exits cannot be provided. Most of the schools have only one entry/exit each. Secondary exit should be created. Exits should have security guards. In most cases creation of secondary exit is not possible. Open space for assembly after escaping from a fire is not designated and in many cases not possible.

**Health:** Lead may affect performance of children, intelligence and behaviour. Lead-free paint and plumbing should be used. The surrounding of a school should be kept clean. The occupants of the upper floors should be advised not to throw garbage or any article unregulated. The drains around should be kept clean and covered. Potholes should be filled and levelled. If proper natural ventilation is not available for the classrooms, mechanical ventilation may be introduced.



Unsafe and unhealthy surrounding.

**Psychological health:** There should be open space. But if not possible roof may be used. The mind and body rooms about freely in open space. Training and education on safety and security should be practiced. Teaching of safety signs and symbols may help them feel safe. Safe layout of a school may convey a feeling of safety. School activities need continuous supervision to ensure safety.

**Conclusion:** Dhaka City's large population, scarcity of land, ineffective legislation and commercial yearning has compelled some owners to establish schools in residential buildings. There are thousands of children studying in these residential buildings and one is terrified to visualize what would be the situation without them, as all the children cannot be provided in the limited custom-built school buildings. Under the present situation, there seems hardly any alternative and these children are destined to be in these converted schools.

The problem of residential buildings to suit the functions of a school lead to safety and security problems. However, some measures may be taken to mitigate the negatives before initiating a school in a residential building. Sponsors of the schools, owners of the residential buildings rented for the purpose and architects should be aware of the needs and aspirations of the schoolchildren.

The author is an architecture graduate from BUET, pursuing higher studies and employed in a private practice in Dhaka.