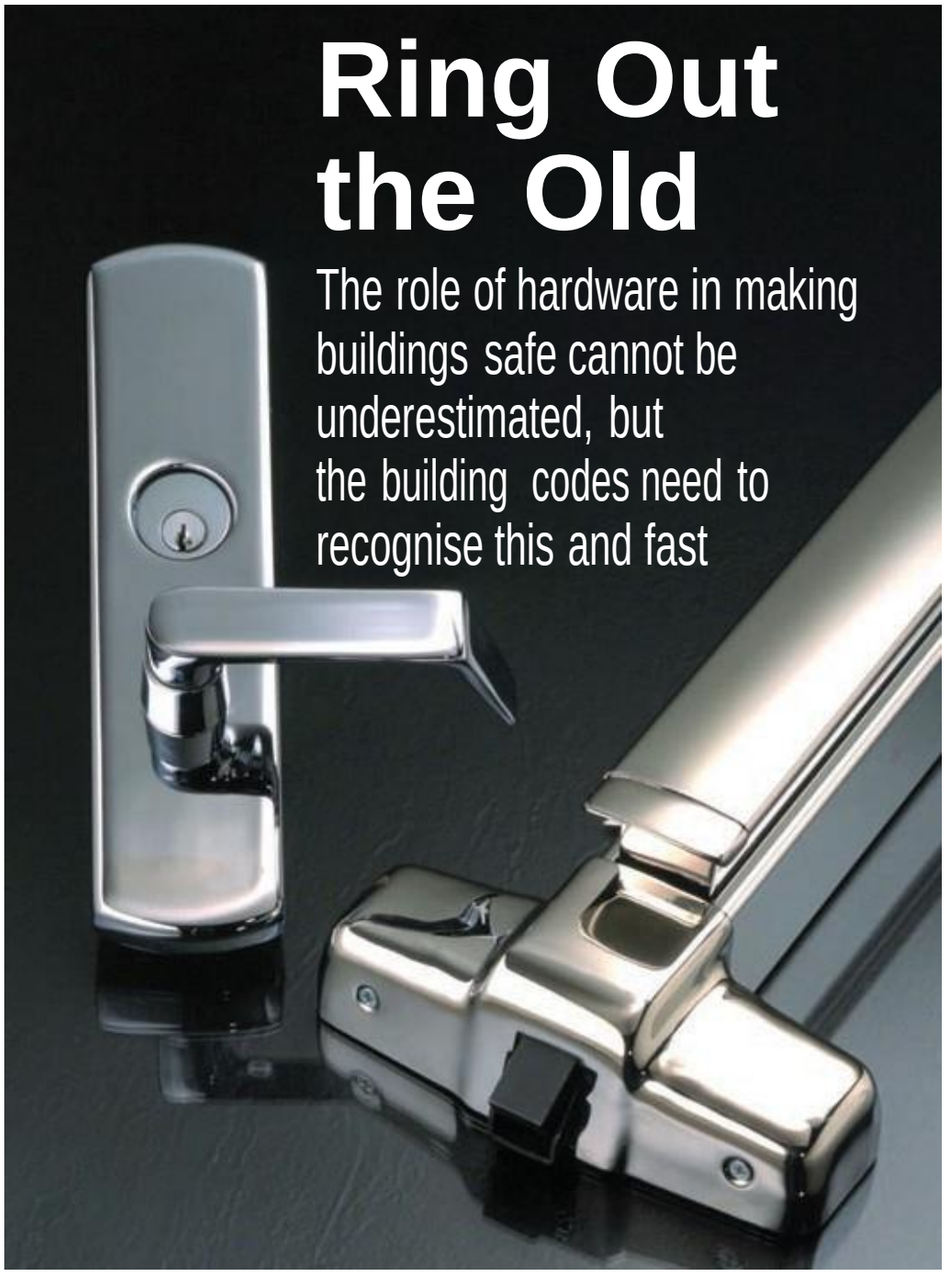
Ring Out the Old

The role of hardware in making buildings safe cannot be underestimated, but the building codes need to recognise this and fast



CONSIDER THESE EVENTS.

In a recent case of false fire alarm at a multiplex in an upmarketsouthDelhishopping mall, not even the slightest of concern or body reflex was visible among the movie goers, who remained glued to their seats chatting nonchalantly and eating popcorn. The available exit hardware remained unused. *A case of mass inertia in a modern milieu.*

A recent mock drill conducted by the Delhi Metro in over 10 stations, to test the preparedness of people and various agencies for handling accidents and disasters, revealed that most commuters did not understand the meaning of the words 'mock drill'. As a result the exercise failed on many counts. The available exit hardware was insufficiently used. *A case of mass unpreparedness in using state-of-the-art infrastructure.*

Fires at Kolkata's AMRI hospital and Maharashtra Mantralaya in Mumbai turned these buildings into killing fields as they together claimed at least 92 lives. Most of the unlucky ones had choked to death on dense toxic smoke that got trapped inside and made exits difficult to find. The available exit hardware proved insufficient. *A case of system failure due to lack of infrastructure or misuse.*

In emergency situations like these, exit hardware plays a key role in raising alarm, directing people to safety, and preventing danger from spreading. While the first two incidents above reflect our mindsets, the third reveals lack of seriousness amongst building owners and managers, with respect to public safety.

No wonder building professionals across the country lament that the laws are not powerful enough to ensure safety in buildings despite huge sums being spent in making them so. Their key concerns are that building occupants are not trained sufficiently to look for or utilise the exit hardware during emergency, the mandated hardware is not incorporated in true spirit, and most importantly building codes remain outdated and do not specify correct hardware for the new genre of structures that are being built.

It is the National Building Code, last updated in 2005, which governs every aspect of buildings in the country. NBC provides regulatory guidelines for construction activity, and its part IV covers fire safety requirements. While it states the broad guidelines for fire prevention, life safety in relation to fire, and fire protection in various categories of buildings, it does

> Next gen hardware will diffentiate new buildings
>
> Arun Dogra
> *Ingersoll Rand India*

"NBC must provide clarity on new building categories"

Anshuman Bhargava
Blue Leaves Design

"The codes are silent on hardware selection"

Rawal Singh Aulakh
GND University

"MNCs are setting standards in safety"

Parasuraman Ramachandran
SE Controls India

not specifically discuss the most modern of structures such as shopping malls, mega marts, and airports. Compounding the problem is the absence of sufficient mandates regarding the use of hardware.

"Despite being the latest edition, the statutory requirements are not clearly demarcated in the Code. The specifications are better defined and more stringent for luxury and hospitality industries such as malls, hospitals, hotels, and less stringent for offices and factories where more often than not only basic hardware specifications are in place," says Arun Dogra (arun.dogra@irco.com), VP and business head–security technologies of Ingersoll Rand India, an architectural hardware heavyweight.

Architect Anshuman Bhargava (anshuman@blueleavesdesign.co.in) of The Blue Leaves Design Group,the Delhi-based firm, points that Group D of the NBC does not lay out specifics about malls and mega marts. "This part is not exhaustive. The NBC only has a section on public buildings. In the current context where there are a lot of malls and retail centres, NBC should have special provisions for them as well."

Vouches architect Rawal Singh Aulakh (rawalsinghaulakh@rediffmail.com), assistant professor at Department of Architecture, Guru Nanak Dev University, Amritsar. "The NBC needs urgent revision. Some technically updated agencies should be involved for this matter, and institutions be involved at different levels for updating standards and guidelines for selection of hardware. We have seen that any new gadget or hardware added for particular use is not known to the operator and user, which doesn't allow the device to operate correctly for longer time period."

Interestingly, in such a policy vacuum direction is coming from overseas. The cheerleaders of safety today are international organisations that are setting up office in India, and bringing in their tow consultants and designers to help design infrastructure that adheres to global standards. "Whichever geography it is, the MNCs will set up their operations by replicating safety standards of their headquarters," says Parasuraman Ramachandran (parasuraman.r@secontrols.com), managing director of SE Controls India Pvt Ltd, a part of UK-based smoke and natural ventilation specialist SE Controls. He adds that multinational companies imbibe technology faster than anyone else. "They live up to their corporate philosophy of safety and protection."

Adds Jagdeep Malhotra (jagdeep@dormaindia.com), head of hospitality vertical at Dorma India Pvt Ltd, subsidiary of German glass hardware major Dorma GmbH, "They usually refer to the codes and standards of America's National Fire Protection Association and the British Standards. These norms are much more stringent than the NBC of 2005, and even Indian insurance companies refer to them to assess the suitability of the hardware being used by their clients." Malhotra also points that the NBC only refers to materials like cast steel and cast aluminium, whereas steel and brass are extensively being used internationally and in India.

Case in point are shopping malls in major metros that are vying to attract

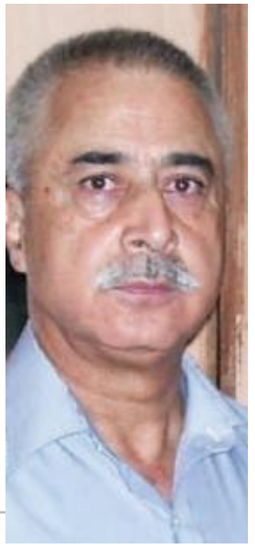
Whatever It Takes!

Malls, the country's newest temples of entertainment & retailing, need to be prepared for the worst at all times, in order to prevent loss of life and property when accidents occur. Vijay Aima (vpops@ambiencemalls.com), VP-operations at Ambience Ltd which owns signature malls in Gurgaon and Vasant Kunj in Delhi, prescribes:

- Conduct evacuation drills and training sessions regularly, each month or at least quarterly Involve
- staff of mall management & retailers in drills
- Conduct drills in batches, and in different areas of mall
- Demonstrate use of fire fighting equipment & alarm system
- Fix signages, so they are visible from far; at elevator landing, by exit stairway door
- Enhance surveillance technology, use IP-based digital solutions for CCTV system
- Automate mall operations as far as possible

"International safety norms are the reference points

Jagdeep Malhotra
Dorma India



"Developers should go beyond mandated norms

Vijay Aima
Ambience

"BMS will redefine the way safety is ensured in buildings

David P Gayen
GEZE GmbH

global retail giants as tenants. These malls are offering infrastructure that matches international standards in quality if not yet in scale, including facade design, internal ambience, and safety and security features. "We have used measures to safeguard the assets and lives of our tenants, and ensure the smooth functioning of our malls," says Vijay Aima (vpops@ambiencemalls.com), VP-operations of Ambience Ltd, the real estate development company that has built iconic malls in Gurgaon and Vasant Kunj in Delhi.

Challenging Situation

Group D section of Part IV of the National Building Code currently categorises theatres, motion picture houses, assembly halls, auditoriums, exhibition halls, museums, restaurants, club rooms, stadia, etc as assembly buildings.

But by this year end 280 malls and 584 Adarsh railway stations will be ready, in another 12 years 500 new and renovated airports will be operational, by 2015 hundreds of new hospitals, hotels and IT complexes will be occupied.

There's an urgent need to review the NBC in light of today's highly automated architectural landscape, one which users still find unfamiliar.

According to Aima, Ambience recently geared up surveillance at its malls by adding 100 cameras and upgrading the CCTV system from analogue to IP-based digital. Besides, he informs that the company is in talks with Schneider Electric for exploring the feasibility of incorporating a building management system (BMS) in the malls. BMS is a computer-based system that controls and monitors the building's heating, ventilation, air-conditioning, refrigeration, lighting, power, and fire and security systems, by using protocols such as C-Bus and Profibus. Ambience and other establishments are also unilaterally upgrading the exit hardware, in order to make it easier to manage crowds during emergencies, and quickly get them to safety even as danger like smoke and fire are localised. (*see Genre, pg 68*)

"This is just the onset of path-breaking technology in the exit and panic hardware. These are rapidly being upgraded with advanced features such as integration with BMS. This has also broadened the role of bluetooth technology and smartphones, which enable constant monitoring and controlling of exit systems," says David P Gayen (d.gayen@geze.com), MD of GEZE India Pvt Ltd, a part of Germany-based GEZE GmbH. This hardware company offers a range of solutions for smoke and heat extraction, and window and ventilation systems.

Exit hardware refers to products that adorn doors, windows and spaces that lead people outside the building. These include door closing devices, latches and levers, panic bars and signages. Many of these have to be compulsorily used in the buildings, while many other are simply recommended. However, each of these products is increasingly becoming digital and getting connected to other systems of the building, so that communication of warnings and alarm becomes simpler and automatic.

Now consider these.

When an emergency exit door opened accidentally at a New Jersey multiplex during the screening of *The Dark Knight Rises* this July, its BMS-integrated alarm brought the show to a standstill. The police arrived, turned on the lights of the movie theatre, and cancelled the show and cleared the hall.

An unscrupulous customer tried to sneak out of a restaurant in Singapore without paying, by using the emergency exit door at the back. A sonic alarm integrated into the door's panic bar alerted the management and police, and he was caught in time.

Had window automation devices, which automatically open windows on sensing smoke, been used in AMRI hospital and Maharashtra Mantralaya, the death toll could have been smaller.

These are but a few examples of how exit hardware is helping save lives and managing buildings better, besides de-stressing authorities from unnecessary harassment by alerting on unauthorised use of emergency facilities. n

FIRE DOORS

Glazed

Glazed window in door provides an easy way to see if it's safe to open door during a fire. Windows in fire doors are often made of ceramic or borosilicate glass, wire mesh glass or a layer of liquid sodium sandwiched between two panes of glass. Smaller glass panels tend to be more resistant than bigger ones. It's important to use a fire resistant glazing system to hold window in place.

Rolling steel

These doors are constructed using a unique design pattern, namely interlocking steel slat design, and a plate-steel construction.

Sliding

nels to protect the edges. re walls & are fitted with c hold open device, which with audible warning device & flashing red light, get activated by either heat or smoke detectors or any other fire alarm such as r system.

Steel

Recommended

Steel doors in fire-resistant frames are available as single or double doors with panic bar, finger plate or drop bar. Often these doors exceed three-hour rating, and achieve ratings of four & six hrs.

Solid-core wood

Mandatory

It's a composite door with wood veneer on both faces, and a variety of infill in between. The fire rating of a solid core wood door ranges depending on its core material.

Metal-clad

These doors are constructed using flush or panelled design which consists of metal covered wood core or stiles, while rails & insulated panels are covered with high quality steel.

Glass

Insulated glass fire doors are available in timber or steel frame. Automatic sliding versions are also available.

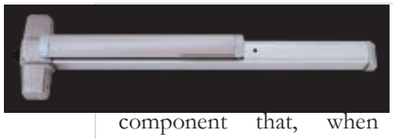
PANIC BARS

Pipe style

This panic device utilises a horizontal pipe or flat bar. A pair of arms pivot on base plates at each side and allow the device to operate a latch retractor when pushed.

Crash bar

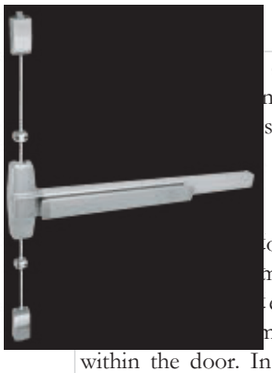
Mandatory



This has a flat integral component that, when pushed, retracts a latch mechanism. Compared to pipe or bar it is easier to push, and is generally resistant to obstructive issues. It functions with few moving elements on the exterior.

Sonic panic bar

In areas where theft is a concern, sonic alarmed panic devices are installed with delay egress feature. Use of the emergency exit door fitted with this device sounds an alarm, bringing attention to the exit activity.



conjunction with
nd other hardware
stalled to stop &
compartmentalise
fires. It relies on
vertical rods to
oors closed when
n a fire builds up
evice can be surface
mpletely concealed
within the door. In some applications both a top & bottom vertical rod is attached to latch mechanism that integrates with a strike plate or cup within the header of a door frame & floor. In others, only top rod is required. Installation includes lever or knob on pull side of door to allow re-entry.

EXIT SIGNS

Double-sided

Recommended

Such signs read EXIT on either side & are usually suspended or wall-fixed in passages.

Weather-proof

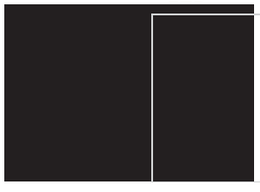
Housing of this sign is made from corrosion resistant ABS thermoplastic, is fully gasketed with hot bonded silicone to withstand damp, wet weather.

Photo-luminescent

Mandatory-green in colour

These non-electrical signs eliminate operating costs. They illuminate by absorbing surrounding light from regular light sources. When charged, the signs glow for at least 90 minutes in complete darkness. They are suitable for indoors, where lights are on while the facility is occupied. If lights are not on at all times, the sign will not charge constantly, and thus will not be suitable for the application.

LED



Fitted with LEDs, they provide bright, constant & uniform illumination to the word 'EXIT' for 8-10 years. Also, they are 10 times more efficient compared to incandescent & fluorescent illuminated signs.

DOOR CLOSER FOR SINGLE LEAF

Recommended

Door closers generally have electro-hydraulic
old open device & smoke detector integrated
housing. In event of fire, the smoke detector
es & door closes on its own accord.

DOOR CLOSER FOR DOUBLE LEAF

Recommended

These have an integrated closing sequence control, two-sided electromechanical hold-open device & integrated smoke switch for mounting on fire & smoke protection doors. In event of fire, the smoke detector activates & the door closes.

Events

India Hardware Congress
14 September 2012
New Delhi
www.indiahardwarecongress.com

SKYDD - Security, Fire & Rescue
18-21 September 2012
Sweden
www.skydd.net

China International Hardware Show
19-21 September 2012
Shanghai, China
www.hardwareshow-china.com

Security Essen
25-28 September 2012
Essen, Germany
www.security-messe.de

Shanghai International Disaster Reduction & Security Show
10-12 October 2012
Shanghai, China
www.sidrschina.com

Taiwan Hardware Show
11-13 October 2012
Taipei, Taiwan
www.hardwareshow.com.tw

IFSEC India
1-3 November 2012
Greater Noida, Delhi-NCR
www.ifsecindia.com

Sicurezza
7-9 November 2012
Milan, Italy
www.sicurezza.it

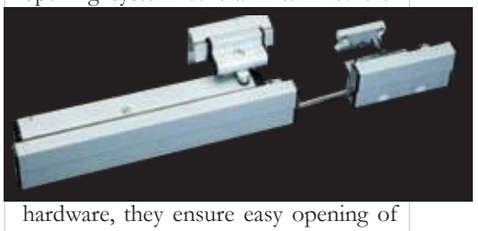
BAU 2013
14-19 January 2013
Munich, Germany
www.bau-muenchen.com

VENTILATION SYSTEM

Manual

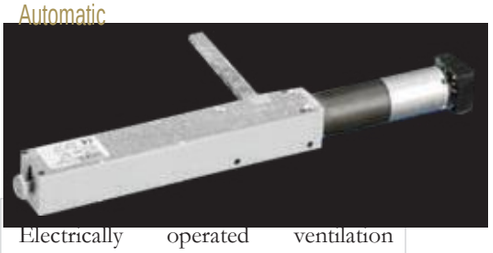
Mandatory

Manual window opening systems are used for ventilation. With a fanlight opening system & crank turn & tilt



hardware, they ensure easy opening of large windows. Applications include vertically installed bottom or top-hung windows opening inwards & vertically installed top-hung windows opening outwards.

Automatic



Electrically operated ventilation systems are actuated by smoke, CO2 & heat detectors, for automatic daily airing and ventilation of smoke during fire.

ACTUATION DEVICES

Actuation devices such as presence & movem
opening
of sw
revolving
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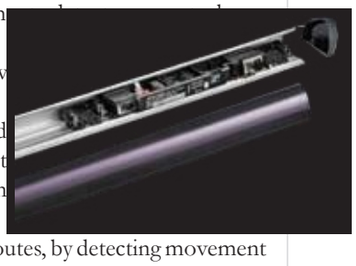
o o r s s i t
u a t e d in
escape



& rescue routes, by detecting movement & presence of persons or objects.

Smoke switch & control units help early recognition of smoke, & control hold-open devices used in fire and smoke doors.

Safety switch / button is used to deactivate the main power & enable emergency opening of automatic doors.

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Fire door nt:in&s ue gowrmd by NBC u wellu dis:ectiws of loco!tu. &.....;;;pol *ulhorities.

Exit sign
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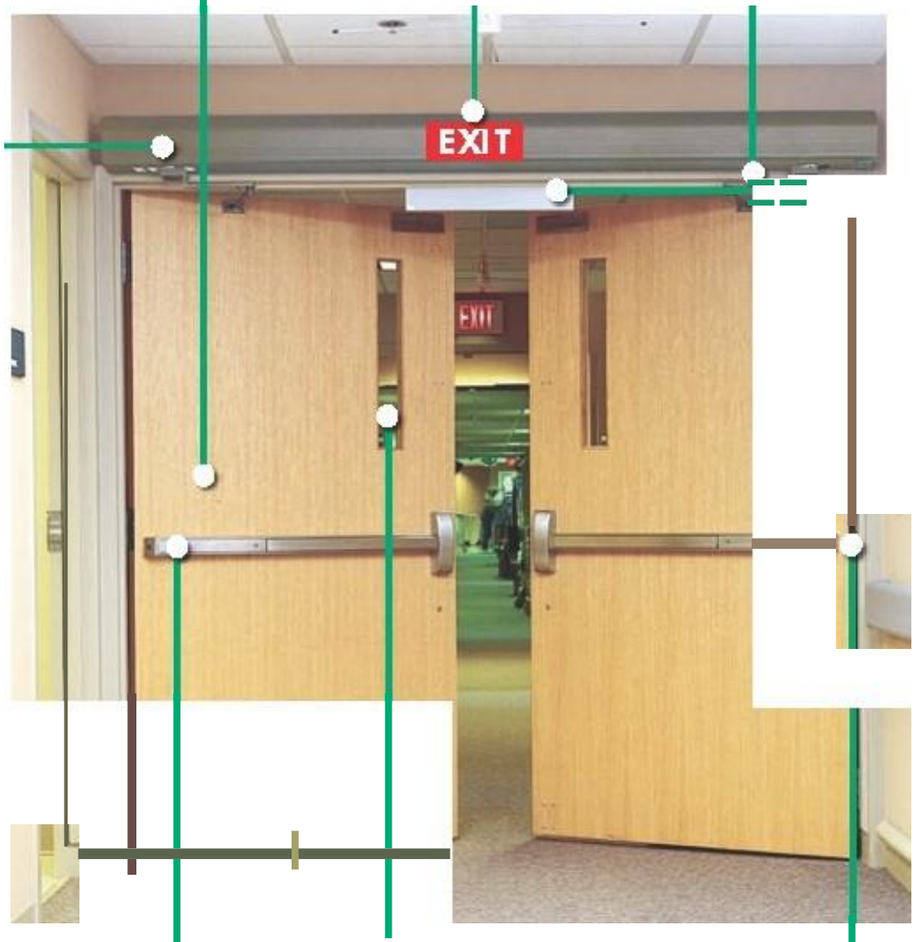

Sonic olorm deviOl
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Monmouth Housing Association, Pontypool, Wales, UK

Project: The new headquarters for Monmouth Housing Association was build for accommodating their 114 staff in a spacious open plan environment, planned such that it could potentially expand by 30% within the same site when required.

Challenge: The brief was to design a ventilation strategy that would provide fresh air into the working space of the building to enable a healthy and productive environment for its users. This could be achieved by expelling stale air and introducing fresh air.

Design: It was designed with natural ventilation and high level lighting, which consequently assisted in achieving an excellent BREEM rating. SE Controls provided the control and automation of the façade and clerestory windows by designing and installing 165 chain actuators. The central control strategy acted as an intelligent interface between actuators and the BMS, communicating via LonWorks interface. As temperature increases above a set parameter in the building, the warm stale air rises and high level clerestory windows would open to exhale it. The façade windows would open to allow cool fresh air to be drawn in, replacing the stale warm air. This is a typical application of the stack ventilation principle, utilising the buoyancy effect of warm air to create low pressure areas at the bottom of the stack. This in turn draws replacement air from wherever possible, in this case an open window. As the temperature levels return to normal, the windows close incrementally.

During summer, a night time cooling strategy is triggered - in part due to a comparison of internal and external temperatures during the day. If applicable, the strategy will result in the OS2 controller to open vents, allowing cool night air to enter the building and purge the interior warm air. During the day, warm air is cooled by these surfaces, which in turn warm up ready for the next night cooling cycle. Such a cooling strategy can typically reduce internal temperatures by a further 1°C during the day. During winter, heat produced by occupants and electrical equipment in the office is retained as much as possible by high performance building insulation, and by minimising the opening of windows and vents, reducing the need for mechanical heating.

Hackney Academy, London, UK

Project: Hackney's City Academy is a striking building that has bold colours and an extensive façade of aluminium and glass in an acoustic twin façade design. Catering to 900 pupils of different faiths, the academy specialises in business and financial services with KPMG and The City of London Corporation as its sponsors.

Challenge: The company's brief was to design a system that can reduce running costs of the building and ensure safety in the event of fire.

Design: A combined natural ventilation and smoke control system was designed and installed. SE Controls specified the project and supplied equipment to various sub-contractors, while its engineers completed the final installation and commissioning work. The company supplied around 1054 actuators and fitted them in various combinations to 538 vents, having configuration of both the top hung open out and the bottom hung open in casement windows. It specified various methods of actuation depending on the location and ventilation requirement within each space.

The classroom ventilation consists of linked tandem pairs of actuators fitted to the window system, which are operated via a single switch when ventilation is required. In circulation and communal spaces actuators are wired back to a total of 10 panels controlling 17 zones for the entire building. The 1054 actuators are grouped into 110 separate groups, either switch or BMS operated. All window actuators were fitted with pivot brackets ensuring that the window can have lateral movement for reducing the strain on the actuator chain. Adopting this method of attaching actuators to the windows ensured that the actuators themselves attain the longest possible life without failure. Where there are areas of possible entrapment, TGCO 24 20ED and TGCO 24 30ED programmable chain actuators were implemented within the windows, and these have been reduced in both closing force and speed in order to protect against injury.

To provide smoke free exit routes in case of fire, the circulation and communal spaces control panels were designed to work together with a control panel linked into the fire alarm system. This independent and battery backed up device would open all the windows in these spaces in an event of fire alarm and power supply failure. For natural ventilation, the 10 control panels are linked to BMS to offer comfort ventilation. When the fire alarm is reset, smoke vents would return to their previous positions and be under control of the BMS again.

Ordnance Survey, Southampton, UK

Project: Great Britain's national mapping agency Ordnance Survey began work on their new Southampton head office in April 2009. Located alongside the busy M271 highway, the building was designed by Broadway Malyan, which was projected as a flagship corporate building of the area. Stakes were high as Southampton has been the home of the agency for over 160 years, and their existing office in Maybush was opened by the Queen in 1969.

Challenge: SE Controls' brief was to design and commission a natural ventilation system to ensure the most comfortable environment for occupants. The system had to work in conjunction with other low energy systems, including a ground sourced heat pump system, rainwater harvesting, and recycling composter for creating a green sustainable building.

Design: The company provided solutions that include 480 no. TGCO 24ED chain actuators and 105 no. OS2 control panels, which were linked to a building management system (BMS). The chain actuators opened top hung windows and worked with chimney funnels exhausting rising hot air, whilst allowing fresh air to be drawn in. The control panels were wired into one of three LON Networks, which then were attached to the BMS. The two products were linked to CO_2 and temperature sensors to provide a silent operation with minimal maintenance, besides automatically opening windows at the correct distance to ensure maximum ventilation for the occupants.

Demystifying the Exit

Architect Neelakshi Srivastava (arssrivastava@yahoo.co.in), director of Delhi-based Design Convergence, feels Indian building codes need to be upgraded so that latest exit hardware becomes the norm

Q. What is the law relating to use of hardware at points of exit in buildings?

A. The National Building Code 2005 specifies that fire escapes should provide easy and unobstructed exit in times of emergencies. In the event of fire, fire exits should remain smoke tight and not allow fire to reach these escapes. They should be fitted with a suitable fire-rated door and a door control device. Therefore, it becomes essential for high rise and public buildings to have functional exit/panic devices to help smooth exit of the occupants.

Are there sufficient Indian guidelines for selection of hardware?

No, we do not have an updated and comprehensive code that elaborates criteria for use of hardware. In the absence of any guidelines from regulatory bodies, fire consultants and manufacturers are frequently recommending exit hardware that complies with American, European and British standards.

What are the newest concepts being used in buildings?

Electrically operated panic bars, exit hardware with alarm features, exit devices for double leaf doors and occupancy sensors are some of the new products being used. These products are in compliance with European CEN Standard of EN 1125, which covers cross bar type exit devices for public buildings, and EN1 79 that specifies lever type devices for non-public buildings.

What are the challenges in using the newest hardware?

Since these products are new to the Indian market, quality with reliable performance becomes a challenge. It is difficult to assess which supplier is more dependable.

What is the level of awareness about exit hardware and its importance?

Well, I have found that both consultants and builders are aware of the potentials of hardware. They are responsive to suggestions regarding use of the updated versions, since they understand their role in improving maintenance, access and safety. As for the actual users, many of these products are still a novelty since users have not been exposed to their use through routine drills, and at crucial times they find it difficult to understand. n

Cover story by: Mrinmoy Bhattacharjee & Sonal Singh Nigam