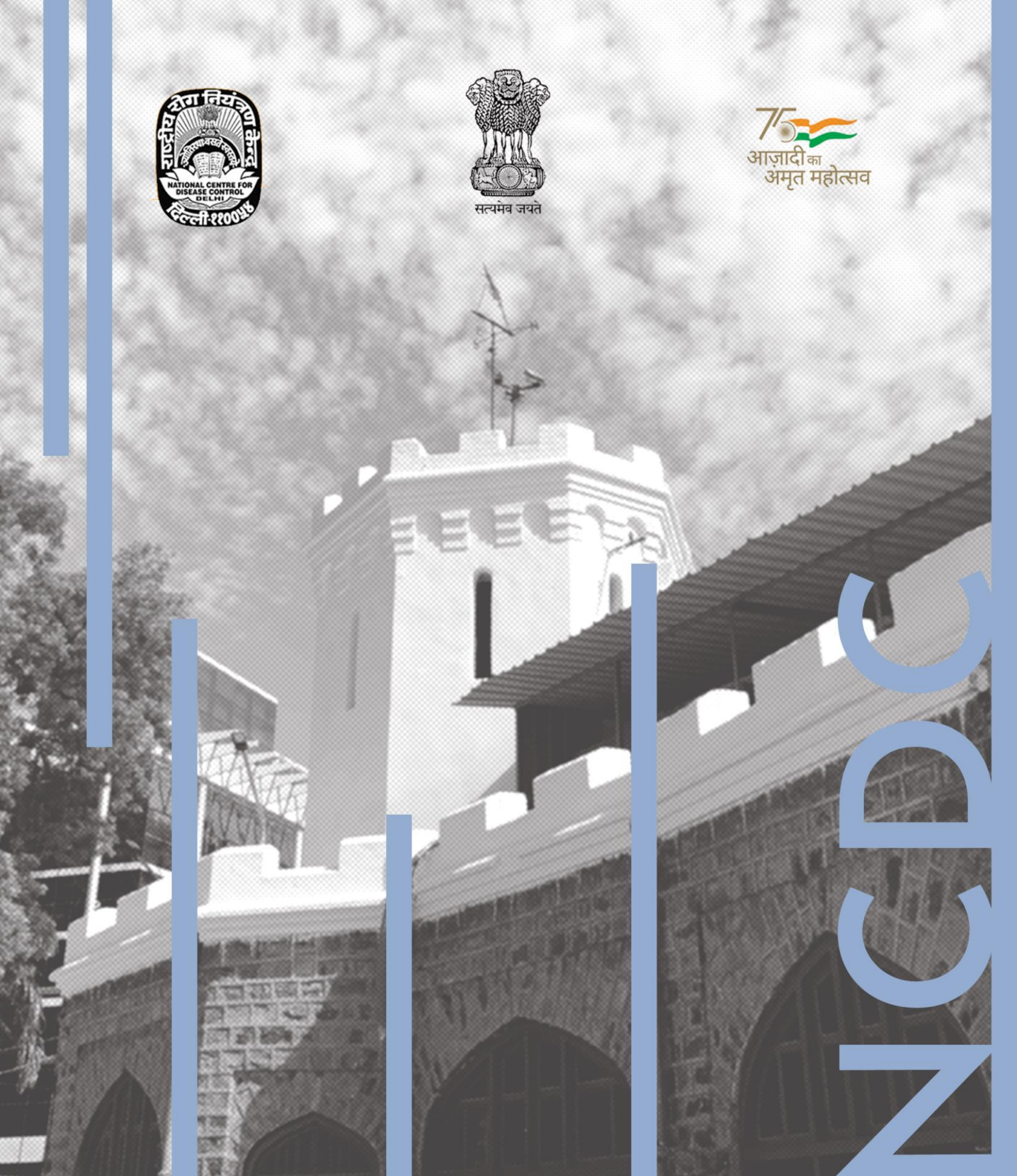




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# RISK REDUCTION HANDBOOK

**National Centre for Disease Control, Delhi**

Directorate General of Health Services  
Ministry of Health & Family Welfare  
Government of India







## **RISK REDUCTION HANDBOOK**







# ABOUT THE BOOK

“As the research says, investing one dollar in prevention and risk reduction strategies, saves around eight dollars in response”. Also the ancient philosophy in healthcare “Prevention is better than cure” is the baseline for this document. Being an institution of national importance, NCDC and its safety is vital for the progress of public health systems in India.

This Risk Reduction Handbook encompasses and incorporates the possible scope of improvements and recommendations that as a team of technical experts we observed during the preparation of the Disaster Management Plan of NCDC.

These recommendations are statutory in nature and may be implemented as per the discretion of NCDC leadership.





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The Disaster Management Plan of NCDC campus provides an opportunity to draw attention to priorities, activities, and ways to strengthen the status of the institution for emergency preparedness, mitigation, prevention, and response activities.

Implementation of disaster management plan is an ongoing dynamic process. Building resilience towards disasters is a constant effort.






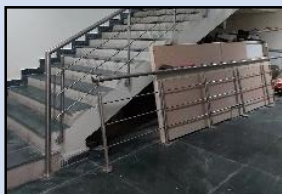

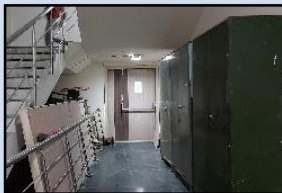
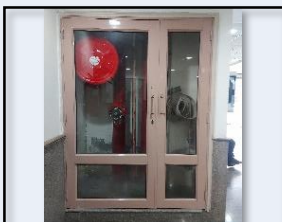
These following recommendations can further enhance the capacity of NCDC as an institution to be better equipped to deal with hazards. The sustainable campus development would make it a safe and friendly campus for the employees to work and enhance their productivity.

| SITE                   |                                  |  |  |   |
|------------------------|----------------------------------|--|--|---|
| CATEGORY               | SUB-CATEGORY                     | OBSERVATIONS   | IMAGES   | RECOMMENDATIONS   |
| Fire safety provisions | Hose reel cabinets               | Damaged, empty and hidden behind bushes hose reel cabinets.  |    | Hose reel cabinets should be properly maintained and placed in visible areas throughout the periphery of the site.  |
|                        | Turning radius                   | At some places turning radius is not enough for proper movement of fire tender which might become a hindrance during any emergency or drill. |    | Replanning of internal roads is required with proper width and turning radius.  |
| Architectural finishes | Boundary wall                    | Damaged boundary wall  |   | Boundary wall should be repaired and maintained properly.   |
|                        | Manholes and chambers            | Open and broken manhole covers   |  | Manholes and chambers should be in good state and kept covered.   |
| Landscape              | Plantation, pathways and parking | Uneven growth of grass, damaged grass pavers etc.  |  | Proper & regular maintenance of landscape and pathways should be done   |
|                        | Waste material                   | Waste material dumped along the boundary wall.   |  | Waste material should be stored away from visible areas and dumped properly afterwards. Proper institutional waste management protocols must be followed. |
|                        | Porta cabins                     | Damaged porta cabins   |  | Damaged and unused porta cabins should be discarded or disassembled.  |

| SITE                   |                        |  |  |  |
|------------------------|------------------------|--|--|--|
| CATEGORY               | SUB-CATEGORY           | OBSERVATIONS   | IMAGES   | RECOMMENDATIONS  |
| Landscape              | Temporary structures   | Temporary structures are taking up space allotted for landscaping purpose  |    | Temporary structures should be removed as they are taking up space designated as assembly areas.   |
|                        | Railing                | Broken railing   |    | Broken railings should be repaired and maintained regularly.   |
| Services and utilities | Throughout NCDC campus | Open electrical cables & wires hanging at a low height obstructs the movement of fire tender, ruins the aesthetics of the campus and pose a great threat to life and property. |   | Cables and wires should be properly installed in a safe and secure manner and checked regularly.   |
|                        |                        | Plumbing pipes coming out of building are not maintained properly.   |  | Periodic maintenance of plumbing pipes is required.  |
|                        |                        | Electrical boxes and poles are getting damaged due to rusting.   |  | Problem of rusting is a major issue and it should be taken care of as soon as possible and all the electrical poles and boxes should be kept rust free.                        |
| HERITAGE BLOCK         |                        |  |  |  |
| CATEGORY               | SUB-CATEGORY           | OBSERVATIONS   | IMAGES   | RECOMMENDATIONS  |
| Architectural finishes | Openings               | Window frames are damaged due to rusting, cables are running through the window openings & windows are flanked by window ACs.  |  | Window frames and panels should be replaced wherever required. Cables should also be stacked securely at a safe and designated places instead of building façade and openings. |
|                        | Masonry work           | Walls are damaged and masonry work is not maintained.  |  | Repair work needs to be done and proper maintenance to be carried out.   |








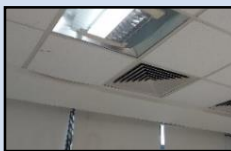



| HERITAGE BLOCK                         |                       |  |  |   |
|--|-----------------------|--|--|---|
| CATEGORY                               | Sub-CATEGORY          | OBSERVATIONS   | IMAGES   | RECOMMENDATIONS   |
| Architectural finishes                 | False ceiling         | Needs to be repaired at few places.  |    | False ceiling should be kept in good condition so that it does not fall and cause damage to life and property.  |
| Appendages to buildings                | Solar panels          | Solar panels on metal fabricated frames/stand are anchored throughout the terrace of heritage blocks.  |    | Solar panels should be removed from heritage block terraces.  |
|  | ACs and Outdoor units | Windows are flanked by window ACs and outdoor units are placed on terrace protected under a tin shade. |    | Window ACs to be replaced by alternative method and all temporary structures to be removed from its terrace.  |
|  | Cables                | Cables hanging from the exterior façade of building.   |   | Building façade should be kept clear from all the hanging and open cables which may cause onset of an emergency.  |
|  | Dish TV antennae      | Dish TV antenna are anchored on the façade of heritage building.                                       |  | Dish TV antenna should be removed as such fastening/anchoring should not be allowed on heritage building.   |
|  | Hoardings             | Hoardings are placed in front of heritage building.  |  | Hoardings and signages should not be placed directly in front of the building and should be shifted to different relevant location.                                 |
|  | Debris                | Debris is piled up in many places around the building.   |  | Area in and around the building should be kept clean and free from piles of debris.   |
| Unsecured heavy items inside buildings | Furniture             | Book shelves are unanchored and placed in corridors  |  | Book shelves should be anchored so that they don't fall during disaster such as earthquake. Shelves blocking the exits, corridors and outer spaces must be removed. |












| HERITAGE BLOCK                         |                                |   |  |   |
|--|--------------------------------|---|--|---|
| CATEGOR Y                              | SUB- CATEGORY                  | OBSERVATIONS  | IMAGES   | RECOMMENDATIONS   |
| Unsecured heavy items inside buildings | Appliances                     | ACs are not properly installed and cables are throughout the exterior and interior of building.   |    | Appliances such as refrigerators, ACs, projectors, extension cords etc. should be turned off when not in use.<br>Extension cords should not run below rugs or taped on floor. |
| Services and utilities                 | Within and around the building | Open telecommunication cables, electrical cables & wires running throughout the external façade of the block and even in the interiors. |    | Electrical cables should run through an enclosed shaft to prevent and reduce emergencies such as short circuit and fire.  |
|  |                                | Rainwater stacks are worn out and some of them are leaking.   |   | Repair work to be done to maintain them in good state always.   |
| ADMIN BLOCK                            |                                |   |  |   |
| Fire safety provisions                 | Stairs                         | Debris below fire staircase which might lead to spread of fire  |  | Fire staircase well should be free from any kind of debris.   |
|  |                                | Distribution board inside fire staircase well   |  | Distribution boards should be removed immediately from fire staircase well.   |
|  |                                | Obstacles inside fire staircase well  |  | Fire staircase well to be kept clear from any kind of obstacles.  |
|  | Fire shaft                     | Fire shaft door is not red in color   |  | Fire shaft door should be red in color as per color code.   |

| ADMIN BLOCK                            |                             |   |  |  |
|--|-----------------------------|---|--|--|
| CATEGORY                               | SUB-CATEGORY                | OBSERVATIONS  | IMAGES   | RECOMMENDATIONS  |
| Fire safety provisions                 | Fire exits                  | Closed fire exit doors                                      |    | Fire exit doors should always remain open for easy access during any emergency.  |
|  |                             | Proper landing is not provided in front of fire exit doors. |    | Proper landing should be provided in front of exit doors so that people don't trip and fall.   |
| Architectural finishes                 | Openings                    | Structural glazing damaged in many places                   |   | Damaged or cracked glass panels should be repaired immediately.  |
|  | False ceiling               | Sagged and dismantled false ceiling.                        |  | False ceiling should be kept in good condition so that it does not fall and cause damage to life and property.   |
| Appendages to buildings                | Exterior metal frame façade | Metal frame façade is damaged due to rusting in many places |  | Metal frame structure should be repaired and kept free from rust before it becomes weak and falls causing further damage.  |
|  | Cables                      | Cables hanging from the exterior façade of building.        |  | Building façade should be kept clear from all the hanging and open cables which may lead to an emergency.  |
| Unsecured heavy items inside buildings | Furniture                   | Cabinets are unanchored and placed in corridors             |  | Corridors should be kept free from storage cabinets. Cabinets should be anchored to adjacent wall<br> |


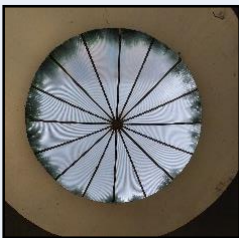





| ADMIN BLOCK                            |                                    |   |  |  |
|--|------------------------------------|---|--|--|
| CATEGORY                               | SUB-CATEGORY                       | OBSERVATIONS  | IMAGES   | RECOMMENDATIONS  |
| Unsecured heavy items inside buildings | Appliances                         |   |    | Appliances such as refrigerators, ACs, projectors, extension cords etc. should be turned off when not in use. Extension cords should not run below rugs or taped on floor. |
| Services and utilities                 | With in and Services and utilities | Open electrical cables & wires running through pantry       |    | Electrical cables should run through an enclosed shaft to prevent and reduce emergencies such as short circuit and fire.   |
| DRY LAB                                |                                    |   |  |  |
| Fire safety provisions                 | Fire shaft                         | Fire shaft door is not red in color                         |   | Fire shaft door should be red in color as per color code   |
|  | Fire exits                         | Closed fire exit doors                                      |  | Fire exit doors should always remain open for easy access during any emergency.  |
|  |                                    | Proper landing is not provided in front of fire exit doors. |  | Proper landing should be provided in front of exit doors so that people don't trip and fall.   |
|  |                                    | Fire exit door is not fire resistant                        |  | Fire exit door should be fire resistant, provided with push bar and open towards outside.  |
| Architectural finishes                 | Openings                           | Structural glazing damaged in many places                   |  | Damaged or cracked glass panels should be repaired immediately.  |
|  | False ceiling                      | Sagged and dismantled false ceiling.                        |  | False ceiling should be kept in good condition so that it does not fall and cause damage to life and property.   |
|  | Stone work                         | Stone cladding is broken in many places.                    |  | Cladding should be intact and repaired periodically to protect the masonry work and prevent anyone from getting hurt due to rough edges.                                   |

| DRY LAB                                |                                |  |  |   |
|--|--------------------------------|--|--|---|
| CATEGORY                               | SUB-CATEGORY                   | OBSERVATIONS   | IMAGES   | RECOMMENDATIONS   |
| Appendages to buildings                | Exterior metal frame façade    | Metal frame façade is damaged due to rusting in many places  |    | Metal frame structure should be repaired and kept free from rust before it becomes weak and falls causing further damage.   |
| Unsecured heavy items inside buildings | Furniture                      | Cabinets and shelves are unanchored and damaged  |    | Corridors should be kept free from storage cabinets. Cabinets should be anchored so that they don't fall during disaster such as earthquake.  |
|  | Appliances                     |  |   | Appliances such as refrigerators, ACs, projectors, extension cords etc. should be turned off when not in use.<br>Extension cords should not run below rugs or taped on floor.   |
| Services and utilities                 | Within and around the building | Open electrical cables & wires running through labs.   |  | Electrical cables should run through an enclosed shaft to prevent and reduce emergencies such as short circuit and fire.  |
|  |                                | Water logging  |  | Water logging should be prevented as it may pose risk for various water borne diseases and can be a breeding ground for various insects.  |
| L3                                     |                                |  |  |   |
| Fire safety provisions                 | Stairs                         | There are steps in place of landing as soon as you open the fire door in one of the fire staircase well. |  | Proper planning needs to be done and position of these two steps needs to be changed if possible as it may lead to another risk of tripping and falling while escaping.   |
|  | Fire Shaft                     | Fire shaft door is not red in color  |   | Fire shaft door should be red in color as per color code.   |
|  | Fire Exits                     | Separate exit is not provided for basement in one of the fire staircases.                                |  | Separate exit from basement should be provided or movement to the basement should be blocked otherwise while escaping people might end up in basement instead of escaping through the ground floor in a state of panic. |

| L3                                     |                                |  |  |   |
|--|--------------------------------|--|--|---|
| CATEGORY                               | SUB-CATEGORY                   | OBSERVATIONS   | IMAGES   | RECOMMENDATIONS   |
| Fire safety provisions                 | Fire doors                     | Closed fire exit doors   |     | Fire exit doors should always remain open for easy access during any emergency.   |
|  |                                | Proper landing is not provided in front of fire exit doors.    |    | Proper landing should be provided in front of exit doors so that people don't trip and fall.  |
|  |                                | Push bar and visibility glass panels are missing in fire door. |    | Proper fire doors following all fire safety protocols should be installed.  |
| Architectural finishes                 | Openings                       | Structural glazing damaged in many places                      |     | Damaged or cracked glass panels should be repaired immediately.   |
|  | False ceiling                  | Sagged and dismantled false ceiling.                           |   | False ceiling should be kept in good condition so that it does not fall and cause damage to life and property.  |
| Appendages to buildings                | Cables                         | Cables hanging from the exterior façade of building.           |  | Building façade should be kept clear from all the hanging and open cables which can be an onset of an emergency.  |
| Unsecured heavy items inside buildings | Furniture                      | Cabinets are unanchored  |   | Corridors should be kept free from storage cabinets. Cabinets should be anchored so that they don't fall during disaster such as earthquake.                                  |
|  | Appliances                     | .  |  | Appliances such as refrigerators, ACs, projectors, extension cords etc. should be turned off when not in use.<br>Extension cords should not run below rugs or taped on floor. |
| Services and utilities                 | Within and around the building | Open electrical cables & wires running through labs.           |  | Electrical cables should run through an enclosed shaft to prevent and reduce emergencies such as short circuit and fire.  |
| BASEMENT                               |                                |  |  |   |
| Fire safety provisions                 | Hose reel                      | Dilapidated hose reel  |  | Old hose reel should be repaired or replaced.   |
|  |                                | Empty fire cabinets  |  | Fire cabinets should be properly maintained.  |






| BASEMENT               |                                |   |  |  |
|------------------------|--------------------------------|---|--|--|
| CATEGORY               | SUB-CATEGORY                   | OBSERVATIONS  | IMAGES   | RECOMMENDATIONS  |
| Architectural finishes | Canopy                         | Canopy over ramp is damaged at various places.  |    | Canopy should be repaired and properly maintained.   |
|                        | Skylight                       | Algae accumulation on skylight is damaging it and blocking the entrance of natural light. |    | Skylight material should be replaced for better penetration of natural light, proper hygiene and better aesthetics.      |
| Unsecured heavy items  | Furniture                      | Cabinets are unanchored   |   | Cabinets should be anchored so that they don't fall during disaster such as earthquake.                                  |
| Services and utilities | Within and around the building | Open electrical cables & wires  |  | Electrical cables should run through an enclosed shaft to prevent and reduce emergencies such as short circuit and fire. |
|                        |                                | Seepage of water  |  | Proper waterproofing and periodic maintenance is required.   |

#### LI, NCVBDC, PG HOSTEL AND GUEST HOUSE

|                        |            |   |  |  |
|------------------------|------------|---|--|--|
| Fire safety provisions | Fire exits | Closed fire exit doors                                      |  | Fire exit doors should always remain open for easy access during any emergency.              |
|                        |            | Proper landing is not provided in front of fire exit doors. |  | Proper landing should be provided in front of exit doors so that people don't trip and fall. |

**LI, NCVBDC, PG HOSTEL AND GUEST HOUSE**

| CATEGORY                | SUB-CATEGORY                   | OBSERVATIONS  | IMAGES  | RECOMMENDATIONS   |
|-------------------------|--------------------------------|---|---|---|
| Fire safety provisions  | Fire doors                     | Debris in front of fire exit doors.                         |   | Debris blocking the fire exit doors should be removed immediately and should be kept clear from any kind of obstacles.              |
| Appendages to buildings | Exterior metal frame façade    | Metal frame façade is damaged due to rusting in many places |   | Metal frame structure should be repaired and kept free from rust before it becomes weak and falls causing further damage in NCVBDC. |
| Services and utilities  | Within and around the building | Seepage of water  |  | Proper waterproofing and periodic maintenance is required.  |

**NOTE :-**

| CATEGORY       | SUB-CATEGORY  | OBSERVATIONS              | IMAGES  | RECOMMENDATIONS   |
|----------------|---------------|---------------------------|---|---|
| First Aid room | All buildings | Unequipped First Aid room |  | Owing to a considerable amount of staff present at NCDC, a proper First Aid / medical intervention room with basic medical supplies and medicines can be maintained. Regular training of staff on First Aid and safety must be carried out. |

**Capacity building** is a process through which individuals, organizations and societies obtain, strengthen and maintain the capabilities to set and achieve their own development objectives over time.

To institutionalize disaster management plan in NCDC, consistent training for capacity building on disaster risk management will be crucial element, which will strength and prepare the staff for immediate action.

- **Training** - It includes educating the vulnerable communities around the complex & NCDC Staff. The training will also develop capacities to strengthen preventive and response strategies in case of a disaster or an emergency .
- **Education on disaster prevention and response to NCDC staff** - It includes imparting the basic training of disaster management to the volunteers. It aims to teach people how they can survive and help others.
- **Mock drill** - It is a method of practicing how a building should be evacuated in the event of a fire or other emergency. Usually, the building's existing fire alarm system is activated and the building is evacuated just as it would in case of real emergency through evacuation routes to designated assembly areas.

## Learning outcomes of Mock Drill training

- Objectives of mock drill.
- Common safety problems at workplace.
- Systematic way of conducting mock exercises.
- Role of management, emergency manager, authorized response person, and workers for conducting mock drill.
- Escape plan in case of emergency.
- Guidelines to be followed before, during, & after mock drill.
- Evaluation of mock drill.
- Implementation & revision of disaster management plan.

All Hazards mock drills should be conducted at specific time intervals to help coordinate the factual awareness and consciousness of NCDC staff related to disaster response and evacuation. Life saving excels like fire safety, first aid and basic awareness must be regularly practiced.





Mock-drill focused on how to initiate in-house response trigger mechanism, coordination among stakeholders, implementation of Incident Command System (ICS) for earthquake, fire and chemical emergencies.



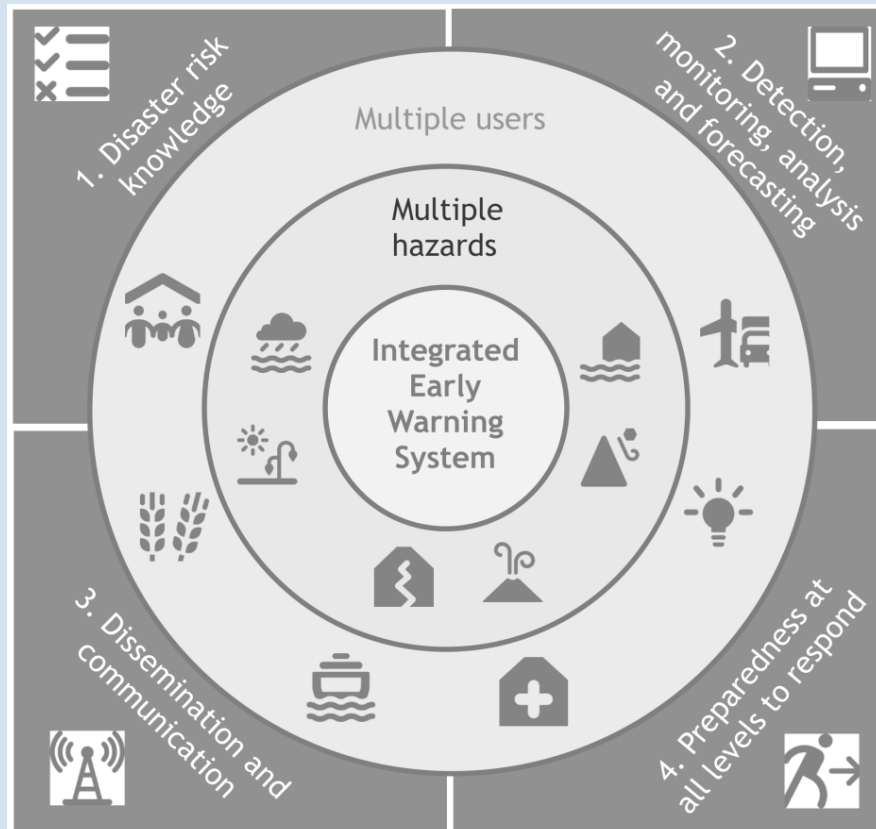
Mock drill was conducted at NDCD on 6<sup>th</sup> June, 2022

- **Preparation of emergency kit** - Department wise emergency kits must be developed and updated at regular intervals.
- **Understanding early warning messages** - Dissemination of early warning message to the vulnerable communities is the next task which can be achieved through better training and involvement of all stakeholders.
- **First aid preparedness** - Along with all necessary things it's important to have a well-stocked first aid kit to deal with minor accidents and injuries.
- **Collaboration with relief agencies** - It includes the collaboration between different governments as well as non-government agencies involved in the relief work for all kind of disasters.



**WE CANNOT  
STOP  
NATURAL  
DISASTERS  
BUT WE CAN  
ARM OURSELVES  
WITH KNOWLEDGE:**

**SO MANY LIVES  
WOULDN'T  
HAVE TO BE  
LOST IF THERE  
WAS ENOUGH  
DISASTER  
PREPAREDNESS**





Training in Disaster Response has to be more skill-intensive and more operation-oriented, with larger proportions of 'demonstration' and 'hands-on' content than merely conceptual inputs covered through 'talk and chalk' method in classrooms. For this purpose, it would require a more extensive training infrastructure, including facilities like 'prop areas', 'simulation or demonstration area' etc. A well structured training regime, along with a top-notch training infrastructure and "state-of-the-art" training arrangements, has therefore to be planned for the staff of NCDC.

Disaster specific preparedness and response equipment kits should be maintained and updated with time.

Disaster-specific mock drills should be conducted at specific time intervals to help coordinate the factual awareness and consciousness of NCDC staff related to disaster response and evacuation.

Conduct DM Committee meetings on regular interval and prepare draft Incident Action Plan for various scenarios followed by its periodic briefing. Periodic revision of disaster management plan, from the view of maintaining its sustainability with changing climate, infrastructural and technology needs of NCDC campus.





Signage is a powerful visual tool for communication and a crucial component of the safety experience. Well designed and strategically positioned signage can welcome, guide, and instruct users, helping them navigate the institutional complex with ease. For research centre, the signage system serve a dual purpose- firstly, they create a sense of safety and comfort the staff & visitors and secondly, they help the centre in conveying its values and beliefs.

Safety signage is an easy and efficient way of informing staff and visitors of all potential risks. Some of the signages are as given below :

- Any potential hazardous risk.
- Prohibited areas or actions.
- Mandatory actions that must be taken.
- Indicate exits in case of emergencies.
- Instructs staff and public on correct evacuation procedure.
- Indicates first aid locations and assembly points.
- Demarcated zones.

## Short Term Steps

- Installation of all the emergency signs in building area.
- Fix and replace missing emergency signs.
- Put signage and demarcation of assembly areas.
- Put the signs at right places.
- Educate and train workers on what symbols actually mean.
- Display building wise and campus evacuation maps.

## Medium Term Steps

- Photo luminescent signs and marking.
- Perform monthly and annual inspection and keep your records up to date.
- Remove signage from heritage block walkway.

## Long Term Steps

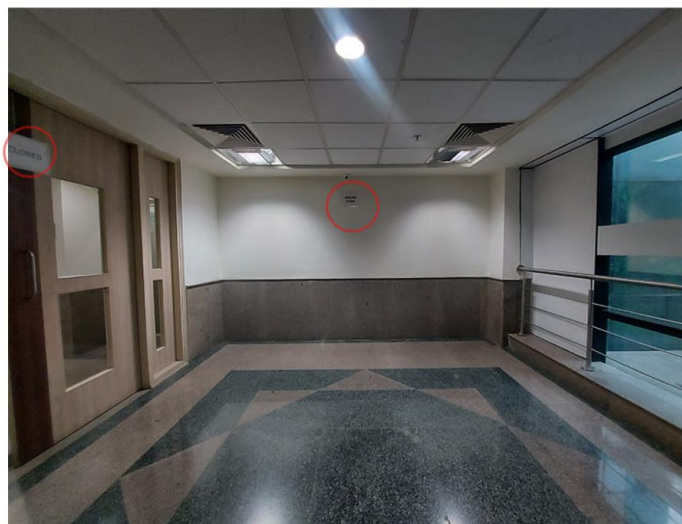
- Emergency lighting is designed to illuminate and identify hallways, stairwells and exits to facilitate a safe and orderly evacuation.
- While traditionally safety signs have been painted on floors or affixed to walls, new light technologies have led to newer types of signage e.g. projected signs are good alternative as they do not fade and deteriorate.
- Innovation in signages can be leveraged through staff creativity.
- Proper display of IEC, do's and don'ts and awareness materials at designated places.
- Illuminated & demarcated pathways and exits, braille and disability inclusive signages are key in making organization safe.







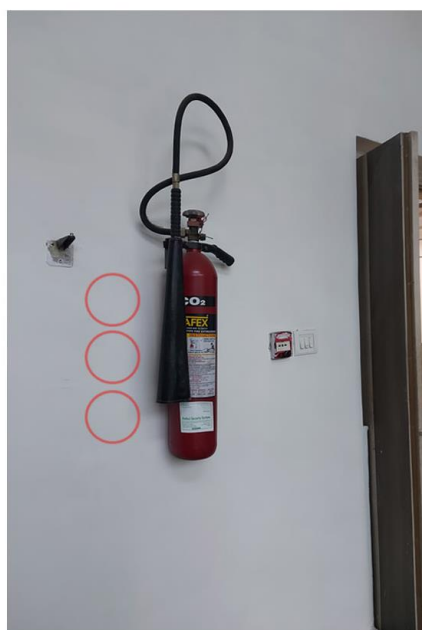
Building signage needs to be visible and legible



Entry to building at floors from elevator needs to be marked



In lobby area - add signage for fire-fighting equipments.



At staircase - Add signage for operation of fire-fighting equipments.



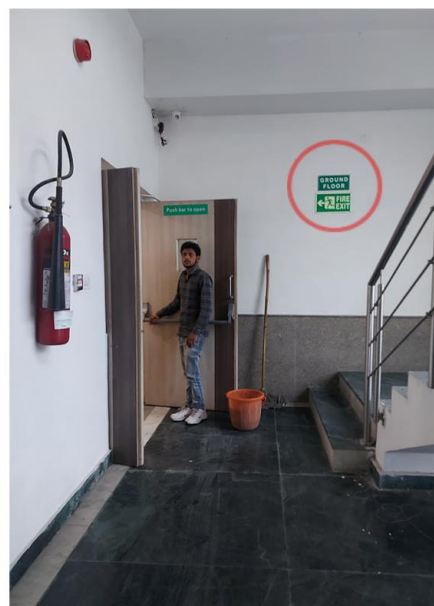
Put exit sign on marked wall



No paper signs, use stickers



Remove signage from heritage block



Wrong type of exit sign

**Ergonomics** - Means incorporation of comfort and occupational safety at workplace.

**Provide management Support** - A strong commitment by management is critical to the overall success of an ergonomic process. Management should define clear goals and objectives for the ergonomic process, discuss it with their workers, assign responsibilities to designated staff members, and communicate clearly with the workforce.

**Involve workers** - A participatory ergonomic approach, where workers are directly involved in worksite assessments, solution development and implementation is the essence of a successful ergonomic process. Workers can :

- Identify and provide important information about hazards in their workplaces.
- Assist in the ergonomic process by voicing their concerns and suggestions for reducing exposure to risk factors and by evaluating the changes made as a result of an ergonomic assessment.

**Provide training** - Training is an important element in the ergonomic process. It ensures that workers are aware of ergonomics and its benefits, become informed about ergonomics related concerns in the workplace, and understand the importance of healthy work environment.

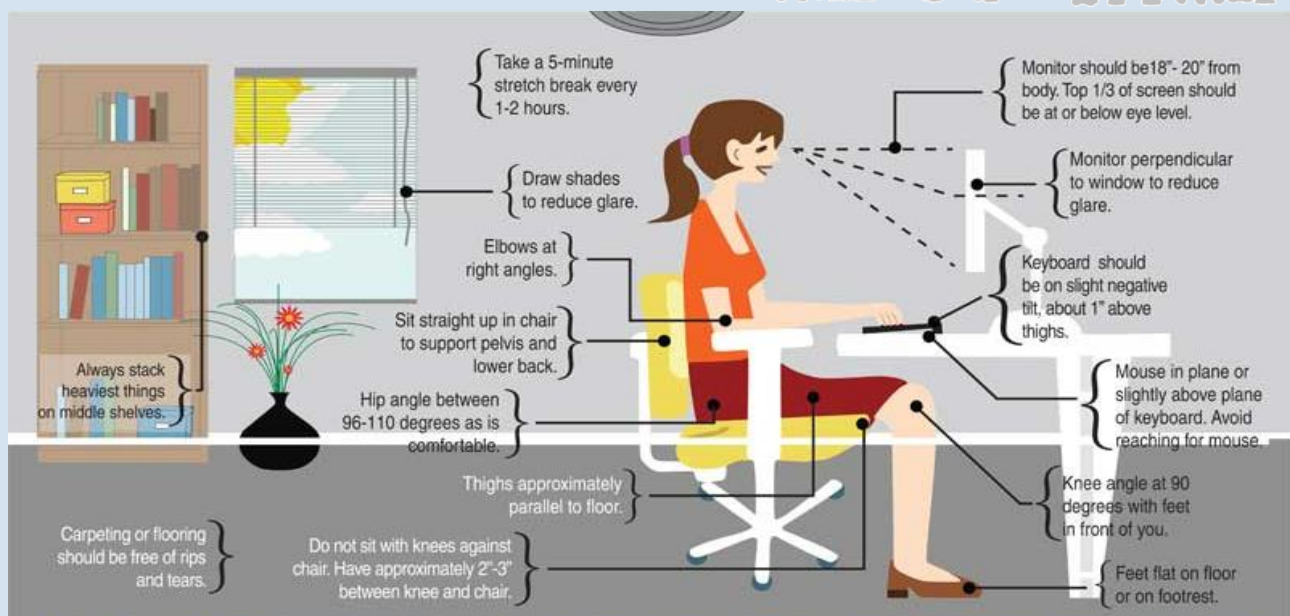
**Identify problems** - An important step in the ergonomic process is to identify and assess ergonomic problems in the workplace before they result in muscular disorder or a long term disability.

**Notifying muscular disorder symptoms** - Early reporting can accelerate the job assessment and improvement process, helping to prevent or reduce the progression of symptoms and the development of serious injuries.

**Implement solutions to control hazards** - There are many possible solutions that can be implemented to reduce, control or eliminate workplace hazards .

**Evaluate progress** - Established evaluation and corrective action procedures are required to periodically assess the effectiveness of the ergonomic process and to ensure its continuous improvement and long-term success.

**IEC** - Information, Education, Communication Awareness plays a very important role in bringing overall awareness about the workplace ergonomics.

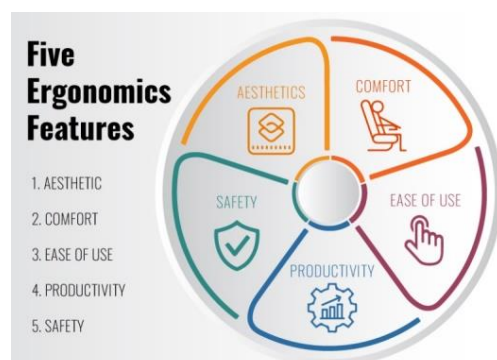


Credits: Environmental Safety and Health - UMBC

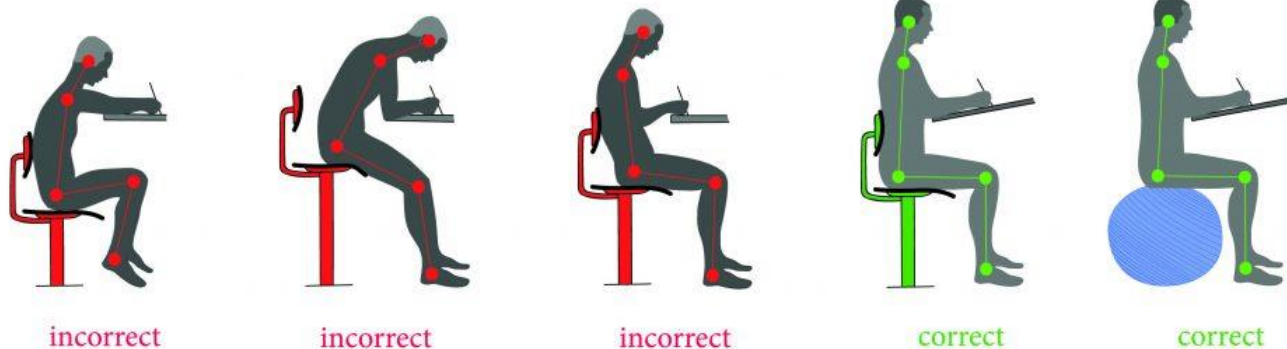


## Occupational health safety

- Store flammable substances properly , labeled and away from electrical sockets.
- Flammable gas - store properly and labeled.
- Avoid electricity overload and inadequate insulation.
- Fix faulty machines.
- Avoid wet floors.
- Improve working postures/ chairs.
- Whenever possible try to stand up and walk.
- Check table top height.
- Keep surface clean and maintain cleanliness to reduce any pathogen growth.
- Keep chemicals locked with proper labels and cabinets must be properly anchored to avoid any spillage.
- Standing desk are becoming more popular , and they are an easy way to squeeze more vertical time into your day.
- Promote green, healthy, positive and resilient workplaces.
- Safety railings must be cleared and maintained.
- Proper ladder maintenance.
- Sharp objects needs to be protected.
- Electrical wiring must be properly covered and any electrical fault must be immediately addressed.
- Fire exits should never be locked or blocked.
- Promote decluttered workplace.
- Promote properly ventilated and well lit workspace.
- Maintain vehicles in proper condition.
- Address workplace violence (sexual assaults, threats, verbal abuse and robberies) strictly.



Credits: Electric Stand Desk





Create inclusive culture to avoid discrimination, exploitation and exclusion of disabled staff and visitors from all spheres of work and nationality.

**Infrastructure support** - Infrastructure, if designed and implemented correctly, can empower people with disabilities to be part of societal and economic development.

## Short Term Steps

Updating campus infrastructure to make it more accessible for people with disabilities

- Elevators
- Ramps
- Railings
- Wheelchairs

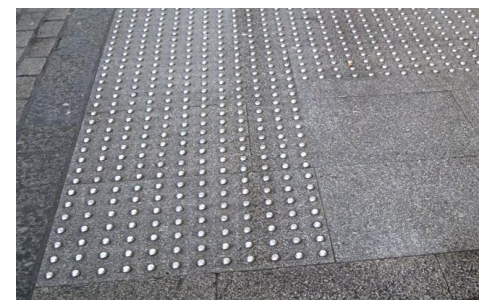
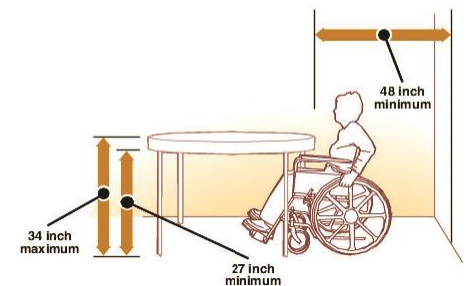
## Medium Term Steps

- Accessible washrooms for disabled persons
- Tactile pathways
- There should be designated parking spaces for the specially-abled persons and parking lots needs to be adequately illuminated.

## Long Term Steps

Provision and upgradation of mechanical and technological support for people with disabilities.

- Reading resources in Braille & low vision
- Disabled-friendly software
- Disabled-friendly signages
- Provision of sports and wellness facilities suited to the needs of persons with disabilities.
- Fire and emergency alarms designed with both audible and visual signals



Credits: WBCSD



An activity-friendly campus is one that is a direct and convenient connection with everyday destinations, offering physical protection from cars, and making it easy to cross the street.

## Short Term Steps

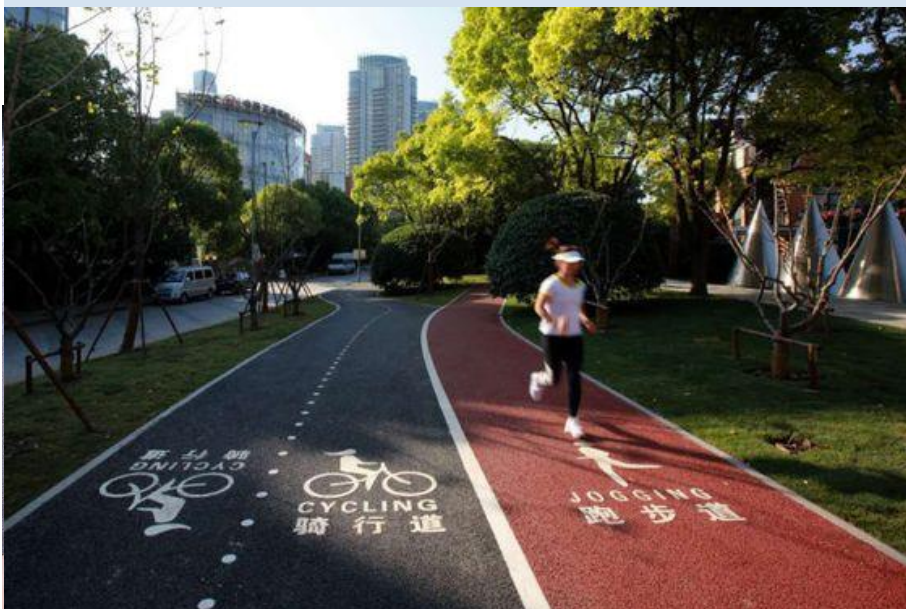
- Encourage lifelong sustainable transportation habits by promoting walking, biking, video conferencing, vehicle sharing, consolidated trips and other alternatives.
- Street pattern design , connectivity and walkway distance marking for daily distance covered.

## Medium Term Steps

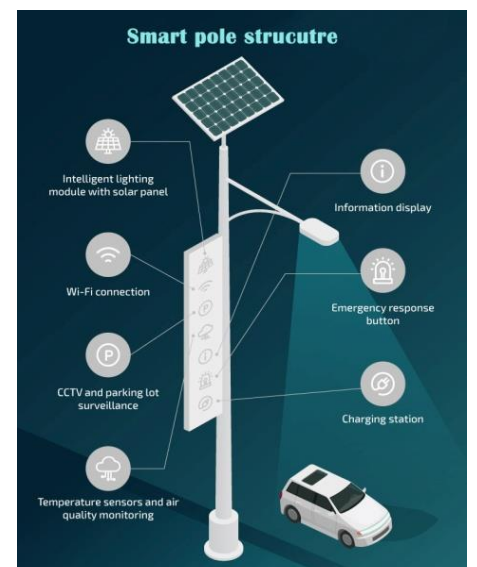
- Enhanced on-campus cycling and pedestrian infrastructure.
- Escalate the use of non-motorized modes of transportation for commuting.

## Long Term Steps

- Enhanced/encouraging footwork landscape walkways and steps milestone achieved marking such as footsteps covered while moving from one building to another building for work or campus-related activities, maintaining general health, and encouraging the use of stairways on NCDC campus.
- Use of smart pole-fitted with electric socket for charging (charging points), CCTV, Wi-Fi (Hotspot), LED display for advertising, LED street light, public addressing system and emergency response switch/ buttons.
- Musical areas and recreational social places for interaction may be promoted.



Credits: Worldlandscapearchitect



## Data security

- NCDC is an institute of national and historical importance, it has critical labs , museum, library and heritage block with important electronic and physical data. It requires a data management protocol.
- Research data security is essential to prevent unauthorized access, disclosure, destruction or amendment of data.
- Controlled access to digital files through password protection.
- Firewall and anti virus protection installed on all computers used.
- Identification and guarantee of the location of stored data
- Controlled access to rooms and equipment where data (digital or physical) are stored.
- Use of the NCDC VPN when working off campus (this allows access to IT services research data storage, avoiding data storage insecurely elsewhere.
- Ensuring conditions of data providers are met.
- Anonymization techniques or data aggregation to avoid disclosure of sensitive data.
- Never store highly sensitive data on cloud services, including Google Drive, or on machines connected to an external network.
- Encryption of data if remote access is necessary, including via email or file transfer.
- Encryption of data transported on storage devices.
- Extant mechanism to deal with data theft must be thought upon.

## Media management of IEC material

- Audio and video spots on natural disasters.
- Print material – posters & leaflets.
- Poster campaign through Department of Posts .
- Print campaign through newspapers & magazines.
- Articles on various disasters published by NCDC in leading magazines.
- Audio and video campaigns through TV & radio if required.
- Disaster Risk Reduction/ First Aid/ Occupational Health Day celebrations with thematic areas of engagement.
- Involvement of staff and their families in media, IEC and promotional activities.

## Cyber security

Cyber security refers to protecting cyber space including critical information infrastructure from attack, damage, misuse and economic espionage.

### Need for cyber security :

With financial services, payments, health services, etc. are all connected to digital mediums and this is expected to increase, safeguarding online presence is need of the hour.

- To ensure that critical infrastructure system does not collapse under any situation.
- To ensure business continuity.
- To balance individual's rights, liberty and privacy.
- To protect the national data structures and emergency operation centers functionally.



**Disasters  
don't wait**

**Make your  
plan today**

- Phishing attacks
- APT attacks
- Cyber attacks
- Zero Day attacks
- Malicious insiders
- Social engineering
- Software vulnerabilities





## Development of IT tools

Mobile phone technologies for campus utilization, institutional usage and emergency planning.

Mobile technology is a great way to be flexible and have the freedom to catch up on an emergency anywhere, anytime (with a stable internet connection). Therefore, investing in mobility tools for NCDC will not only increase productivity but will also help your team to work more efficiently.

- Mobile App
- Website, intranet, employee update section

## 3D Walkthrough

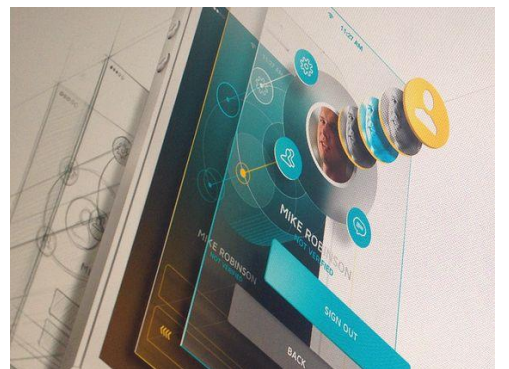
If a picture is worth a thousand words, an enhanced virtual representation is worth much more.

3D walkthroughs are good for social media presence and are impressive during presentations & publications.

NCDC campus walkthrough will provide a glimpse of the entire campus, showcasing all the buildings premises, heritage block, museum, landscape areas, installations, driveways, parking, water features, gates related to disaster management routes and movement etc.

A 3D representation of indoor maps to provide situational awareness and navigation assistance to emergency services, showing the visualizer exactly from which door to enter the building, which path to take, and where to exit.

It is also an incredible way to enhance stakeholders interest and collaboration through innovative approach.





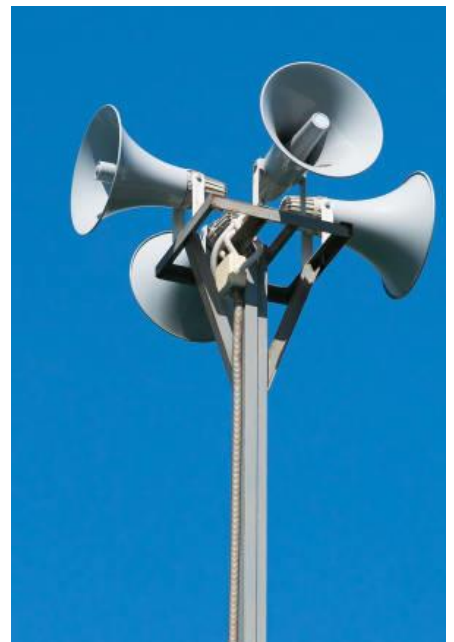
## Public address system

The public address system (PA System) is an electronic amplification and sound diffusion system with a microphone, amplifier and speakers. In the PA system, a person can speak to a wide audience, for example, to indicate movements at the campus area and in a gathering.

## Need for IP-Based PA Systems for Emergency Communications at NCDC :

Amidst natural disasters and emergency evacuation situations, public address system can provide a sound solution to meet the needs for timely emergency communications.

- For applications like these, wireless PA system is a complete and comprehensive means of communications across any facility or expansive premise.
- Wireless public address systems give organizations and institutions an affordable means to install a campus-wide speaker system without any hassles of running cables.



NCDC campus must aim to reduce annual campus water usage, emphasize the conservation of potable water in energy systems and domestic usage, and use reclaimed and rain water in its place where appropriate.

## Short Term Steps

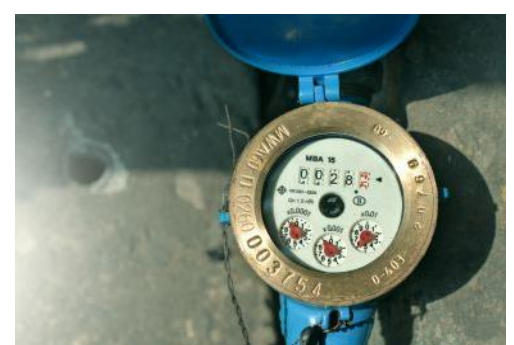
- Fix the leaks at the earliest indoors as well as outdoors.
- Use reclaimed water for flushing.
- Keep a check on water meter.
- Increase staff awareness on wastage of water.

## Medium Term Steps

- Drip irrigation which is a highly efficient watering system can also be considered.
- Reduce annual water usage by mapping the usage.
- Native plants use less water than exotic ones.
- Watering plants in the morning when the temperature is cooler to minimize evaporation. Winds are less intense so it helps in most of the water reaching the plants.

## Long Term Steps

- Install additional water metering and sub-metering.
- Continue to evaluate the feasibility of reclaimed wastewater technologies.
- A dual plumbing line diagram of each building indicating separate grey and black water drainage lines.
- Apply behavioral science approaches to promote widespread adoption of mindful water use behaviors through programs and workshops.





Rain water runoff is one of the most significant environmental impacts of a developed site, but it also provides one of the greatest opportunities for sustainable design. As we face the fastest growing sources of water pollution, and the most significant water quality challenge but when tackled pleasantly it can give opportunities to conspicuous and sustainable spaces.

However, the new NCDC campus has significantly altered the hydrologic cycle for the site and surrounding area. There will be substantial increase in post-development runoff rate due to use of impervious pavements than pre-development rate.

## Short Term Steps

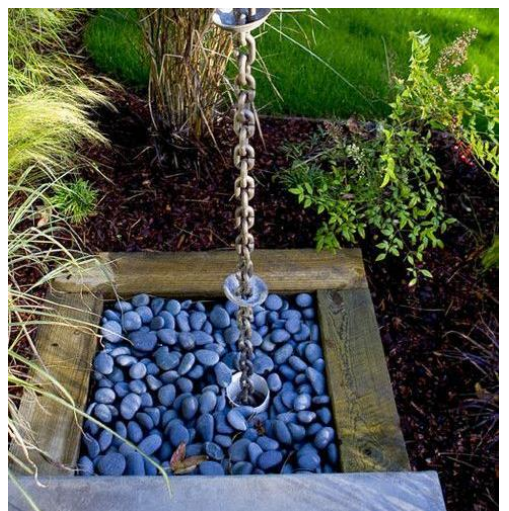
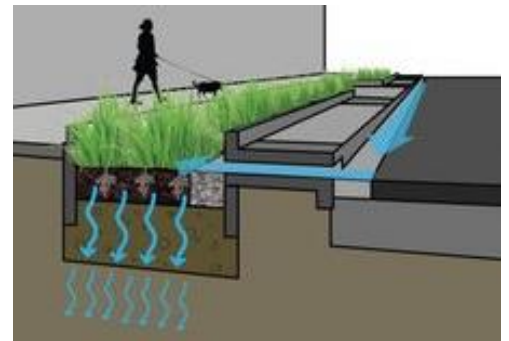
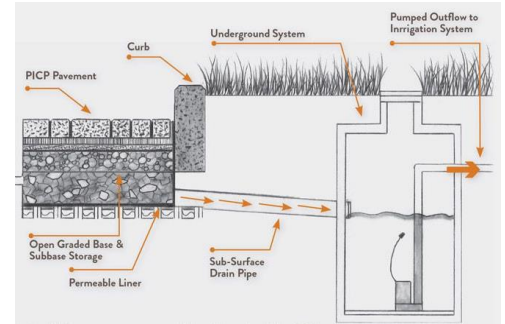
- Utilize alternative water sources, including rainwater, reclaimed and treated water.
- Engage communities to reflect their needs and knowledge for water management.

## Medium Term Steps

- Create Rainwater Harvesting Pits.
- Achieve enhanced rain water management objectives through new construction projects and campus landscape solutions.
- Subsurface infiltration.
- Bio retention.
- Water harvesting.
- Green roofs.
- Porous pavement.
- Natural rain water treatment landscapes.
- Green infrastructure corridors.
- Improve economic efficiency of services to sustain operations and investments for water, wastewater, and rain water management.
- Manage rainwater through swales, bio retention ponds, rain gardens etc.

## Long Term Steps

- Green roofs: It is well suited for urban and ultra-urban areas, intensive and extensive types, less than 20% roof slope, improved rain water quality and interception and storage of rainfall (up to 50%).



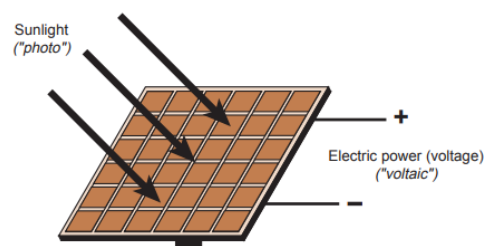
Sunlight being a renewable source of energy, makes it an excellent emergency power solution.

Portability, cost-effectiveness and easy installation process are the main factors that make solar a viable alternative for disaster relief and recovery. In case of emergency, severe damages are inflicted on power grids, in that case it helps in providing power backup.

Solar power affords a viable alternative to gensets for disaster relief. It can be used in tandem with battery banks to ensure that early warning and public announcement system function in any weather or disaster when the electric grid goes down.

Solar PV systems can be applied for various uses in emergency operations, such as backup power for communications, lighting, transportation, or "all of the above" multi-use function on a smaller scale.

Solar energy is completely emission free and as a virtually silent form of energy generation, solar storage systems eliminate many of the aggravating noises associated with traditional power generators, thus being eco-friendly at the same time increasing the energy efficiency of the campus.





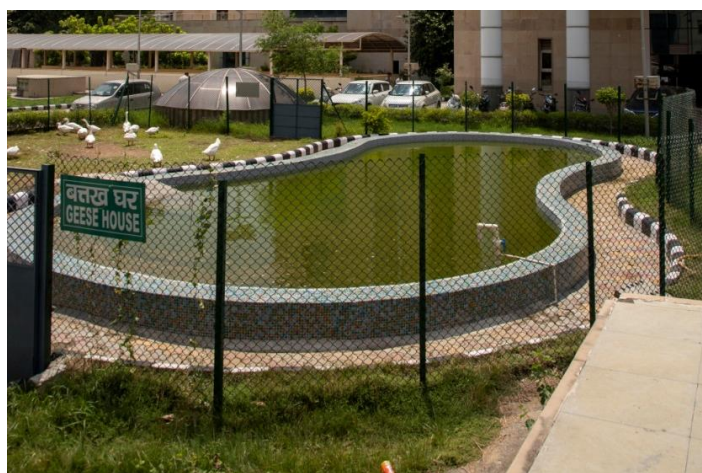
## Short Term Steps

- ## Long Term Steps

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Recognizing the value of healthy habitats for human well-being and biodiversity, especially as development pressures increase, NCDC can work on building a better planting strategy for entire campus.

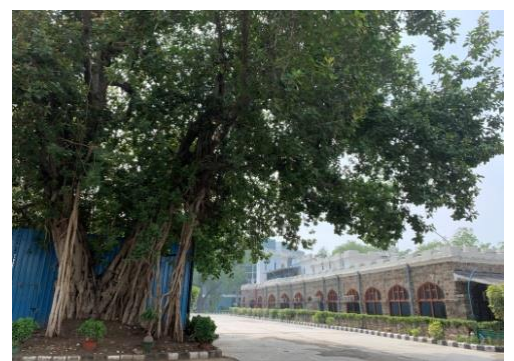
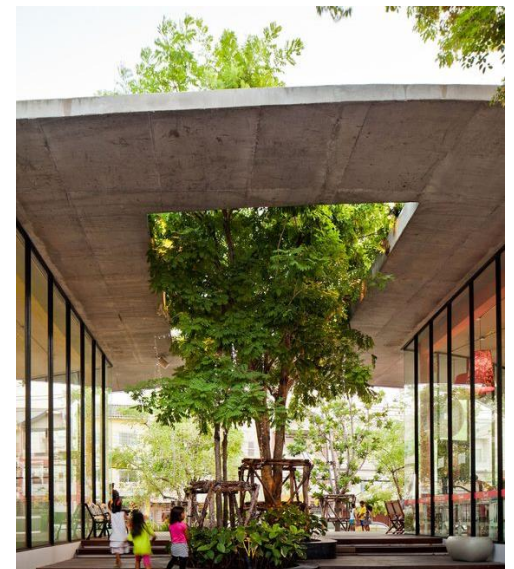
Planting low maintenance indigenous trees around the campus helps in creating a welcoming and healthy environment. Trees play an important role in mitigation of the effects of global warming and reducing heat islands.

## Short Term Steps

- Enhance site feature trees and make them focal points in landscape.
- Prioritize education, training and community engagement.
- Developing a plant material specific to site functions, circulation and movements.
- Having green spaces and more trees on the campus, helps in creating ambient working environment.
- Healthy plants and soil are one of the most effective and cost efficient ways of sequestering carbon.
- Encourage and develop sitting below large trees. Do add relaxing elements to under-tree landscaping.

## Medium Term Steps

- Use of ornamental shrubs and accent trees to establish color and form to complement building elements. Use of native/low maintenance plant material throughout campus which conserve water and add an aesthetic value to green open spaces.
- Track, monitor and report on the survival and health of all trees planted. Share success stories and lessons learned in order to inspire and continually improve planting efforts.



Credits: Riverbank Park



NCDC campus has heritage building which was residence to Chief of British Army in India . Currently, it houses Director's room, SHOC room, library, seminar hall, storage and procurement area, administrative office etc.

As construction of new buildings is in process, these offices will be shifted to new buildings.

The heritage buildings can be considered for adaptive reuse as a strategy towards the conservation, which sustains its heritage values while enhancing its functionality and usefulness for the future.

- The Heritage block can be remodeled and it can be used as NCDC museum projecting and displaying its years of experience. It can have audio and visual room & display room showing various achievements of NCDC.
- It can have experience room with real time projections.
- It can also host experiential learning, heritage walkway, history of NCDC, milestone wall, interactive and exclusive meeting and heritage spaces.









## Public artwork for NCDC campus

Public art at NCDC can make campus a truly unique destination, even in the midst of a city long renowned for its collections.

With an unexpected and arresting sculptures around the corners and within buildings, public art creates countless moments for spontaneous community building and conversation as well as social media popularity.

It extends the intellectual life of the campus beyond office spaces, libraries, and labs, and into everyday spaces that shape NCDC experiences. As you walk across the campus, it takes you through decades upon decades of art and NCDC history, sharing in each sculpture's rich past by touching, embracing, and continuously rediscovering their stunning details and visual impact.

Just like the central garden with milestones, fountain, geese zone etc., more art spaces with sculptures such as public health related art sculptures and innovative creative spaces should be formed.



Credits: CODA worx

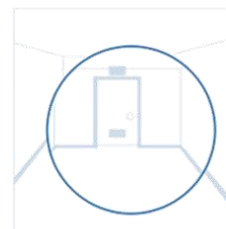
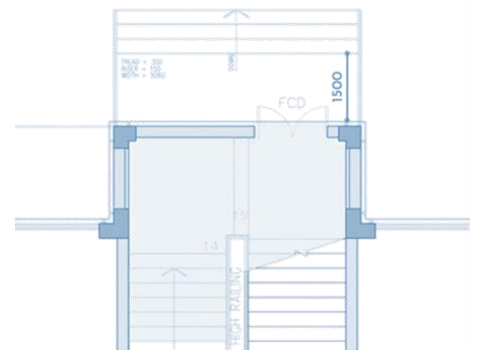


It is important to modernize response to disaster by keeping track of the proper implementation of Disaster Management Plan, wherein equipped with latest equipments, devices and staff.

In conclusion, it is recommended that the campus must follow all the building bye-laws and protocols mentioned for each and every disaster. Each building within the campus should be equipped with proper PA System devices, information regarding all the disasters should be properly displayed (in legible format for all groups of people) and staff training needs to be conducted regularly.

Navigation plans during an emergency should be properly worked upon and displayed at every place necessary throughout the campus. Periodic building maintenance needs to be carried out for both interior and exterior works to prevent any mishap from happening due to structural negligence.

First Aid rooms should be fully equipped with all the necessary things required and should be replenished from time to time.







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