EVACUATION IN CIVIL CONSTRUCTION STRUCTURE: A MINOR INVESTIGATION ON SOURCE OF BNBC 2020

Submitted by:

Md. Shamim Hossain

Id:193-47-1095

&

Rasbihari Deb Nath

Id:193-47-1062

A Suggestion Articulation Capitulated to the Office of **Civil Engineering, Daffodil International University** in Restricted Satisfaction of the Supplies for the Degree of Bachelor of Science in **Civil Engineering.**

CIVIL ENGINEERING DEPARTMENT

DAFFODIL INTERNATIONAL UNIVERSITY

FEBRUARY 2024

DECLARATION

We thus declare that we completed this project under the guidance of **Mardia Mumtaz**, a lecturer at the Daffodil International University Department of Civil Engineering. We further certify that this project, or any portion of it, has not been submitted for consideration for any other prize or for any other purpose (apart from publishing).

Submitted by:

Shamim

Md Shamim Hossain

ID:193-47-1095

Department of Civil Engineering
Daffodil International University

Rasbihari

Rasbihari Deb Nath

ID:193-47-1062

Department of Civil Engineering
Daffodil International University

CERTIFICATION OF APPROVAL

The **"Evacuation in Civil Construction Building"** (civil building A, building B, and lab building) was filled by this project. submitted by Md Shamim Hossain with the reference number 193-47-1095 to the Department of Civil Engineering at Daffodil International University has been accepted as meeting the requirements in part for the degree of BSC in the Department of Civil Engineering and has been given the thumbs up for both its presentation and content.

Mardia 24-02-24

Mardia Mumtaz

Lecturer

Department of Civil

Daffodil International University

BOARD OF EXAMINERS

Mardia 24.02.24 ..... Mardia Mumtaz Lecturer Department of Civil Daffodil International University	Supervisor
.....04/03/2024 Dr. M.R. Kabir Professor Department of Civil Daffodil International University	Chairman
..... Kazi Obaidur Rahman Assistant Professor Department of Civil Daffodil International University	Member-1 (Internal)
..... Ahad Ullah Sr. Lecturer Department of Civil Daffodil International University	Member-2 (Internal)
..... Dr. Muhammad Mukhlesur Rahman Deputy secretary Ministry of Textiles for Jute	Member (External)

ABSTRACT

This paper was developed by doing a literature review and investigating several accident reduction strategies in order to achieve the research aims. One of the questionnaires in the field survey inquiries about the civil construction of Daffodil International University. The inputs and outputs of the building's numerous control systems were recorded, and a range of building statistics were collected. The features of the BNBC 2020 control system and accident prevention mechanism plan is presented in this paper! In addition, much thought is being given to the improvement and implementation of suitable safety measures for the benefit of all inhabitants.

ACKNOWLEDGEMENT

To begin with and first, we would like to earnestly thank All-powerful Allah for giving me the quality and divine favor that permitted us to wrap up the ultimate year investigate on time. Moment, we would like to thank my supervisor Mardia Mumtaz of the Division of Gracious at Daffodil International University in Dhaka from the foot of our hearts. Her unending tolerance, sharp advice, thoughtful proposals, endless support and bolster, visit and proactive supervision audits, and keen direction eat each turn made this report doable. We are unimaginably thankful to Teacher Dr. Mohammad Hannan Mahmud Khan, Head of the Office of Gracious at Daffodil International University, for his priceless help in conducting this inquire about endeavor. At last, I would like to recognize my guardians for their faithful support, persistence, and support all through my scholarly travel.

TABLE OF CONTENTS

LIST OF FIGURES

TABLES

CHAPTER 1
INTRODUCTION

1.1 General

Crisis clearing is the rushed exit or elude of people from a put where there's a prompt or ceaseless chance to lives or property. This chapter centers on a building's compliance with the fire security code amid development. Instructors, understudies, and all other building tenants can all securely and quickly take off a burning instructive office. A broad ponder has been conducted on how to anticipate misfortune of life and expel individuals safely and expeditiously within the occasion of a building fire; as a result, examining is required to improve benefit capability and future improvement potential. Throughout my scholastic travel.

1.2 Background of the Study

In Bangladesh, a parcel of high-rise structures is built without taking fire security into consideration. coming about in various fire fatalities each year. These tragedies can be examined and appropriately settled or kept up on the off chance that high-rise structures are built in agreement with fire security codes. To ensure that everything is in arrange for fire security, fire security reviews in instructive buildings ought to be performed at slightest once a year. Auxiliary reviews ought to distinguish all key zones, explore them, and give proposals for provoke remedial and preventive activities. Here is one of his studies that appears how numerous individuals each year kick the bucket in fire episodes in our country.

Table 1: Fire Occurrence in Bangladesh

Fire occurrence and number of expiries in last five year.		
Year	Number of Occurrences	died
2015	17488	68
2016	16488	52
2017	18105	45
2018	19642	130
2019	24074	184

February 12, 2020, around 10:15 pm, building 6 on the 10th level, Japan Garden City, Mohammadpur. A victim of a fire disaster may have been attempting to escape to safety on the roof. They died from suffocation because the roof door was locked.

1.3 Goal of Study

The persistence of this investigate is

- Analyze the 'Spatial layout' of respectful building especially the think about, office, and lab zone to decide the character of spatial setup in connection to the 'Escape-Route'.
- To reduce the risk to life and property from accidents and to promote and increase awareness of quick and safe removal.

1.4 The Objective of Study

1. A study was conducted on the capacity to clear rapidly and securely a fire in a building in a brief period of time.
2. To plan a list of parameters and their standard values agreeing to BNBC 2020 rule.
3. Fabricate a safe escape removal plan.

1.5 Research Significance

When a building's residents' wellbeing and security are in hazard, departure is required since taking off the office is more secure than remaining there.

1.6 Research Methodology

To begin with, a code examination is performed, after which they are recorded and measured in agreement with the building code 2020.

Phase 1:

❖ Prerequisite in common [Article 3.3] from BNBC 2020
- In what way numerous millimeters has the height altered as restrained utilizing the BNBC 2020 code?

❖ Load factor [Article 3.5] from BNBC 2020
- As each table [table 4.3.1], the occupant load per square meter is evaluated.

❖ Seat fixed [Article 3.5.2] from BNBC 2020
- 500 mm for each person measured separately for a fixed chair.

❖ Exit compartment capacity [Article 3.6] from BNBC 2020
- Examined the stairwells of the building for sprinklers.
- Stairways without sprinklers are evaluated for 8mm of space per person.

- In a similar manner, doors have been checked to verify that there is 6mm of room each person.

❖ Strip and walkway [Article 3.7] from BNBC 2020
- The number of meters that should not be exceeded in cases when the ceiling height enters a hallway or passageway was examined.
- Every corridor and tunnel must be able to battle a fire for at least one hour.

❖ Entryway [Article 3.9] from BNBC 2020
- Confirmed that the door's width and stature ought to be at slightest one meter

❖ Spinning entryway [Article 3.9.7] from BNBC 2020
- The building has been inspected to see whether there are any rotating entryways of any kind.

❖ Stairway [Article 3.10] from BNBC 2020
- Surface inward holes and handrails are measured.

❖ Amalgamation of trade and rise [Article 4.3.5] from BNBC 2020
- The height's accessible headroom clearance is additionally measured.
- The tallness of the handrail or protect has been measured.
- The flying point is computed.

❖ The aggress system's most extreme breadth [Article 4.3.6] from BNBC 2020
- The width of the stairs has been measured based on the number of individuals utilizing the instructive office.

❖ Stairs for fire get away [Article 4.3.7] from BNBC 2020
- The clear width of the staircase is measured based on the weight of the inhabitants.

❖ Watch rail [Article 3.10.5] from BNBC 2020
- Protect rails have too been inspected on stairs.

❖ Winding staircase [Article 3.10.7.3] from BNBC 2020
- Confirm whether there are any winding staircases accessible.

❖ Winders [Article 3.10.7.4] from BNBC 2020
- Confirm whether any stairway winders are display.

❖ Incline [Article 3.11] from BNBC 2020
- Confirm whether a ramp is accessible anyplace within the structure.

❖ Walled in area that's smoke-proof [Article 3.10]
- Confirm whether the walled in area is smoke-proof.

❖ Exit tally [Article 3.14] from BNBC 2020
- The most extreme remove of dead closes has been measured, as well as the length of the trip way.
- Decide how numerous exits there are based on the inhabitant stack.

❖ Way of travel [Article 3.15] from BNBC 2020

- The greatest travel way from the exit get to entryway is along the center measured.

❖ Travel way [Article 3.15] from BNBC 2020

- The most extreme travel way from the exit get to entryway is along the center measured.

❖ Build up the exit and get to prerequisites (Article 4.3.8) from BNBC 2020

- In case sprinklers are introduced in instructive offices, the most extreme travel course has been measured.
- The component's at-grade capacity is measured in terms of the number of inhabitants per unit width.

Phase 2:

Daffodil International University's civil building A&B and civil lab building has been selected for this project since it is the significant buildings on campus. This building was chosen because it is designed with a large population in mind. Analyzing this structure also provides insight into the other structures.

Phase 3:

To begin with, an assortment of this construction's criteria has been indicated, and after that their measurements have been associated to BNBC 2020.

Phase 4:

An endeavor has been thru to supply proposals with respect to the level of security of the building based on the amount prerequisite met now.

1.7 Outline of Perception

The fast takeoff or elude of individuals from a range when there's a consistent or up and coming hazard to life or property is known as a crisis departure. The compliance of a building with the fire security code during construction is the most subject of this chapter, particularly with respect to instructive offices. Numerous high-rise buildings in Bangladesh are developed without considering fire security, which leads to a noteworthy number of fire passing’s each year. At the exceptionally slightest, once a year structural review ought to be carried out to create beyond any doubt that everything is in arrange for fire security. The objective of this ponder is to distinguish the characteristics of spatial course of action with regard to the "Escape-Route" by analyzing the spatial format of respectful structures, with a center on ponder, office, and lab spaces. A code examination is portion of the think about procedure, and the results are displayed and evaluated by the building code. In stage one, common prerequisites like height alter, stack figure, settled situate, exit compartment capacity,

stairwells for sprinklers, hallways and paths, entryway width and stature, spinning entryways, staircases, protect rails, winding staircases, winders, slopes, smoke-proof walled in areas, exit check, exit check, way of travel, and floor level exit signs are assessed. The considerable estimate and populace of Daffodil Worldwide College driven to the determination of the gracious building A&B and respectful lab building for this venture. Measurements of the structure were compared to BNBC 2020 and its requirements were laid forward. Utilizing the amount required as a premise, an endeavor was made to offer recommendations with respect to the building's level of security.

CHAPTER 2
LITERATURE REVIEW

2.1 Introduction

In arrange to instantly clear buildings within the occasion of a fire, auxiliary reviews by gracious engineers are inspected in this proposal think about. centers on raising residents' and building owners' mindfulness. Structural audits are vital to preserve and repair structures that are more than 30 a long time old in order to spare cash, avoid breakdowns, as a result they are basic to construct and utilize and have a high-cost resistance. Due to the intrigued of the building division in improving the social, financial, and natural supportability characteristics, two modern concepts in fire security building were built up in 1983. The specified safe departure time (RSET) is the length of time required for building inhabitants to securely take off. The conclusion is that (REST). Be that as it may, the foremost exhaustive definition begins with the fire's start and considers the minute the fire was found, the minute the alert was enacted, the minute the individual chosen to act, and the minute they traveled to a secure area. The accessible secure departure time (ASET) is the sum of time it takes for a fire to form a building perilous.

2.2 Diagram of Basic Review Works

2.2.1 Characterizing the Fire Occurrence

(Enrico Ronchi (∗), 2014) Concurring to information from Bangladesh's fire service and gracious defense (BFSCD), 414 laborers misplaced their lives in 213 industrial facilities between a long time of 2006 and 2009 owing to fire threats, bookkeeping for hundreds of passing’s caused by troubling rises in fire risks in RMP companies in later a long time. The larger part of fire events in Bangladesh's RMG factories have happened in those that are near to Dhaka and the encompassing locale, agreeing to almost 10-year chronology of fire risks in those firms. (2014 BFSCD Yearly Report)

2.2.2 Fire Rate of RMG Plant in Bangladesh

(Choiti, 2018) The FDI comes about recommend a normal IFR of 2.8 on a scale of 5.0 for fire peril in our RMG division, giving rise to an alarming issue, concurring to Bangladesh fire danger file (FRI) examination. For the government division, the fire risk list (FAI) is utilized as an adaptable fire danger degree. Thirty people were harmed in a charge when piece of clothing workers left the plant after an occurrence fire at the RMG adjoining collection manufacturing plant as of late as 2015. The fire was caused by an electrical brief. At slightest 100 article of clothing specialists, to a great extent

lady, were harmed in a charge that happened in 2013 after an untrue fire caution was raised in November 2012, concurring to Tazreen Design Ltd. At slightest 200 individuals are harmed, and 117 individuals are slaughtered in an expansive fire. Agreeing to witnesses, a few laborers were unable to elude through the building's little exit, and the fire office reports that 12 of his casualties perished after jumping out of windows to urge absent. The production line needed an adequate crisis exit.

2.2.3 Fire Bore

(M. Omidvari a, 2015) A fire penetrate may be a simulation of the security and clearing methods. To begin with help, firefighter migration, and deliberate clearing are all instructed to building inhabitants (Draft BNBC, 2015). Agreeing to BNBC, fire drills must be performed in understanding with the plan's enlightening. The suggestions within the table underneath must be taken after when deciding the recurrence of fire drills at RMG production lines. The fire work out must be gone to by all building inhabitants, building benefit work force, and staff individuals in charge of fire safety and clearing strategies. As it were competent individuals who are qualified to conduct authority ought to be relegated duty for arranging and carrying out drills, agreeing to the NFPA (Draft BNBC,2015).

2.2.4 Signs and Floor Arrange

(Ahmed, 2021) All floorings are mandatory by BNBC code to have exit signs, and NFPA suggests that these signs be went with a floor graph that appears the precise situation of the stairs as well as the interface between the sign and the building in a crisis. Exit signs may be situated in any noticeable area that is immovably affixed to the wall's surface, such as specifically over the lift's call button. The composing, bolts, and other images on the signs must be printed in a vernacular letter set on a scenery with extraordinary differentiate. The beat of the sign cannot rise over 2 meters from the ground. The code moreover requires stamping and showing signs to direct evacuees as indicated within the code in the passages or burrows driving to the exit release (Draft BNBC 2015).

Figure I fire exit symbols

2.3 Elude Course Arrange (ERP) Module (Concurring to OAHA Code)

(Ruggiero Lovreglio, 2015) The objective of this submodule is to form a human elude course arrange for a crisis departure. The idea of an elude methodology isn't modern, and different analysts have completely inspected it. The elude course module can too be coordinates utilizing the way given in this ponder. As of late, a few commercially open programs have created capabilities for crisis clearing as portion of a robotized elude course technique. The visual script created in Dynamo and made accessible for the generation of the versatile firefighting hardware arrange with an open application programming interface is coordinates. It decides the most limited path of elude from the room entryways to the required crisis exits. The dynamo scripts naturally extricate the building's level from the input by characterizing the areas of the standard entryways within the circulation range and crisis exits. The program treats the corridor, campaign, and stairs as one space family (the category for stairs was included independently). The outlined calculation makes a girl on the intrigued locale utilizing the Dulaney triangulation framework strategy once the client indicates and demonstrates the most exit, crisis exit, and staircases as a goal and clicks the clearing way button. The Dulaney triangulation, which is utilized within the dynamo (a Revit plug-in), is an elective to the Voronoi framework rationale. When the calculation has created a suitable fire elude arrange and has visualized it in Revit, it applies the most limited work rationale from the standard entryways to the closest exit entryways. The ease think about incorporates the delivered elude course arrange. In stage one, common necessities like rise alter, stack calculate, settled situate, exit compartment capacity, stairwells for sprinklers, passages and ways, entryway width and stature, spinning entryways, staircases, protect rails, winding staircases, winders, slopes, smoke-proof walled in areas, exit check, exit check, way of travel, and floor level exit signs are assessed. The considerable measure and populace of Daffodil Worldwide College driven to the determination of the respectful building A&B and civil lab building for this extend. Measurements of the structure were compared to BNBC 2020 and its prerequisites were laid forward. Utilizing the amount required as a premise, an endeavor was made to offer

recommendations with respect to the building's level of **security**.

Escape route plan (ground floor)

2.4 Repair

(Nuzaihan Aras Agus Salim, 2023) On the premise of the audit's discoveries and recommendations, different reinforcing and repair measures are actualized. There are two sorts of repairs: auxiliary and serviceability repairs. Within the case of a high-rise structure, basic repair. an expensive piece of craftsmanship. It ought to be kept as distant absent from as doable. For this, benefit capacity repair must be required, clearly destitute plan, building destitute support in appropriate utilize, as a result of unused natural impacts, requires building adjusting without taking specialized contemplations under consideration. Furthermore, components such as the generally quality of repairs and the estimate of individual repairs may moreover have an effect on the ultimate choice of how to repair a concrete structure. Get to for repair relative fetched case of application accessible.

2.5 Recurrence of Auxiliary Review

(Guo-Qiang Li1, 2018) The basic review is laid out as a obligatory (required and ordered) condition in Show Byelaw No. 77. In case a building is 15 to 30 a long time ancient, it is required. Auxiliary reviews must be performed each five a long time, and each three a long time for structures more seasoned than 30 a long time.

2.6 Basic Review Strategy

(Enrico Ronchi, 2014) Fire security reviewers utilize a method called a fire security review to decide how well-maintained your premises are for fire security. It is additionally known as an assessment of your commerce premises and significant papers. EMS Designing Innovations conducts a fire security review in Bangladesh. Amid the review, our engineers may meet with one or two of your representatives to confirm that they are as learned almost fire security as you claim they are.

2.7 Observation of Summary

The structural inspections carried out by civil engineers to guarantee that buildings are promptly evacuated in the event of a fire are examined in this thesis research. focuses on raising awareness among tenants and building owners. Structural audits are critical to the maintenance and repair of structures over thirty years old since they are simple to construct and run, have a high-cost resistance, and can save money by preventing breakdowns. In 1983, two innovative concepts in fire safety engineering were developed as a result of the construction industry's aim to enhance sustainability in terms of social, economic, and environmental issues. The required safe egress time (RSET) specifies how long it takes for building occupants to safely leave the building. It may be concluded, at last, that (REST). Nonetheless, the most thorough justification.

CHAPTER 3
DATA COLLECTION AND ANALYSIS

3.1 Introduction

We analyze the code BNBC 2020 for inquiries, categorize them, besides after that decide which questions are appropriate to which inquiries. In field overviews, a few information can be effectively accumulated, a few information can be found outwardly, and a few information cannot be found. A few requests are hazy since a few building specialists have illustrated small intrigued in uncovering information.

3.2 Survey

Following are the survey results for Daffodil International University's civil building A&B and civil lab building:

Table 2: Survey information from field work report.

General inquiries:
1. What is the building's name and address?
2. How many floors are in the building?
3. Does the building have an elevator?
4. What kind of building is it?
5. How is the structure used?
6. How often has the building been maintained?
7. What types of structures are there?
Article 3.3 [General requirements] from BNBC 2020
8. Is a ramp accessible?
9. Is there a sudden change from 60 to 130 millimeters?
10. Does the elevation change go beyond 130mm?
11. Is the tread depth and riser height of a stair less than 330 mm and 230 mm, respectively?
12. Is the level change greater than 530mm?

13. Is the walking surface sloped in any way?
Article 3.5 [occupants load] from BNBC 2020
14. In a classroom at a school, are there 2 net inhabitants per square meter and 3.5 net for preschool, respectively?
15. If a fixed seat is not divided by an arm, does each person's 500 mm exist or not?
Article 3.6 [capacity of exit components] from BNBC 2020
16. Does the door have a 4 mm width or 8 mm width without sprinklers for each person on the stairs?
17. Do the ramp and the hallway have a 5 mm width?
18. Do the hallway and the ramp both measure 5 mm wide?
Article 3.8 [Corridors and passageway] from BNBC 2020
19. Is 2.4 meters the required minimum ceiling height for a hallway or corridor?
20. Does every hallway or corridor have a higher 1-hour resistive capacity?
Article 3.9 [Doorway] from BNBC 2020
21. Whether the door's height is greater than 6.60 feet and its width is greater than 3.30 feet.
22. Is the escape compartment's door sliding or hanging?
23. Does the journey path's floor level match up?
24. How many people can fit through one exit door at once, and how far can they travel?
25. Is there a revolving door of any kind?
26. Does the distance between the surface and the handrail exceed 63.5 mm? How much headroom is there on the flight?
27. How much headroom is there on the flight?

28. What is the handrail's height?
29. The maximum number of flights is how many? The maximum number of flights is how many?
Article 3.10 [Stair way] from BNBC 2020
30. Is 3.70 meters the maximum height between landings?
31. Is the 2 m minimum headroom required?
32. Trade 860 mm to 960 mm from the handrail's top to bottom, or anywhere in between?
33. The handrail's outer diameter is greater than 32mm?
34. Are handrails reachable all the way around?
35. Is a guard rail present?
36. Does the stairway's width exceed 4475 millimeters?
37. How far away from a dead end can you go?
38. What is the maximum travel distance?
39. How many exits are there at most? A spiral staircase is there?
Article 3.11 [Ramps] from BNBC 2020
40. Is there a ramp inside the structure?
41. Exists a smoke-free area somewhere?
Article 3.13 [Horizontal Exits] from BNBC 2020
42. Is the greatest travel way for sprinklers higher than 46 meters?
Article 3.14 [Smoke Proof Enclosure] from BNBC 2020
43. Within the case of elevators and stairs, whether the component's unit width is littler than 65.
44. Is the passage and ramp's width littler than 916 mm?

45. More noteworthy dead conclusion less than 12180 mm?
Article 3.16 [Means of Exits and Illumination] from BNBC 2020
46. At least 150 mm in height for exit signs?
47. How many millimeters wide is the staircase?
48. Maximum what number of exits are there
49. Spiral staircase or not?
50. Exit signage stature at final 160 mm?
51. Is the foot of sin from floor level 160 mm to 210 mm?

Table 3: Questions and Answers Agreeing to Studies

1. What is the building's name and address?	Civil building and lab building
2. How many stores does the structure have?	2&3 stored but 5 stored are planed
3. Does the building have an elevator?	No but it planed
4. What kind of building is it?	Educational
5. How is the structure used?	Study
6. How often has the building been maintained?	Maintained and being maintained
7. What types of structures are there?	Reinforced cement concrete
8. Could be a slope available?	No
9. Is there a sudden alter from 65 to 135 millimeters?	Unknown
10. Is the tread profundity and riser tallness of a stair less than 330 mm and 230 mm, separately?	yes
11. If a fixed seat is not divided by an arm, does each person's 500 mm exist or not?	No
12. Does the door have a 4 mm width or 8 mm width without sprinklers for each person on the stairs?	Yes
13. Do the ramp and the hallway have a 5 mm width?	Unknown
14. Do the hallway and the ramp both measure 5 mm wide?	Unknown
15. Is 2.4 meters the required minimum ceiling height for a hallway or corridor?	Yes
16. Does every hallway or corridor have a higher 1-hour resistive capacity?	yes

17. Whether the door's stature is more noteworthy than 2 meter and its width is more noteworthy than 1 meter	yes
18. Is the escape compartment's door sliding or hanging?	yes
19. Does the journey path's floor level match up?	yes
20. How many people can fit through one exit door at once, and how far can they travel?	27 Meter
21. Is there a revolving door of any kind?	No
22. Does the distance between the surface and the handrail exceed 63.5 mm?	Yes
23. How much headroom is there on the flight?	3480 mm
24. What is the handrail's height?	914 mm
25. The maximum number of flights is how many? The maximum number of flights is how many?	5
26. Is 3.70 meters the maximum height between landings?	Yes
27. Is the 2 m minimum headroom required?	Yes
28. Trade 860 mm to 960 mm from the handrail's top to bottom, or anywhere in between?	Yes
29. The handrail's outer diameter is greater than 32mm?	Yes
30. Are handrails reachable all the way around?	Yes
31. Is a guard rail present?	No
32. Does the stairway's width exceed 4475 millimeters?	No
33. How far away from a dead end can you go?	45 Meter
34. What is the maximum travel distance?	No
35. How numerous exits are there at most? A winding staircase is there?	Nope

36. Is there a slope interior the structure?	No
37. Exists a smoke-free area somewhere?	No
38. Is the most extreme travel way for sprinklers higher than 45 meters?	Yes
39. Within the case of lifts and stairs, whether the component's unit width is littler than 65.	Unknown
40. Is the corridor and ramp's width smaller than 915 mm?	Unknown
41. Greater dead end less than 12190 mm?	No
42. At least 150 mm in height for exit signs?	Yes
43. How many millimeters wide is the staircase?	2896 mm
44. Maximum what number of exits are there	2 exits for civil building B& another 2
45. Spiral staircase or not?	No

3.3 Observation of Summary

Using the BNBC (2020) code, information on the architecture of Daffodil International University's civil buildings A&B and civil lab building was gathered. The construction is an institution of learning with many businesses, a staircase, an identifier, and an address, based on the vote results. The building's many structural components, such as the ramps, R.C.C., halls, and stairwells, are always maintained. The general parameters of the building are its construction type, number of stores, and elevators. The construction has a minimum height of the ceiling of 2.4 meters, a maximum elevation between landings, and a greater 1-hour resistive capacity. Other important parameters to consider are the door's width and height. Both the journey path's floor and the escape compartment's door may slide.

CHAPTER 4
RESULT & DISCUSSION

4.1 Introduction

In this think about, the buildings were made a difference to see in the event that they have the proper fire departure frameworks in put in agreement with BNBC 2020's proposals. The larger part of the necessities has, hypothetically, been met by these buildings. To form beyond any doubt that the clients are mindful of this framework, there may be a few authorities and repeating works out.

4.2 Result

➢ Exchange estimations of 254 mm were found within the stairs, which is rectify per the code.

➢ The quay stage measures 3260 mm in width, which worthy & 3429 mm in length.

➢ The staircase doesn't have any nosing available.

➢ There are 11 trades accessible in the stairs.

➢ There are 40 seats in the room.

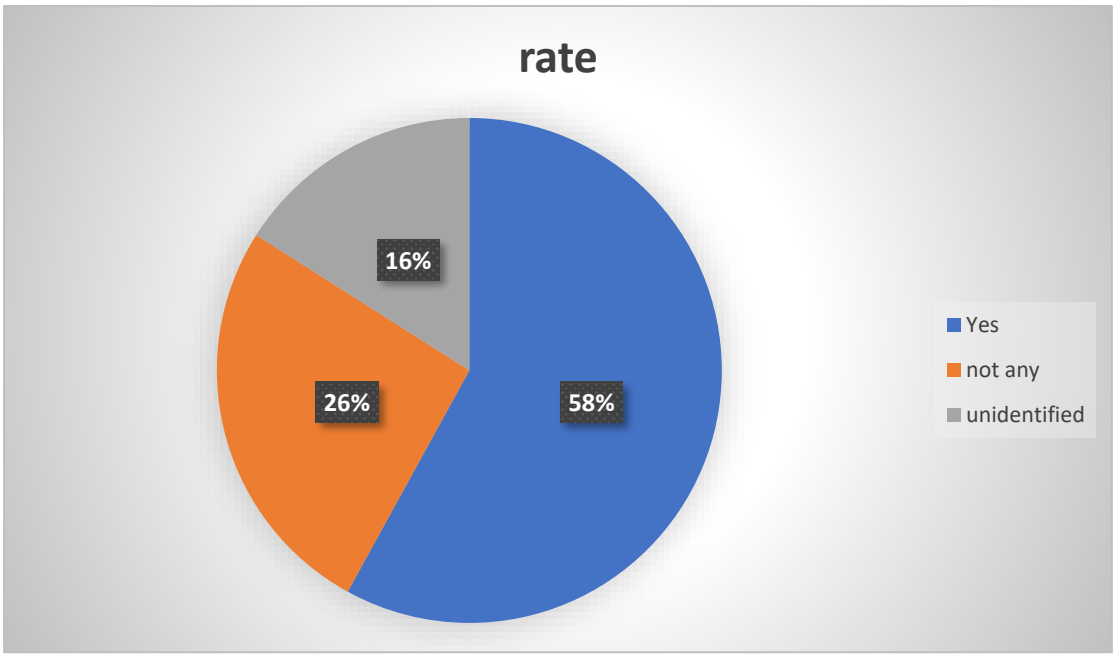

Figure II rate of "Yes" "Not any" and "Unidentified"

4.3 Discussion

In the table below, different percentages of affirmative answers, 58% of unknown answers, 16% of no answers, and 26% of yes answers are shown after evaluating the data from the field survey conducted in the A and B buildings and the civil lab.

Table 4: this table gives all of those information

Structure type	Proportion of yes Response	Proportion of no Response	Proportion of no information or unknown information
Useful	58%	26%	16%

It is simple to determine that civil buildings A, B, and the lab building all have adequate fire escape capabilities.

CHAPTER 5

CONCLUSION & RECOMMENATION

5.1 Conclusion

The latest model case training shows how modern structures are configured. However, an additional variety of structural heights and combinations need to be investigated. This would entail researching various building purposes, such as residential structures, healthcare facilities, etc. (the example case study involves business usage). Another important factor is the building's geometric design. It is necessary to look into various building configurations, such as various floor counts, building heights, and the placement and features of the egress elements (such as the number and design of the elevators, stairs, and so on). The preciseness of the evacuated model forecasts is a significant additional concern. The accessibility of trial information to regulate the effort is mostly responsible for this. The latest model case study shows how modern structures are actually configured. However, an increased variety of building pitches and combinations need to be investigated. This would entail researching various building purposes, such as residential structures, healthcare facilities, etc. (the example case study involves business usage). Another important factor is the building's geometric design. It is necessary to look into various building configurations, such as various floor counts, building heights, and the placement and features associated with egress component (such as the number and design of the elevators, stairs, and so on). The preciseness of the evacuating model forecasts is a significant additional concern. The accessibility of experimental data for calibration of the input is mostly responsible for this. It is evident from the debate and results that the current data, which is based on code requirements and a single structure, does not accurately reflect the entire situation in Bangladesh. We require a system that will continually display and support the excitement evacuation mechanism for all commercial or business reasons, even though this does not accurately represent the general situation of Dhaka city or any other educational building in Bangladesh.

5.2 Recommendation for Further Study

We provide some guidance that might assist structures that require upkeep to comply with the BNBC code standards. For a facility that teaches the following particular and broad suggestions are derived from this study in order to create architectural design strategies that satisfy the protocols and standards for sufficient population safety during evacuation, with an emphasis on the exit. More in-depth analysis of its actions is

required. examines and evaluates refugees in light of the many emission variables that can be evacuated protocols for educating refugees on how to take the proper action. Plan your escape routes and ensure that the most efficient ones allow you to go in the shortest amount of time. This might be the result of a poor comprehension of conduct. tenants of the building in their situation of outdated methods. As an illustration, consider that something Because certain residents may be terrified of heights, it is important to look at a number of factors, including the amount of training of occupants, staff availability, population type (e.g., varying percentages of individuals with disabilities, and types of impairments, etc.), occupancy load, etc. The latest model case study shows how modern structures are actually configured. However, a wider range of structure heights and combinations need to be investigated. This would entail researching various building purposes, such as residential structures, healthcare facilities, etc. (the example case study involves business usage). Another important factor is the building's geometric design. It is necessary to look into various building configurations, such as various floor counts, building heights, and the placement and features of the egress aspects (such as the number and design of the elevators, stairs, and so on). The precision of the evacuating model forecasts is a significant additional concern. The accessibility of data collected from experiments to determine the input is mostly responsible for this.

REFERENCES

(1) Choiti, S. S. (2018). Spatial analysis of RMG factory buildings in relation to emergency escape routes.

(2) M. Ahmed, (2021). Impact of architectural layout on exit preference of RMG workers during fire emergency.

(3) Omidvari, M., Mansouri, N., & Nouri, J. (2015). A pattern of fire risk assessment and emergency management in educational center laboratories. *Safety science*, *73*, 34-42.

(5) Ronchi, E., & Nilsson, D. (2014). Assessment of total evacuation systems for tall buildings.

(6) Ronchi, E., & Nilsson, D. (2014, February). Modelling total evacuation strategies for high-rise buildings. In *Building Simulation* (Vol. 7, pp. 73-87). Springer Berlin Heidelberg.

(7) Li, G. Q., Zhang, C., & Jiang, J. (2018). A review on fire safety engineering: Key issues for high-rise buildings. *International Journal of High-Rise Buildings*, *7*(4), 265-285.

(8) Lovreglio, R., Ronchi, E., & Nilsson, D. (2015). A model of the decision-making process during pre-evacuation. *Fire Safety Journal*, *78*, 168-179.

(9) Agus Salim, N. A., Salleh, N. M., Jaafar, M., Sulieman, M. Z., Ulang, N. M., & Ebekozien, A. (2023). Fire safety management in public health-care buildings: issues and possible solutions. *Journal of Facilities Management*, *21*(1), 69-83.