

Vertical Buildings

CHIRAG BHATNAGAR

Abstract

As currently everybody talks about nature preservation and different enterprise to reduce the damage to the minimum, so this exploration paper includes study of the practice known as perpendicular armature and how it contributes to nature's good as well as furnishing a good sanctum and pleasing armature. To know how we can produce further spaces or places inside one structure for peoples convenience and comfort and to save land mass.

Key Words: Vertical architecture , housing , skyscrapers , Highrise ,height to width ratio .

Date of Submission: 19-04-2023

Date of acceptance: 03-05-2023

I.INTRODUCTION

A hutment is a altitudinous continuously inhabitable structure having multiple bottoms. ultramodern sources presently define towers as being at least 100 metres(330 ft) or 150 metres(490 ft) in height, however there's no widely accepted description. Towers are veritably altitudinous high- rise structures. Historically, the term first appertained to structures with between 10 and 20 stories when these types of structures began to be constructed in the 1880s. Towers may host services, hospices, domestic spaces, and retail spaces. One common point of towers is having a sword frame that supports curtain walls. These curtain walls either bear on the frame below or are suspended from the frame over, rather than resting on cargo- bearing walls of conventional construction. Some early towers have a sword frame that enables the construction of cargo- bearing walls high than of those made of corroborated concrete.

II Literature study

- Remote Stairway locales – There must be at least two exit stairways separated by a distance lesser than 30 ' or at least one- fourth of the maximum overall dimension of the served area
- Exit Patterns – A design pattern must be handed in exit enclosures for all areas, including way, levees, border separation lines, rails, exit doors, and tackle.
- Fire- Service Conditions – High- rise structures must have a minimum of two fire- service entrance elevators and include a minimal 150sf elevator lobby and a direct connection to a stairway with a fire line. Please note This demand doesn't apply for erecting lower than 120 ' in height.
- Bank – Stairs for exiting should be designed as smokeproof enclosures, generally taking a pressurized stair shaft. See the following visual for clarity Fire Command Center(FCC) – An FCC is needed for all high- rise structures and must be at least 200sf with minimal extents of 10 ' in any direction. The position of the FCC must be approved by the original fire functionary.
- Admonitions – The following four types of communication systems for an exigency are needed in all high- rise hospices structures 1. Systems for Bank Discovery 2. Voice Alarm 3. exigency Radio 4. System for Fire Department Communication

III. Bhurjkhalifa (Case study-1)



- Type: Skyscraper
- Total Stories: 206
- Inhabited Stories :106
- Maximum Height: 2,717 Feet / 828 Meters
- Location: No. 1, Burj Dubai Boulevard, Dubai, United Arab
- Total area: 4,000,000 sq.m

III.I Introduction to Bhurjkhalifa

Official Name Burj Khalifa Bin Zayed(Burj Dubai), erected 2004- 2010, Cost\$, Designed By Skidmore, Owings & Merrill, Structural mastermind WilliamF. Baker, Main contractor Samsung C&T.

III.I USES

Burj Khalifa design is a multi use development palace with a bottom area of 460000sq. m that includes domestic palace, hostel, marketable office, entertainment, shopping, rest and parking installations.

III.I ANALYSIS

• Foundation The modular, Y- shaped structure, with lapses along each of its three bodies provides an innately stable configuration for the structure and provides good bottom plates for domestic. operation The Y- shaped plan is ideal for domestic and hostel operation, with the bodies allowing maximum outside views and inward natural light. Nature Gradient helical design hinders the swirling wind. Structural material concrete, sword • Structural System Buttressed Core • The palace superstructure of Burj Khalifa is designed as an all corroborated concrete structure with high performance concrete from the foundation position to position 156, and is outgunned with a structural sword braced frame from position 156 to the loftiest point of the palace. • In addition to its aesthetic and functional advantages, the twisting ‘ Y ’ shaped plan was employed to shape the structural core of Burj Khalifa. • The structural system for the Burj Dubai can be described as a “ buttressed- core ” and consists of high-performance concrete wall construction. • The structure is modular in nature with a central hexagonal shaft or core and three branches that spread out at 120 degrees from each other. • Attached to these branches are wall like columns at 9m distance that simply drop off as each leg sets back, avoiding complex and expensive structural transfer

IV. THE SHARD (Case study-2)



- World's 2nd Tallest Freestanding Structure in UK –309.60 M
- Construction Period- March 2009 – November 2012(38 Months – Completely Furnished8.15 M/ Month)
- RENZO PIANO's – Vision to produce a VERTICAL CITY
- MIXED USES- RETAIL, OFFICES, RESTAURANTS, HOTEL & RESIDENTIAL
- SHARD palace- expands to theRe-Development of LONDON BRIDGE STATION
- The first ever use of TOP DOWN CONSTRUCTION & JUMP LIFT CONSTRUCTION
- The first ever CRANE supported on top of SLIPFORM
- MAXIMUM use of PREFABRICATION & OFFSITE ASSEMBLY
- Including 80 of MECHANICAL & ELECTRICAL SERVICES

IV.I ANALYSIS

- Top Down Construction Strategy
- Jump Lift
- Off- Site Works The crane 317 measures altitudinous when it's completely extended and will allow builders to construct the top 23 bottoms of the Shard, which stands at 244 measures.
- The machine is anticipated to perform roughly 100 lifts and raise 500 tonnes of sword in the process from its platform outside the structure at bottom 55.
- Due to the limited space on point, people had the sword sections manufactured off point and the crane used to lift complete sections rather than independently lift the 800 pieces of sword.

V. CONCLUSIONS

- As we saw the height difference which is- • Bhurj Khalifa- 828m • Shard- 306m
- We can eventually understand that there can be no limit to the height we can erected in future.
- The shard comprises of numerous effects not only residents and restaurants but it's like a megacity inside a structure.
- Not only in our country but in colorful places perpendicular armature only seen as apartments or long domestic structures but as we saw in alternate case study a hutment or a high rise structure can compromise numerous effects and bitsy places like request space, services,etc.
- To save over lesser land mass we can make a whole megacity inside a structure complex as banded as a vision of renzo piano.

REFERENCES

- [1]. <https://www.slideshare.net/saumitrasmart/tall-buildings-case-studies>
- [2]. <https://www.slideshare.net/prasad3060/case-study-high-rise-buildings>
- [3]. <https://www.slideshare.net/ShreelekhaKulkarni/high-rise-buildings-case-study>