Designaddvance 2024

Architecture of Assembly:

Industrialised Construction for High-Rise Buildings

Summary:

Welcome to Designaddvance 2024, with the theme Architecture of Assembly: Industrialised Construction for High-Rise Buildings

This year, creativity meets innovation in the realm of Architecture, Design and Construction. Our theme focuses on revolutionising the construction process using Industrialised Construction (IC), particularly with prefabricated components. This move towards industrialising the architecture-design-construction process is an attempt to navigate challenges within the construction industry like unorganised labour, workmanship issues, site management, and pollution caused by construction. Participants are tasked with creatively integrating industrialised components to assemble a high-rise residential building that is delivered exactly as it has been designed.

Designaddvance 2024 offers a unique opportunity for students to showcase their talents, drive positive change, and contribute to a more sustainable future. We encourage participants to push the boundaries of traditional design thinking and inspire the next generation of architects and builders.

Premise:

The Construction industry in India is the 2nd highest employment generator[1], with a workforce of over 71 million. It contributes nearly 18% to the Indian economy's output[2], and yet it is overrun with significant challenges: quality of construction, organising the workforce, and environmental degradation caused by construction activity. Due to the unorganised nature of the labour force in India, the construction workers endure unsafe working conditions, prolonged exposure to polluted environments and no legal protection. They seldom have the opportunity to learn the necessary skills (less than a fifth of those employed in the sector are adequately skilled[2]). Workmanship issues and unsatisfactory design delivery impact not just the clients and end-users but also discourage the Architects and Designers who work on a project for months with their teams. Prevalent construction methods are often inefficient, cause unnecessary wastage of materials and have a long project delivery time.

Multi-storeyed[3] housing, one of the most common building typologies, is particularly susceptible to these challenges. There is an urgent need for good design, in both ideation and outcome, to ensure the well-being of the residents and to maintain the longevity and functionality of the buildings. Issues like maintenance, structural deficiencies, water leakage and seepage, accessibility, high energy consumption and inadequate ventilation could be resolved with careful planning and construction. Moreover, standardising the repeating elements in such a building (like staircases, balconies, bathrooms, facades, etc.) and streamlining the construction process could make the design execution much more effective!

How can we address these challenges and revolutionise the housing construction sector?

Designaddvance 2024 invites you to reinvent multi-storeyed housing **through the lens of Industrialised Construction (IC)** and Prefabricated Components. Your task is to design a high-rise residential building or complex that not only provides safe and comfortable living spaces but also embodies creativity and sustainability from the design table to its execution.

1. India's construction sector second highest employer: Report https://economictimes.indiatimes.com/industry/indl-goods/svs/construction/indias-construction-sector-second-largest-employment-generator-report/articleshow/102399804.cms?from=mdr Accessed 04/04/2024.
2. India's construction sector to employ 100 million, requires skilled workforce for economic growth: Report https://www.livemint.com/industry/infrastructure/indias-construction-sector-real-estate-jobs-employment-gdp-economy-civil-engineers-11691047850783.html Accessed 04/04/2024.
3. "Multi-Storeyed Building or High Rise Building"- A building above 4 stories, and/or a building exceeding 15 meters or more in height above the average level of the front road. https://mohua.gov.in/upload/uploadfiles/files/Chap-1.pdf Accessed 04/04/2024.

The Design Task:

Designaddvance 2024 | Architecture of Assembly: Industrialised Construction for High-Rise Buildings, invites participants to showcase their ingenuity and drive positive change through their ideas.

- ➢ Participants are tasked with designing a **high-rise residential building or building complex** using **Industrialised Construction (IC) -** using **prefabricated building components**. The goal of this challenge is to maximise the use of industrialised elements in the design and execution of the high-rise structure.
- ➢ Demonstrate how a **transition from unorganised to organised construction practices** addresses the issues of **quality** (workmanship, consistency, and design delivery to site), **workers' protection** (upskilling, formal contracts, and safer working conditions) as well as integrating **sustainable design** (reduced wastage and pollution, inbuilt energy-efficient materials, and a reduced construction period).
- ➢ Explore **suitable construction materials and prefabricated components**, and push creative boundaries while ensuring functionality and sustainability. Determine the repeating elements in your design like staircases, washrooms, balconies, facades, etc. and envision how the components will seamlessly come together to form the structure.
- ➢ Draw inspiration from the **uniqueness of the site, context, history, local heritage, and arts and crafts** and show an integrated approach with IC. Lend a distinct identity to even the standardised elements: to internal components as well as to externally visible parts like **facades**.

Participants are also suggested to further research IC and prefabrication of building components to create sustainable, inclusive and accessible spaces.

Guidelines for Site and Design Program:

1. Participants can choose an **urban site (Tier 1 or Tier 2 cities)** at a location of their choice within the following guidelines:
    a. Site Area should be between **5-12 acres**.
    b. The minimum FAR should be 3.
    c. Green Cover should be at least 15% of the total site area.
2. Participants should follow the local by-laws or the National Building Code (NBC) in the absence of local by-laws.
3. The Design should be constructed using **IC - prefabricated building components**, partially or entirely. We suggest construction details be featured on 1-2 sheets highlighting:
    a. Prefab Components chosen and the reason for choosing them.
    b. The impact of opting for prefabricated elements instead of conventional construction, in terms of cost savings, timeline of the project, worker well-being and sustainability.

Design Considerations:

1. Integration of Industrialised Construction: Break down the building into its components and strategize the flow of assembling them using prefabricated elements into a functional end product. **At least 50-60% of your design should be made using IC-enabled building components, fully or partially.**

2. In-depth Research and its Application: Conduct a thorough inquiry into Industrialised Construction and Prefabrication of building components. Examine the suitability of materials for each component and make the best choices for your design.

3. Sustainability is Key: Take advantage of building performance analyses and integrate passive design strategies into the building components. Make the elements as energy-efficient as possible. Incorporate smart building systems, photovoltaic panels, rainwater harvesting systems, IoT sensors, insulating materials and biophilic design principles.

4. Well-being in your Design: Design living spaces that promote well-being, social cohesion, accessibility and inclusivity within the design, ensuring that the building serves the needs of diverse populations and makes everyone feel welcome.

5. Unleash your Creativity: Using prefabricated elements does not mean designing a box. Design your spaces with future adaptability and scalability in mind and feel free to use interchangeable modules, plug-and-play utilities and parametric design tools.

Eligibility:

- The competition is open to all Undergraduate and Postgraduate Students of Architecture, Planning, Civil Engineering and Design, globally.
- Those graduating in 2024 are also welcome to participate.

Evaluation Criteria:

Submissions will be evaluated based on the following criteria:

- **Design Innovation and Creativity:** The Jury will consider the uniqueness of the Design Proposal, innovative approaches to both design and construction methodologies and architectural forms.
- **Industrialised Construction (IC) and Prefabricated Elements:** Materials chosen for the elements as well as the creativity and ingenuity in the use of elements to design livable spaces. (Does your project justify being a creative case of Industrialised Construction?)
- **Sustainability and Environmental Impact:** The building's energy consumption and carbon footprint, water conservation strategies and incorporation of passive design strategies.
- **Well-being:** Introvertedness vs. extrovertedness - whether the design promotes social connectivity, mental and physical health, accessibility and inclusivity, and offers choices for every user group.
- **Presentation of Design:** Clarity of the design communication and overall aesthetics.

- 50-60% of building components, whether fully or partially, should be Industrialized Construction enabled.

Team Composition:

- A **maximum of three members per team** is permissible.
- Participants may make teams **with students from different academic years of study, colleges or even courses** of Undergraduate or Postgraduate disciplines. However, at least one of the team members must be a student of architecture.

Timeline:

Registrations Open: April 15, 2024
Registrations Close: October 7, 2024
Submissions Close: October 17, 2024

Submission Requirements:

1. **Design Statement (PDF):** A written narrative outlining the design concept, design strategies incorporating IC and prefabrication, programme, context and the choice of site in one A4 sheet as a pdf, named in the format **<Code_Statement>**.
2. **Presentation (PDF):**
    a. 5-7 Sheets in 16:9 ratio, Landscape orientation, 200 to 300 DPI, with the design process and the drawings (comprehensive architectural drawings, rendered views, construction details & assembly process, sustainability features, area and energy calculations, etc.) depicted in a suitable graphical scale.
    b. Include a materials list and construction details specifying the prefabricated components used as well as their materiality and environmental impact in 1-2 sheets within your presentation.
    c. Calculations and statements for compliance with zero energy building requirements–Energy Rating System Index, Energy conservation code, Energy use intensity, etc. are to be included in the submission. Elaborate on decarbonization and calculation of other zero energy design strategies within the design and the processes that surround it.
    d. Name the pdf as **<Code_Presentation>**.
3. **Video Presentation:** A recorded presentation of under 5 minutes duration explaining the project shall be included in the submissions, to be uploaded in the submission folder/link provided. Name the recording as **<Code_Video>**.
4. **Letter of Declaration (PDF):** A letter of declaration signed by the participant shall be included. (Format attached in the annexure of the brief). Name the PDF **<Code_Letter>**.
5. Acknowledge references used for case studies and design ideas that have been adapted from sources in the submission. All entries shall be scrutinized for evidence of plagiarism.

6. Document the design process. It is recommended, though not mandatory, that drawings/ graphics be developed using Autodesk Revit and auxiliary Autodesk BIM tools. The sheets may include plans, sections, elevations, 3D views, joinery details, Dynamo scripts, and anything else that would help communicate the idea better.
7. Participants' names must not be mentioned anywhere, only the submission code as provided has to be mentioned in the top-right corner of the documents.
8. The Autodesk Docs link for uploading the entry will be communicated to the participants after registration for the competition closes.

Awards:

- Cash Prizes for the top three winners:
    - **1st: ₹ 75,000/-**
    - **2nd: ₹ 50,000/-**
    - **3rd: ₹ 25,000/-**
- **Top 10** entries to be **published** on our website.
- **Top 5** winners get **free entry to Capricot BIM for Design Program (140 Hours)** worth ₹ 75,000/-
- **All participants** who have submitted the entries will get a discount voucher of 40% on the BIM for Design Program.
- E - Certificates for all attendees of the workshop.
- E - Certificates for all participants who have submitted competition entries

Knowledge Resources by Capricot:

All Designaddvance 2024 registrants will get access free of cost to online Self-Learning Modules and Webinars by experts in sustainability, Industrialised Construction, BIM, energy simulation, and building innovations, conducted at regular intervals. This will help the teams understand concepts and best practices for high-performance buildings. For more info, stay tuned at: https://www.designaddvance.in

Resources and Suggested Reading:

- https://damassets.autodesk.net/content/dam/autodesk/www/pdfs/autodesk-industrialized-construction-report.pdf
- https://www.researchgate.net/publication/333758118_Industrialized_Construction_Emerging_Methods_and_Technologies
- https://www.msuite.com/bim-and-its-movement-to-construction-industrialization/
- https://www.linkedin.com/pulse/3-building-parts-best-suited-prefabrication-patrick-mays/
- https://www.re-thinkingthefuture.com/rtf-fresh-perspectives/a1609-10-things-to-remember-while-designing-hotels/