2017 Design Brief

The *Metals in Construction* magazine 2017 Design Challenge invites architects and engineers to reduce embodied energy by submitting their design for a high-rise building that integrates its enclosure with its structure. Substituting a hybrid frame and skin structure for the typical aluminum-and-glass curtain wall can eliminate material that is structurally inert in the typical 10 to 15 pounds-per-square-foot facade assembly, minimizing the materials used in the building's construction. Studies show that the amount of CO2 emissions embodied in producing construction materials accounts for more than 50 percent of the energy consumed during a building's lifetime. In highly energy efficient buildings, embodied emissions can account for almost 300 percent of that energy consumption.

Your design must fully integrate the building's systems that provide environmental protection and resistance to wind and seismic forces. Entries will be judged on the amount of embodied energy reduced in the form of building mass, as well as on the overall performance of the enclosure.

Metals in Construction will award a **$15,000 cash prize** to the design judged to exhibit the greatest innovation, efficiency, and aesthetic integrity in achieving these objectives. The grand prize winner will be announced and the winning design featured prominently in a half-day ideas conference at New York City's TimesCenter on February 24, 2017. The deadline for entries is February 1, 2017.

Specific Design Guidelines

Submissions must address the performance of the hybrid frame-and-skin system with both illustrations and data. They must first demonstrate the hybrid system's functionality in moisture protection, thermal performance, sound attenuation, fire safety, and limiting drift. Second, they must calculate the reduction in CO2 emissions resulting from the use of a

hybrid system instead of an aluminum-and-glass curtain wall. While the use of more durable, longer-life materials or of materials that produce fewer carbon emissions is permitted (and will be considered in the judging), it is the integration of structure and enclosure by eliminating the standard curtain wall that is the required scope of this challenge.

Designs submitted for consideration must:

- Demonstrate an understanding of sustainability as well as of desirable daylighting and creature comforts for modern, Class A office space including a highly transparent facade and column-free space.
- In addition to aesthetics, take into consideration local climate, neighboring buildings, city requirements, efficiency of materials, new technologies, functionality, and overall constructability.
- In addition to conceptual visualizations, participants must communicate the functionality of their approach to a hybrid envelope design by conducting standard analyses of both embodied carbon and structural performance. (Follow additional guidelines for these analyses in the FAQ section of this site.) The energy analysis should include calculations on thermal and solar performance as required by NYC ECC 2016 as well as embodied energy per guidelines in LEED v4. The analysis for structural performance must include design criteria per local code (NYC BC 2014) requirements, narrative on scheme, and preliminary calculations including worst-case load cases.

Additional Design Parameters

- The building must be designed as a core and shell for Metropolitan Class A office use including a highly transparent facade and column-free space. Interior layout and amenities may be shown solely to illustrate functionality of the facade in all environmental and use conditions.
- Designs must be situated in one of the five boroughs of New York City with proximity to public transportation, green space, and

shopping. Participants will define the location of their project, and justify their choice.
- The building must be a height of at least 15 stories with a primary frame of structural steel.

These parameters are intended to provide participants with maximum freedom to engage the project with minimal constraints, allowing them to focus on designing a building that explores the principal challenge, that of integrating structure and enclosure.

Submission Requirements

Registration and submission are handled completely through www.metalsinconstruction.org. The process is composed of three parts:

- Entrant Information – Contact information of the individual or team submitting. This will not be shared with judges and is only for contact purposes.
- Project Description – A series of descriptive points related to the design and process of the submission.
- Proposal Visualization – Up to 10 pages may be submitted to represent the proposal. This attachment should be one (1) multi-page PDF file (max. 10 pages) formatted at 11″x17″ (ledger) and can include supporting backup data, calculations, and commentary to supplement the images. Do not link or embed objects. Maximum file size is 20MB.
- **All materials are due by February 1, 2017, 11:59 p.m.** Once you register via this site, you or your teammates may log in and edit your competition entry as many times as you like until the deadline.

See Competition Rules and the FAQ page for more information.

Prizes

One grand prize of $15,000 to be awarded at a half-day conference at The TimesCenter in New York City on Monday, February 29, 2017.

Along with the winner(s), up to 15 honorable mentions will be chosen for presentation and discussion at the conference. The winner and the top five finalists will also be published in *Metals in Construction* magazine and its digital platforms.

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This Design Brief contains research from "Structural Skin: Integrating Structure and Cladding" by John Neary, Sr. Associate, HOK New York. The paper was published by the Facade Tectonics Institute and presented at an October 10-11, 2016, conference in Los Angeles along with nearly 100 other peer-reviewed papers.