

Exhibition | A Symbiotic Process – Zaha Hadid: Form in Motion

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Exhibition designers in the museum setting are often called upon to strike a balance between the architecture of the gallery and the presentation of its contents. Frequently, the architecture performs a supporting role for the art objects it aims to display. When effectively executed, the built elements in the gallery become a subconsciously perceived background that fall away to promote the significance of the art within and enhance the viewer's experience.

At the other end of the design spectrum is an endeavor such as **Zaha Hadid: Form in Motion**. In this exhibition, the gallery space transforms to become an art object in its own rite, and a synergistic relationship is created between the exhibition architecture and the objects within.

Rather than becoming a subtle backdrop, the gallery is re-imagined as an environment, its design and architecture as thoughtful and evocative as its resident objects. The exhibition is comprised of two distinctly different but interrelated architectural elements: a 3500 square foot continuous vinyl floor graphic that undulates and converges with a monolithic sculptural wall. These two elements, in conjunction with the furniture, industrial and product designs on view, act together to transport the visitor beyond the gallery, and into a world where the delineation of two and three dimensional space is blurred through the manipulation of form, perspective, surface, and lighting.

Zaha Hadid: Form in Motion beckons the viewer to ask the question of how such an environment is conceived. However, to answer this question, one must delve deeper into the account of how the exhibition is constructed. At its most fundamental level, the exhibition comes to life through a critical working relationship between designers and fabricators, and at the heart of this partnership, is the ability for both parties to share information and ideas through the use of computer aided design and technology. To be more specific, the use of 3D computer modeling permeates every aspect of this exhibition from conception to installation. The process of working with digital models in the design and production phases of the project creates unique opportunities for innovative material applications, and for the use of complex fabrication techniques that rely on computer assisted machining. Ultimately, technology plays a pivotal role in creation of the architectural forms and surface treatments, but of particular interest is the making and assembly of the expansive contoured wall feature in this exhibition.

The design process begins with the computer modeling of the existing Special Exhibitions Gallery in the Ruth & Raymond G. Perelman Building at the Philadelphia Museum of Art. The model is developed to address inherent spatial parameters and limitations, and to establish the look and feel of what will become the re-invented gallery space. Renderings are generated to study views and perspectives that inform the location of art objects in relation to the architecture. The digital model becomes an easily adaptable tool that aids in formulation of the overall context and narrative of the exhibition with which visitors will observe and interact. >

MODEL DRAWINGS (WALL STRUCTURE)

ASSOCIATED FABRICATION

Color-coded 3D image of the wall structure showing the breakdown of parts;
piece drawing representing the production methodology and labeling of the foam parts



As the design phase moves into production, the working digital model allows for vital discussions between designers and fabricators regarding the building of architectural components. In this case, the wall structure has numerous, often conflicting requirements. The forms must be very light, yet self-supporting. They must cantilever and span distances with minimal support and anchoring. They must also be small enough to fit into the gallery through existing doorways, but large enough to minimize installation time in situ. Finally, the forms must be robust enough to survive transportation, and they must be affordable to accommodate an exhibition budget. With these requirements, the fabricators

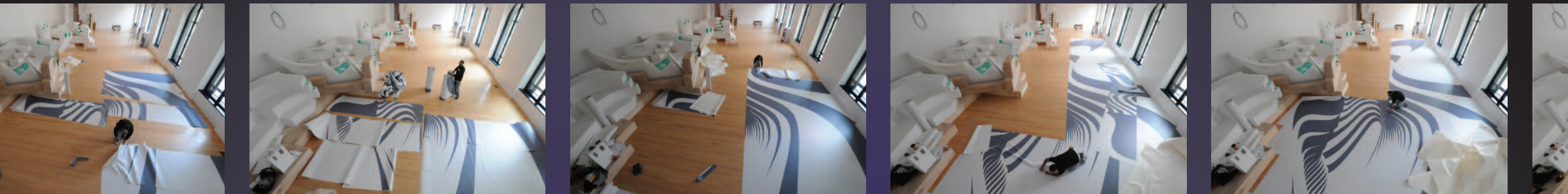
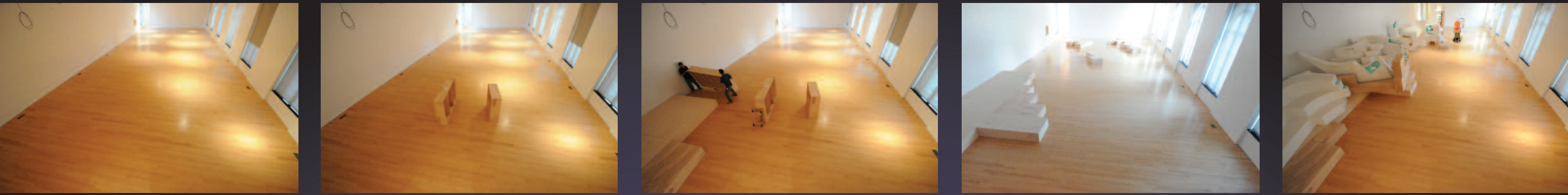
settle on a somewhat unorthodox material for construction: expanded polystyrene foam (EPS).

For its many applications, EPS foam is less commonly used as a structural and sculptural element in an exhibition setting. The contours of the sculptural wall are made up of large foam blocks at varying thicknesses. The same digital files that enabled designers to study and develop the exhibition layout are reinterpreted to create cutting templates for the vast assortment of curvilinear forms. Once these piece drawings are produced, the foam is cut using a Computer Numerical Control (CNC) hot wire cutter. Through computer assisted machining, each piece is

generated to the exact size and proportion specified by the designers. Then, through meticulous attention to labeling and registration, the cut foam pieces are glued together in larger chunks, coated with a urethane hardener, pre-finished and sized appropriately for transportation and installation in the gallery. Once on site, the pieces fit together like a giant puzzle with oversized finger joints that disappear to create what appears to be a single stacked and continuous form. Through this method of machining and pre-fabrication, the seemingly infeasible sculptural element is constructed, installed and finished in a matter of days.

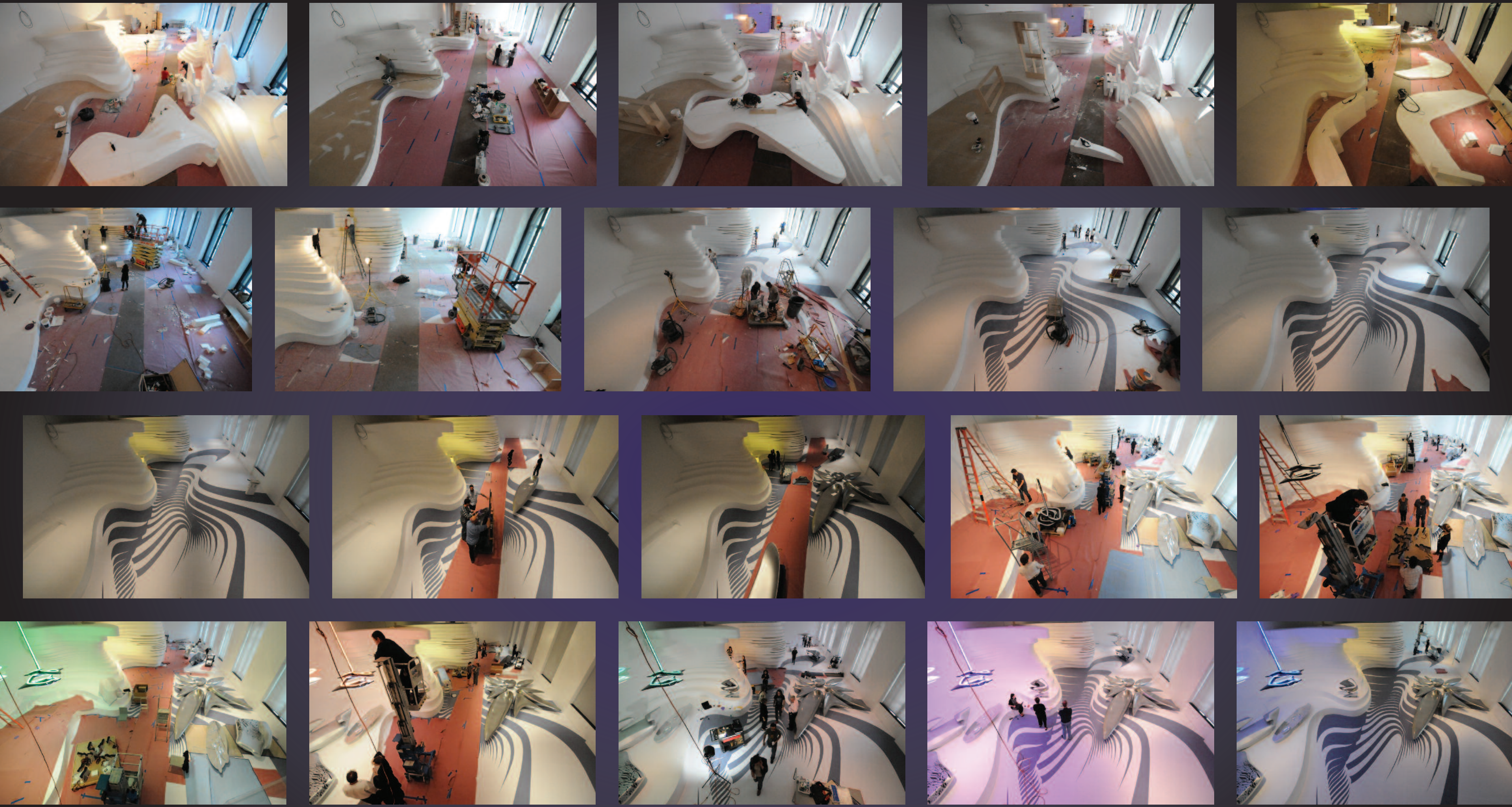
While technology helps bring this type of intricate exhibition to fruition, I would like to acknowledge the tremendous amount of work put forth by many individuals with respect to the design, fabrication, and coordination of *Zaha Hadid: Form in Motion*. On behalf of the Philadelphia Museum of Art staff in collaboration with Zaha Hadid Architects and Associated Fabrication on this project, we would like to thank all of the designers and fabricators involved for their diligent efforts that have resulted in a truly unique and inspiring exhibition. **JS**

Installation View of **Zaha Hadid: Form in Motion**
at the Philadelphia Museum of Art



Computer Modeling and Programming: 200 Hours; Shop finishing and floor graphic: 3400 Square feet; Polyurethane coating: 21 Gallons; Spray foam: 20 cans; Foam sheets: 220; Individual foam parts: 432; Total

assembly:1000 Hours; Site work: 336 hours. TOTAL: 1536 hours; Vinyl Plaster: 250 lbs; Joint compound: 50 gallons; Laminate glue: 10 gallons volume: 4096; Plywood sheets: 40 4x8 (1280 square feet); 30 4x8 (960 square feet); Wiggle board: 10 4x8 (320 square feet); Shipments: 3 Tractor



Building Mechanics: Parts needed: 1 hour; Lighting: 31.5 hours; Wiring: scissor lifts: 2 (15'); Paint: 120 gallons; Longest work day: 24 hours; Handlers: 368 hours; Admin (SpEx, installations): 500 hours; Graphics: Conservation: 30 hours; PLUS innumerable hours spent by the Museum's

10.5 hours; TOTAL mechanical: 43 hours; Carpenters: 13; Electric Construction hours: 780; Shipments: Air, truck, sea; Crates: 32; Art 40 hours; A/V + Web: 150 hours; Security: 50 hours; C-tech: 10 hours; curatorial, exhibition, + publishing offices and Zaha Hadid Associates.