Full Figures: Finding Form in Excess Matter

The bigger the better; in everything.
—Freddy Mercury

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EXCESSIVE MATTER

With any economic implosion, its very occurrence is cause for an immediate rethinking of all things deemed excessive. From tightening the reigns on budgetary spending to retooling the means of production in service of material and labor reduction, the architectural profession and the resultant trickle-down effects that ultimately find their way into academia feel a reactionary impulse to respond to crisis by trimming the fat. Typically, this response involves marketing work under culturally accepted and industry cliché words such as "sustainable," "zero-energy/waste," and "optimized." It may also imply that primarily aesthetic material, such as ornament or decoration, are the first to be value-engineered out of the project.

Without diminishing the importance of environmentally responsible work, this speculative course adopts an alternate attitude toward excess, arguing instead for maximizing matter in the form of spatial and figural volumes. Full Figures asserts a position that espouses the production of excessive matter organized into disproportionate massing as a means of achieving architectural effects that dial up physical weight (volume), material performance (thickness), and visually express the latent phenomenon that brought the form into being in the first place.

FIT FIGURES VERSUS FULL FIGURES

Typically, pursuits of excess would center on issues of quantity, assembly, and parts-to-whole relationships. This approach, what we'll call "Fit Figures," is thin. Fit Figure projects typically consist of sheet material and are often realized through surface aggregation strategies, topological studies, or surface patching to produce 3-dimensional objects. They are superficial in a controlled way in that they aspire to produce specific features and will employ all modes of software and hardware to achieve a "look." They adhere to a set of procedural design steps that result in taut skin, defined muscles and visible bone structures. Excess material is nipped and tucked, and seams are either intentionally hidden or exuberantly expressed in the construction details. Digital pre-visualization on screen is often only a fraction removed from the end product, producing a level of control at nearly


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all stages of the process. However, the end product is formally predetermined only in so far as material behavior and machined limits allow. Even Fit Figures let themselves go sometimes, succumbing to the external material and fabrication pressures applied to them.

Conversely, we might view excess in the same way we analyze the human body: pliable envelopes (skin) with often-disproportionate distributions of weight (mass), as opposed to a collection of visibly identifiable assembled parts. Measurable only through its cubic dimensions, weight, and postural attitude as opposed to the number of parts, types, or assemblage techniques (Figure 1), this text proposes “Full Figures” as an alternative to “Fit Figures.” Full Figures are heavy. Where Fit Figures exploit sheets and surfaces, Full Figures grapple with weight and are formally concerned with global volumetric operations over localized bits. They have no problem letting nature take its course as their form is found from variable and often uncontrollable or loosely controlled factors. They adjust their weight in an effort to posture or position themselves among other adjacent bodies.

Form is found, not through direct determinacy (software) or machined precision (hardware) but through the unwieldy misbehavior of the material itself (Figure 2). Material misbehaviors such as wrinkles, roles, flaps, pocks, and kinks are embraced as odd details, freakishly exaggerated into new formal features, and employed as devices to prompt an intentional misreading of the materiality itself. What appears fixed is static, what is hard, appears soft. Full Figures typically begin with the rigorous ambitions and constraints that Fit Figures do through the use of framework, scaffolding, or bounding boxes. However these limits are simply loose guidelines, allowing the external pressures applied to them such as airflow, gravity, loading, and position help guide its final form. Form is a resultant index of surrounding flows of matter they are immersed in.

OPERATION

At the center of a full figure project is the exploration and articulation of 3-dimensional objects. Full Figure source material focuses specifically on revolved forms, using the revolve operation as a way of studying shifting figural profiles and formal transitions across a body in 360 degrees.

Figure 1: Malumma, Susanne Jakobsen

Revolve, as an operational technique, is often associated with design and manufacturing methods found in industrial design. On the low-tech end of this spectrum is the production of ceramics on a potter's wheel. On the high-tech manufacturing end, is rotational molding, also known as Rotomolding. Rotomolding is used to form plastic parts between two molds. Rotomolding uses an additive casting process where volumetric form is found by distributing the casting agent (typically plastic) across the surface area of the molds. The second example is a 4-axis Rotary CNC Mill, which unlike Rotomolding employs a subtractive approach to cut material away rotationally, similar to the potter's wheel process. In addition to their material specificity, the two methods differ in their ability to address the three X-, Y-, and Z-axes. The potter's wheel is limited to rotation about the Z-axis while rotational molding and 4-axis milling revolve about 2 perpendicular axes. 02

Technically, the revolve command establishes an axis about which to both control and measure volumetric adjustments from the same reference datum. Full Figures modeling parameters include profile curves and rail curves, along which the variability of each degree along the revolution is controlled. In addition to controlling the exterior profile using rails, revolving inherently produces an interior. Often this interior is a resultant of the exterior profile curve, or it might be intentionally designed through additional profiles located at the center datum. Full Figures considers both exterior and interior profiles as a way of maximizing surfaces area for excess matter to infiltrate and settle (Figure 3).

In James C. Gifford's article, The Type-Variety Method of Ceramic Classification as an Indicator of Cultural Phenomenon, Gifford argues that "ceramic types represent the combining of a number of attributes into abstract conceptions which, when executed in clay by potters, are acceptable to them and a majority of others within their cultural identity."[1] Gifford implies that the figural type—the shape, relationship to known forms, and the derivatives of the initial throw on the wheel—are in fact representative of their environmental context. Following Gifford's assumptions, Full Figures interrogates revolved forms as if they were operating on bodies as surgeons; adding, removing, and sculpting matter in order to produce oddly familiar, often anthropomorphic, figures.

Figure 2: Civilized Guilt, Ernesto Neto

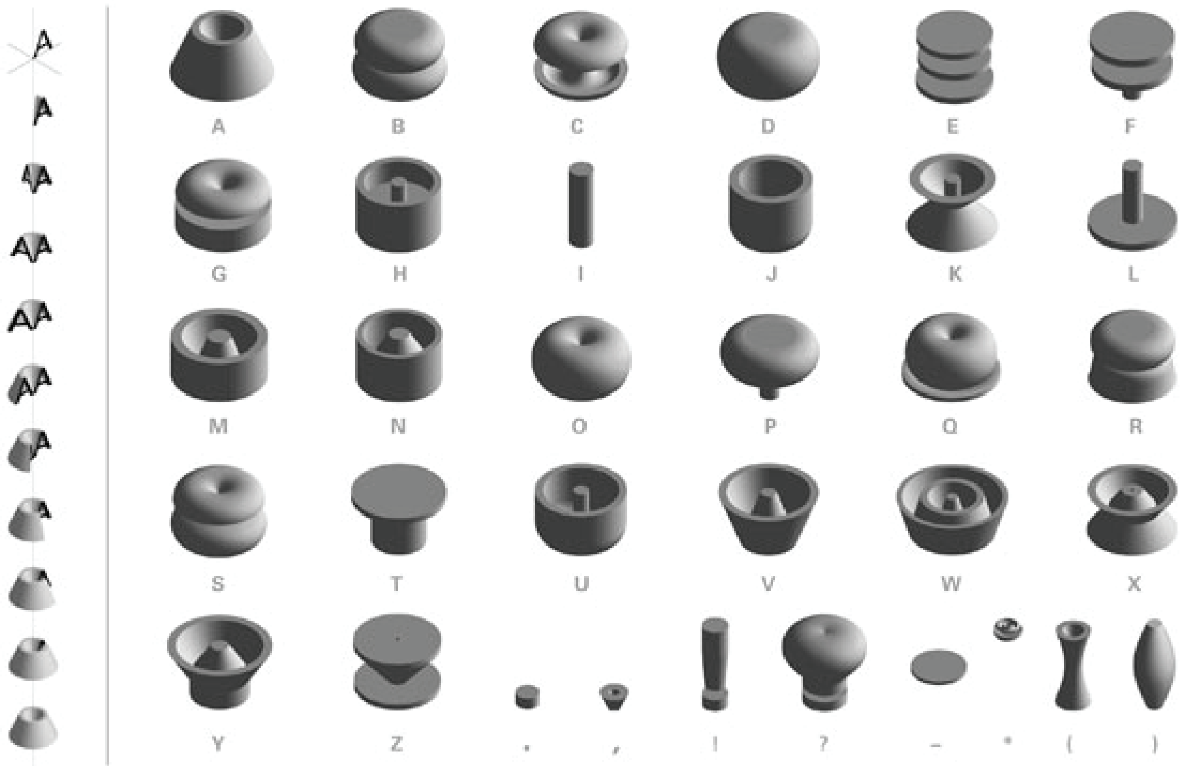

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Figure 3:Universe Revolve 3d Typeface, Ji Lee

Figure 4: *Skin Type*, Arjan Benning

Figure 5: *Full Figures*, Kelly Bair

FORMS AND FEATURES

Using both analog and digital material experimentations, the Full Figures incite novel methods of form finding and feature mining. While the term form finding is traditionally rooted in the optimization of structural logics using minimal surfaces or tectonic assemblies (as was the case with Gaudi's catenary models or Otto's tensegrity surfaces), this work is less interested in structural efficiency. Instead, it privileges the development of a formal language derived from material misbehavior as it undergoes various external pressures. Influences such as surface area, heat, weight, loading, adjacencies (to other contextual figures), and viscosity will act as agents for finding form. This language lends itself to strangely familiar forms or forms that reference qualities of the human body as opposed to the more technologically expressive work of computationally based methods.

In the Full Figures loose-fit attitude, methods of displacement inevitably yield new features (Figure 4) as excess matter is redistributed unevenly depending on the quantity, location, and pressure exerted by external inputs. For Gaudi and Otto, features emerged from material experiments that eventually found their way into the built work in the form of larger scale architectural effects. In Gaudi's case, the layered mesh of counterweights in the catenary model reemerges in the façade of Sagrada Familia in the form of dense feathery ornamentation. For Otto, 2-dimensional line work becomes thick 3-dimensional structural members, resulting in a visually heavy yet structurally lightweight canopy system, best exemplified in the Mannheim Multihall project.

Found features emergent from the physical material studies are sampled, exaggerated, and grafted onto the revolved figures. This amplification and manipulation of features removes the associative scale of the physical artifacts (such as clips, fasteners, seams), further abstracting the qualities of these details.

Lastly, Full Figures approaches literal and representational visualization in two ways. First, through the development of physical material tests and their digital avatars, revolved objects are produced that are tactile, metric, and indicative of the physical processes undergone in the form-finding process. Full Figures examines the formal aesthetics and material sensibilities that result in the pairing of rudimentary form-making methods (such as casting, carving, and drape forming) with the precision of computational-based machining (laser cutting/etching, CNC milling, 3d printing) in architectural design.

Secondly, Full Figures develops novel 2-dimensional representational imagery in an effort to move beyond the literal graphic depiction or orthographic description of an object. Instead, photographic imagery is used to convey the contextual atmosphere of the environment that initially spawned the figural and feature-rich body (Figure 5). The graphic image is ultimately used as a generative device to project environmental properties back onto the figure to further enhance their excessive mass, exaggerated features, and the legibility of the external inputs applied. ◆

REFERENCES

Gifford, James C. 2005, *American Antiquity,* Vol. 25, No.3. (Jan. 1060), 341-347. The Type-Variety Method of Ceramic Classification as an Indicator of Cultural Phenomenon.

PHOTO CREDITS

Figure 1. Susanne Jakobsen, image source: http://susannejakobsen.com

Figure 2. Ernesto Neto, image source: http://papaissue.com

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