Mass Production for One: Inverting Standards in Design Art Furniture

Lauren L. Gallow, University of California - Santa Barbara
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Lauren Gallow, *University of California, Santa Barbara*

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**Abstract**

“When is a chair not a chair? The answer is probably, ‘When it’s a piece of design art.’”

So began a recent article on the burgeoning field within contemporary art known as design art. While it is difficult to summarize the diverse practices of design art practitioners, typically they share an interest in exploring the tools, methods, and forms of the industrial manufacturing system. This project examines several designers who are using the means of industrial production to create limited edition or one-off design art objects. While they often start with familiar, functional forms such as chairs and tables, these practitioners consciously move their work out of the ream of industrial design and into the art world by producing their designs in limited editions or removing the functionality of the objects entirely, making tables out of fragile layers of resin or chairs out of sharp steel plates, for example. As such, their work has increasingly come to be evaluated under the standards of the commercial art market. However, this has by no means been a smooth transition, as many art critics have been reluctant to recognize design art as a legitimate artistic category. Often this resistance seems to derive from design art’s close ties to industry, mass-production, and consumerism—all the things against which fine art has traditionally defined its cultural value. This project examines how by upsetting standards of industrial mass-production and artistic production, design art produces a fresh perspective on both sets of standards.
A recent article on the burgeoning field of design art began with this question:

“When is a chair not a chair? The answer is probably, ‘When it’s a piece of design art.’”

Over the past decade, design art has emerged as a fast-growing field in the contemporary art world. However, this quote with its hints of sarcasm and cynicism, suggests the uneasy and turbulent relationship that has developed between design art and the larger contemporary art world. Since the prominent art auction house Philips de Pury launched the very first design art sale in 2001, design art has enjoyed an increasing level of commercial success, with works in the category fetching prices in the upper echelons of the contemporary art market. Design art is also increasingly being entered into museum collections around the western world. Many major museums have featured exhibitions on design art over the past decade, including this image which pictures an exhibit called Industrial Revolution 2.0 which was held concurrently at the Victoria & Albert Museum in London and a local London gallery in 2011. However, this has by no means been a smooth transition into the art world, as many art critics have been reluctant to recognize design art as a legitimate artistic category. One critic put his disapproval quite succinctly, declaring, “Design art is either design or art. It cannot be both, therefore it is a term that does not need to exist.”

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But, design art certainly does exist! Examples of exhibitions… museums, galleries, art fairs, Phillips de Pury pop-up shop. So what is design art? It can be loosely defined as any artwork that attempts to play with the place, function, and style of art by commingling it with architecture, furniture, and graphic design. Or, as one critic nicely put it, design art is “something to sit on, eat off, or live in—or, simply something to make money from.” Design art can often be characterized as a representation of a functional object, rather than an actual object of utility. While it is difficult to summarize the diverse practices of design art practitioners, typically they share an interest in exploring the tools, methods, and forms of the industrial manufacturing system. At the same time, design artists engage with the methods, mediums, and historical boundaries that have traditionally encompassed the discipline of fine art. In this way, design art offers an ideal arena to consider the boundaries separating these distinct but certainly historically interconnected categories of design and art.

Slide 3  Bengtsson, Verhoeven

In this presentation, I focus on the work of two design art practitioners. Mathias Bengtsson and Jeroen Verhoeven both use the means of industrial production to create limited edition or one-off design art objects. While design artists often start with familiar, functional forms such as chairs and tables, they consciously move their work out of the realm of industrial design and into the art world by producing their designs in limited editions or removing the functionality of the objects entirely. Much of the resistance to design art as a legitimate category of contemporary art seems to derive from its close tie

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to industry, mass-production, and consumerism—all the things against which fine art has traditionally defined its cultural value. I argue, however, that by upsetting standards of industrial mass-production and those of artistic production, design art produces a fresh perspective on both sets of standards.

The question of how the fine arts and the decorative arts can and should be related is certainly not a new one. During the Industrial Revolution in the late nineteenth-century, William Morris and the Arts and Crafts movement took a largely anti-industrial position, advocating for a return to traditional modes of craftsmanship. Later, in the twentieth-century, Walter Gropius in his manifesto for the Bauhaus took up the opposite position, arguing for a union between all the arts and especially between craftsmanship and industry. Contemporary design artists such as these two offer the latest chapter in this longstanding debate about artistry and industry, as they are concerned primarily with the new digital production techniques that have emerged in the last decade or so.

Specifically, I believe these three artists are offering a critique of one of the newest and most advanced digital construction techniques: rapid prototyping, which is also known as 3-D printing.

**Slide 4 Fabrication methods**

In order to understand rapid prototyping and these two designers’ specific investigations of it, it is useful to know that there are three fundamental processes for fabricating virtually all objects with which we come into contact on a daily basis.¹ 1.) Subtractive: You start with a single block of solid material, and you remove material until

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the desired shape is reached. (carving wood or stone, etc. Queen Anne Chair, 18\textsuperscript{th} century). 2.) Formative: In this process, mechanical forces or restricting forms are applied on a material so as to form it into the desired shape. (Rashid, Oh Chair, heated thermoplastic injected into mold). 3.) Additive: the exact reverse of the subtractive method—a material is manipulated so that successive portions of it combine to form the desired object. The additive method is the most recent in its development, and it is the one most often associated with digital production techniques such as rapid prototyping or 3-D printing. With this method, construction can be carried out entirely by machine. I will explain rapid prototyping in more detail in a moment, but for now just keep in mind that it is an additive process where an object is formed by adding successive layers of material. Today, with techniques such as rapid prototyping, designers can work through projects completely digitally—from the initial design, through the prototyping stages, and into final construction, all without ever touching the physical object as such.

\textbf{Slide 5 \quad Bengtsson, Verhoeven}

These two designers both address this idea that digital technologies and strategies have taken over the world of design. At the most basic level, these works are both familiar furniture forms: tables and chairs. However, in combining digital and handcrafted fabrication techniques, the designers abstract those familiar furniture forms into shapes that are increasingly less and less recognizable as furniture. These designers also have in common a similar method of fabrication: a type of “slice” construction. Stacking and layering materials in order to build up their furniture objects, Bengtsson and Verhoeven both assemble slices of material in a type of additive fabrication process in
their work. This slice method is significant because I believe it can be read as a direct engagement with and criticism of rapid prototyping.

**Slide 6  Bengtsson chair images**
*Bengtsson Design, Slice Chair, 1999: Plywood and aluminum versions*

So, how are these chairs actually put together? Well, let’s begin with Bengtsson’s *Slice Chairs*. With its undulating, organic curves and waves, both the plywood and the aluminum *Slice Chairs* evoke associations of a topographical map or a jagged cliff face. The chairs issue a commanding presence with their sense of monumental weight and mass, upending the lightness and sparseness of form traditionally associated with the chair shape. However, this sense of a weighty, bulky unified form in the *Slice Chair* is uprooted when examined up close.

**Slide 7  Bengtsson slice details**

What appears to be a continuous, vertical surface in Bengtsson’s chairs is in fact revealed to be horizontal layers of perfectly aligned slices. Extremely lightweight at only three millimeters thick, the delicate thinness of each individual slice contrasts sharply with the bulky mass of the chair form taken as a whole. In another point of opposition, Bengtsson undermines the expected functionality of the furniture object by abstracting the chair form so that, from certain angles, it is barely recognizable as such. Bengtsson’s *Slice Chairs* are a study in contrasts, not just in form, but also in his particular mode of construction. Bengtsson has said his inspiration for the chairs was actually the new methods of rapid prototyping or 3-D printing which I mentioned earlier. Those additive methods, where forms are constructed by adding layer upon layer of material, definitely
correspond to the kind of stacking or layering effect Bengtsson is working with here. Let me explain how rapid prototyping works so you can see what I mean.

**Slide 8  Rapid prototyping**

In a nutshell, rapid prototyping allows a designer to develop a new product entirely virtually, on the computer, and then import that digital information into a machine which builds the product for them. It eliminates the need for casting, hand modeling, or molds in the design process because you can create incredibly accurate and complex prototypes directly from a 3-dimensional computer-aided-design, or CAD, drawing. There are no intermediate steps between the CAD model and the finished object. In stereolithography, the most common method of rapid prototyping, the designer begins with a three-dimensional CAD model of an object. Then, driven by that digital file, components are produced by a laser, which scans a bath of photosensitive resin, building the components of the object layer by layer. Essentially, the three-dimensional CAD drawing is broken into *slices* by the computer (as in the diagram on the right), which are then beamed onto the photosensitive resin, tracing each cross-section and turning successive thin layers of the liquid into solid. The solid part remains below the surface of the resin throughout the process because it is resting on a platform that is lowered gradually, allowing the object to be built up in layers.

**Slide 9  More rapid prototyping images (chair)**

*Patrick Jouin, CI Chair, 2007*

So here’s that chair I showed you earlier as an example of an additive fabrication process… you can see it being raised out of the liquid resin once all the layers have been added on, and then upside down in its finished state before the support block has been
removed. Rapid prototyping provides a geometrical freedom offered by no other digital construction process—you can literally create any kind of shape you want, there are no geometric limits. With this construction method, the design process is now entirely digitized and mediated by a machine.

**Slide 10**  Bengtsson construction images
1) Original sketches
2) Hand-formed clay model → Laser scan
3) 3D computer model → digitally sliced in layers

So, how is Bengtsson using these rapid prototyping methods in the construction of his chair? Well, remember I said he is using rapid prototyping as inspiration for his slice chair, and not necessarily in the actual construction of it. In fact, he does NOT use the rapid prototyping method at all. Instead, he uses more traditional materials in a process that mimics the layering, additive process of rapid prototyping, but is anything but “rapid.” Instead, Bengtsson seems to be actively trying to draw out the construction process, using industrial and digital techniques in some instances, but in a way that subverts their possibilities for rapid mass-production. He moves fluidly between hand-crafted and mechanical modes of production in his Slice Chairs. Beginning with drawings and sketches, Bengtsson then adjusted and perfected the chair’s shape by modeling it out of wax into a three-dimensional form.

**Slide 11**  CNC machine
4) Computer Numerical Controlled (CNC): Cutting, laser-cut pieces

After literally slicing the wax model into layers by hand, each slice was scanned into a computer and translated into a CAD drawing. These CAD drawings were then
uploaded into a Computer Numerical Controlled (CNC) cutting machine, which uses lasers to cut out each individual, two-dimensional slice.

**Slide 12**  Assembly by hand
5) CNC cut pieces are then hand assembled and finished

Finally, Bengtsson attaches each CNC-cut piece by hand in his studio, assembling the layers into the final chair form. Thus, while each individual slice is generated out of digital, mechanical means, the initial chair form and the shape of each individual layer is constructed by hand. Alternating between handcrafted and mechanical modes of production, Bengtsson subverts the subtractive formative process of the CNC machine by assembling the layers completely—and painstakingly—by hand in a kind of additive process.

**Slide 13**  Slice Chairs

Bengtsson further undermines the mass-production capabilities of these digital modes of production by using them to produce unique, limited edition pieces. [       ] Through these subversions, Bengtsson deliberately inserts himself and his body back into the industrial production process. Bengtsson explores the design possibilities that can arise from this combination of the hand-made and the high-tech, the craftsman and the machine. Multiplying contrasts and oppositions in his Slice Chairs, Bengtsson’s work asserts that far from restricting the creative process, these oppositions can in fact open up new creative possibilities and generate entirely new forms.
Similarly, designer Jeroen Verhoeven, a member of the design firm Demakersvan in the Netherlands, combines industrial and more traditional craft production techniques in his *Cinderella Table*. Starting with structural studies of several seventeenth-century tables, Verhoeven then used a computer to combine all the drawings into one complete three-dimensional CAD model. The final form recalls this process of amalgamation and synthesis, as from one angle the table appears to have one particular shape, and from another angle the table shape looks completely different.

Much like Bengtsson’s *Slice Chairs*, Verhoeven assembles his *Cinderella Table* in layers, stacking sheets of CNC-cut plywood and adhering them together to build up the table. In its final form, the table appears to be one solid piece of wood with visible wood-grain markings…

However, a closer look reveals that what appears to be wood-grain is in fact a record of the places where the individual slices have been adhered together. Like Bengtsson, Verhoeven is interested in combining more traditional design and construction methods with the latest digital manufacturing technologies. As Verhoeven himself describes his process, “To make the table we used a high-tech method as our new modern ‘craft.’ It is
about the possibility of making something unique with an intelligent machine that is
normally used for mass production.**4

**Slide 17 **Bengtsson and Verhoeven

Both of these designers use digital technologies not only in construction, but also
as inspiration for the creative process behind the designs. Choosing not to use rapid
prototyping in the actual construction of their furniture objects, Bengtsson and Verhoeven
instead use more traditional materials in a process that mimics the layering, additive
process of rapid prototyping, but is anything but ‘rapid.’ These designers control and
manipulate industrial and digital construction techniques in a way that subverts their
possibilities for mass-production. While such digital processes as rapid prototyping make
it possible to fabricate objects at the push of a button without ever having to touch the
construction material, these three design art practitioners are actively disrupting that
process with their work.

In fact, I would argue that they are engaged in a kind of paragone with the rapid
prototyping construction method. Bengtsson and Verhoeven assert the superiority of their
techniques by creating a finished product that mimics the layered, additive construction
process of rapid prototyping, but trumps it in a number of ways. First of all, they use
materials—wood and metal—that cannot be utilized in rapid prototyping, where synthetic
materials such as resin and polymers prevail. Secondly, by creating their furniture objects
in such labor and time intensive ways, where the hand of the artist is needed at multiple
points to move the construction process along, these designers assert the necessity of this

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**4** Jeroen Verhoeven quoted in *Making It: Manufacturing Techniques for Product Design*, ed.
physical connection between designer and object—a connection that is all but lost in rapid prototyping methods.

Ultimately, these hybrid industrial and hand-crafted construction methods are what invest these designers’ work with value. Because their work is produced in limited editions, they occupy the status of luxury items that are only affordable for a select few. For Bengtsson and Verhoeven, and many other designers working in the emerging field of design art, digital production technologies have had a tremendous impact on their work. Many designers are utilizing these new technologies directly and exclusively to fabricate their pieces. However, there are others, like these two designers, who are thinking about digital technologies in more creative ways. For Bengtsson and Verhoeven, digital fabrication methods are just one of many tools that inform their artistic practice: both in the form of actual construction methods, as tools of construction, but also as a source of creative inspiration. These designers are actively engaging with digital processes and using them to inform a new style of craftsmanship—one where the machine can enhance both the technical, and the creative outputs of the designer.

Editions of Bengtsson’s Slice Chair are in the permanent collection at the Contemporary Arts Museum in Houston and the Manchester Art Galleries in England, and editions of Verhoeven’s Cinderella Table have been acquired by the MOMA in New York and the Victoria and Albert Museum in London. While it is not public what these museums paid for the pieces, actor Brad Pitt is reported to have bought a marble version of Verhoeven’s Cinderella Table in June, 2008 at Art Basel for $293,000.5

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