

Plane, Space, Cubism and Perceptual Displacement in 3D Design

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Planar construction in design integrates aesthetics, spatial choreography, structural integrity, folded proportions and relational geometry. As such, I have developed a five-tiered exploration of planes and space to explore these relationships. Specifically examined is the work of one multi-tiered studio project in which students approach, synthesize and construct a variety of complex planar and spatial exercises and fold them into one final sculpture/construction.

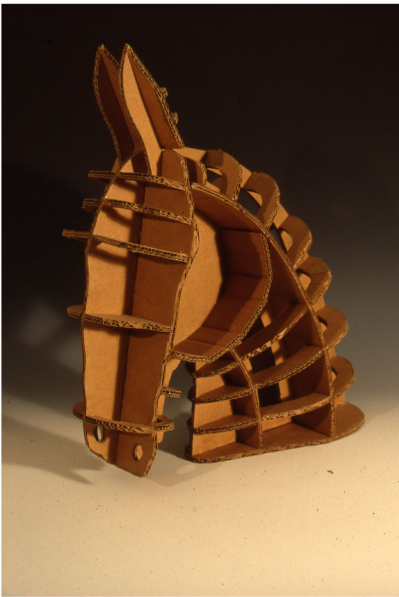
Planar construction is the process by which any form is expressed through planes. The number, shape, character and spatial relationships of the planes are the focus of this project. The formation of this project reflects research that I have conducted in Japan on the nature of folded space in everything from the folding of the Kimono around a body to the folding of Shoji screens to confine and define a space. It also reflects the work of Picasso, Braque, Tatlin and how their explorations grew into modernism and the international style. As such, planes can be engaged as a structural system, proportioning system, measuring system, folding system, visual rhythm system, polyglot rhythmic system, boundary/border/barrier, tool of analysis, pathway for the eye and choreographer of space.

Before addressing the five stages of the planar analysis, students engage in three preliminary exercises. The first, based on the golden section, addresses creating a freestanding structure which both contains and defines space. For this exercise the design operations are limited to folds, tabs and cuts in which no material may be removed. The second exercise is based on the Japanese proportioning system exemplified by the Tatami mat. The guidelines of this exercise are similar to the previous one except all cuts and folds are placed within the formalist grid. The two classical systems are discussed, contrasted and explored in relationship to the exercise. The third exercise consists of constructing five platonic volumes/forms. Once the exercises are constructed, students deconstruct and reconstruct them using deconstructivist techniques to create a sculpture. A discussion of Plato and Derrida follows to highlight their ideas and their relationship to design. Once students have completed the initial exercises and have been exposed to several disparate aesthetics and notions of form, they are ready to proceed to the project. The objective of these preparatory exercises and ideas is to introduce creating a volume through folding a 2D plane. It is also about initiating the play between volume and void and the continuum of inside and outside spaces. Finally, it is about introducing some rudimentary philosophical structures of which this project engages.

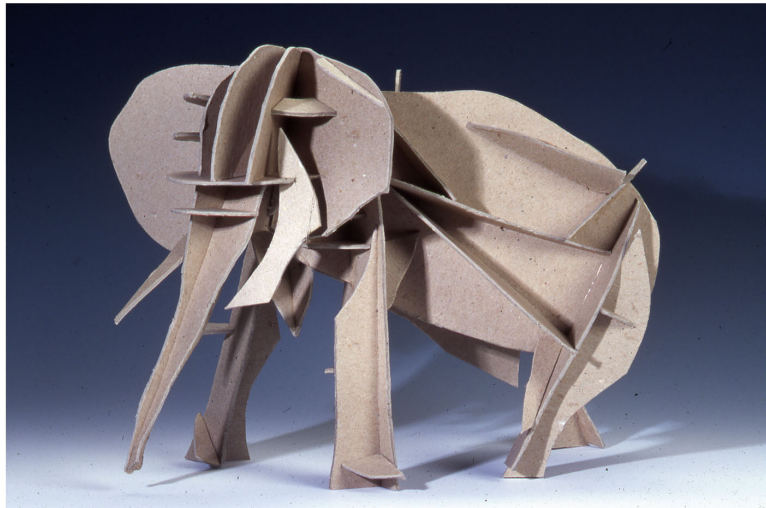
Upon completing the exploratory exercises, students enter into a five-stage process by which they consider the progressively complex interaction of planes and space within a form. The stages and concepts that I have organized to guide students through the process engage an innovative use of planes and spatial expression. The first stage, Encapsulation, is the shielding of a volume with a skin of planes. This is conceptually the most concrete stage and only discussed in preparation for the next stage. Secondly, Rational Ribbed Construction, utilizes an internal rib structure in which the edges of the planes define the external contours of the form. The geometry is perpendicular, hence the label rational. The third stage, Organic Ribbed Construction, utilizes an internal ribbed armature but the planes are assembled and organized in a non-cartesian, fluid and

dynamic mode. The fourth stage, Cubism, utilizes planes as spatial containers and defines a form through the interplay of confined and defined space. The final stage is a hybrid of the previous stages in which multiple creative operations are utilized to engage planes thoughtfully. The visual and spatial complexity of the stages is both additive and increasingly difficult. After students have prepared maquettes of the last four stages, they select one mode for a final project that will challenge their design growth.

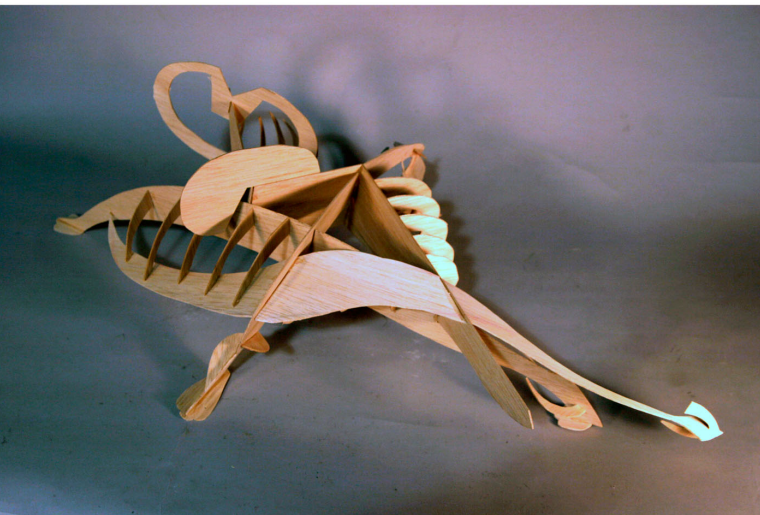
Demonstrated through one studio project are a variety of applications of planes, use of proportioning systems and utilization of design operations as an innovative and rigorous approach to design. Also examined is the perception of space in relationship to math, design, art and science. Illustrated is how planes and space can be seen, understood, developed and integrated in a comprehensive studio.



Rational Rib Construction



Organic Rib Construction



Hybrid Rib Construction



Cubism