A CULTURE IN PAPER

Frank Gehry: paper, pencil & computer

Architectural design methods have profoundly changed after the 1990s. The use of the computer, also thanks to the experience of Frank Gehry, has allowed producing architectural shapes and volumes that seem to defy the force of gravity.

Nico Zardo

"It's not the right angle that attracts me, and not even the straight line, hard and inflexible, created by man. What attracts me is the sensual free curve - the curve that I find in the mountains of my country, in the sinuous course of its rivers, in the body of the preferred woman, in the clouds of the sky and the waves of the sea. Of curves is made all the universe. The curved universe of Einstein." This is how Oscar Niemeyer, ultra-centenarian Brazilian architect who designed Brasilia, commented his work.

Not many people in the realm of architecture have let themselves be so absorbed by curved lines. To find some interesting examples, we must go back to the Barcelona of Antoni Gaudì (1852-1926), to Eric Mendelshon (1887-1953) and his Einstein Tower in Potsdam, to Le Corbusier (1887-1965) and the Ronchamp Chapel. Only at the end of the 1980s some first-rate architects the likes of Santiago Calatrava, Zaha Hadid, Norman Foster, Richard Meier, Daniel Libeskind, Shigeru Ban, just to name a few, by applying digital elaboration to architectural design, have established themselves with "curved" works of fundamental importance. But there is one architect who, perhaps before any other, gave the lines of contemporary architecture a jolt by tracing new forms and defining the necessary production procedure: Frank Oswald Gehry. For Gehry, every object stems from a sketch drawn on a piece of paper. It is just the first of a series of approaches through which the designer specifies, in a path of subsequent, constantly more detailed phases, the formal qualities of the project. The piece of paper in this case constitutes the instrument which – like a mirror – returns the different moments of the elaboration, allowing the creative mind to experiment, verify and compare the different paths and results, and to evolve them. In a documentary film by Sidney Pollack (Sketches of Frank Gehry), Frank Gehry sustains the fundamental importance that the sketch has for him as the originating moment of very complex works. But while the sketches of traditional architects offer a drawing where the architectural forms are rather recognizable, "Gehry's sketches behave like lines of force, like musical scores that suggest rhythms and indicate a direction to follow. They are used to acquaint everyone with a very clear cultural journey in the mind of the person producing it, but at the same time, they identify something very different", writes Monica Bruzzone in her book "Frank Gehry. Architetture, testimonianze" (published by Feltrinelli, 2009).

THE ARCHITECTURE OF FRANK GEHRY (BORN IN TORONTO IN 1929) HAS NOT HAD AN EASY TIME OF IT. Only after the great success obtained with the Guggenheim Museum in Bilbao, those slanted forms that do not resemble anything ever seen before, were accepted (not by everyone) and admired. The secret of their originality lies very much in the capability of the person who conceived them, his story and training. His passion in his younger years for Alvar Aalto, great master of organic architecture, the admiration for the works of innovative architects like Charles Eames, Raphael Soriano, Richard Neutra, his relationship, in the California of the 1960s, with artists such as Claes Oldenburg, Richard Serra, the special predilection for poor materials (metallic netting, cardboard, plywood, corrugated sheets...). And, as he gratefully acknowledges, much is owed to his psychoanalyst who helped him to express himself in a freer manner.

ALL GREAT ARCHITECTS OF THE PREVIOUS CENTURY, from Le Corbusier to Wright, have often accompanied their works by articulated theories on how to conceive the modern man's house, favoring the birth of schools of thought that have influenced entire generations of designers. Gehry, even though inevitably an offspring of modern rationalism, was able to express a deliciously personal, decisively innovative architecture, much closer to the world of an artist following a deep personal intuition. The signs of this way of understanding architecture visibly emerged when, in 1978, he decided to renovate his home in Santa Monica by upsetting traditional volumes, creating openings and skylights that were non-conventional – to say the least – using poor materials. The measure of the incisiveness of the result can be considered proportional to the indignation of his neighbors!

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IN THE 1980S, GEHRY CONSOLIDATES HIS THOUGHT in the design of several large buildings: residential complexes, malls, museums, libraries, increasingly refining and evolving his way of doing architecture that will be fully embodied in the Guggenheim Museum of Bilbao (1991-1997) and in the Walt Disney Concert Hall of Los Angeles (1987-1998). In 1985 he participates at the Biennale de Paris and at the Venice Biennale, participates at the Triennale di Milano Design Museum in 1988 (which this year dedicates a large exhibition to him) and in 1989 he receives the Pritzker Architecture Prize, top recognition for an architect's work.
The shapes that characterize his works are always more complex and increasingly less Euclidean: parallelepipedons suspended in mid-air, pointed forms, angular
structures, geometries that seem to defy the force of gravity, volumes that curve "dangerously".

GEHRY'S DESIGN METHOD STARTS WITH A SERIES OF SKETCHES that are subsequently translated into dozens of models, in cardboard or wood, whose comparison aids in making choices. Once the definitive form is ascertained, he moves on to the execution phase. As standard procedure for the Studio, editing of the executive projects was entrusted to external studios; but in 1988, a mistake made in the interpretation of the original design by the person responsible for executive editing led to a substantial over-estimate of the construction costs of the Walt Disney Concert Hall, causing the brusque interruption of the work (which was later completed in 1998). This fact convinced Gehry to ask Jim Glymph, specialist in project development, to become part of his studio to follow the projects and control the work in the course of every phase.

IN THOSE YEARS, THE USE OF THE COMPUTER WAS LIMITED TO WRITING AND ACCOUNTING PROGRAMS, hence all the projects' documentation was entrusted to drawings on paper. As the forms became more and more complex and the size of the buildings became considerable, the possibility/need to represent and transmit to the builder the necessary information for their realization became increasingly more complicated. During the 1992 Barcelona Olympic Games, Gehry designed a steel sculpture in the shape of a fish, 54 meters long and 15 meters tall. And the need to define the certainty of project data led Glymph, after wide-spanning and meticulous research, to adopt Catia, a software belonging to the French company Dessault, used in the aerospace industry to represent complex three-dimensional objects. Then, thanks to an Italian entrepreneur, Massimo Colomban of Permasteelisa, who was willing to adapt himself to the program, it became possible to "easily" translate the project's data into input for the machines that had the task of producing the structure. The loop was thus closed, and the red thread that started from the sketch on paper could arrive all the way up to the finished work.

WITH NORMAL ARCHITECTURAL DESIGN PROGRAMS (CAD) architects have consolidated a working routine that surely facilitates the operations of building definition, and can maybe even easily obtain three-dimensional representations that allow an aesthetic assessment of the result. But all told, the routine remains the same as when drawings on paper were used. We start with the definition of the building plan based on functional considerations and then move on to the composition of the internal rooms; then, as a consequence of this, to the external facings, making them fall within acceptable aesthetic canons in the given environmental context.

FROM THIS POINT OF VIEW, GEHRY'S ARCHITECTURE CAN CERTAINLY BE CONSIDERED INNOVATIVE, both formally and as far as design method is concerned. Above all, for the fact that the first thing it considers is the shape of the volumes that it wants to give to the new building, working in this phase as if he were a sculptor: first with sketches and then with paper and wood models in different scale proportions, which allow him to make a three-dimensional assessment – something that a drawing can scarcely confer. Following the Barcelona fish experience and the stable addition of computerized routines, the project phase has changed course. The definitive cardboard or wood model is digitally obtained and its forms, often characterized by curved surfaces, become the basis for a computerized 3D model. The structure of the building is created and its external forms are defined. With this data, we go back to a printout on paper of the different plans, for the definition of the internal parts and the details whose results will be put back into the digital project.
In complex constructions, this routine, now followed also by many other architectural studios, allow controlling the design phases as well as making cost assessments. In particularly complex constructions, structures and facings with forms that cannot be represented on a piece of paper, they can be checked on video and digitally "communicated" to the machines that will produce them. It is this latter aspect – the constructive one – that has led several companies to equip themselves with the appropriate instruments to be able to interface, with this working mode with consequent great advantages both for what concerns improved results and cost control.
The clear pluses of these new procedures have led many people to think that ... the computer does all the work and there will be no more need for paper to draw new buildings on. The computer certainly constitutes a determining factor in the elaboration of forms and data, but in reality, we all know that without that first confused and fascinating sketch drawn on a piece of paper, everything else would not exist. •