







## POWER PLAY

The spectacular works filling the turbine halls and walls of the giant Guri Dam are testament to a remarkable creative partnership between architects and artists. By Dubraska Falcón

**When the Venezuelan engineers** Herman Roo and Argenis Gamboa set to work on the hydrographic surveys of the Simón Bolívar Hydroelectric Power Plant, they quickly realized it was a once-in-a-lifetime opportunity. On the site near Angel Falls, the world's highest waterfall, in the country's southern Bolívar state, they were about to make a utopian dream come true.

From the very start, the architects and engineers knew that the project would dwarf anything that had come before. Working with the electrical service and construction company C.V.G. Electrificación del Caroní, C.A. (Edelca), they designed a steel and concrete colossus capable of producing around three-quarters of all the power consumed in Venezuela. The project took 23 years to complete, from 1963 to 1986, and employed a workforce of more than 16,000 people. They created an artificial lake of over 1,600 square miles, and hollowed out thousands of feet of rock for two turbine halls and 20 generators. Now the world's third largest hydroelectric power plant, it is surpassed only by the Itaipú Dam, between Brazil and Paraguay, and China's Three Gorges Dam.

The architects wanted to translate the enormity of the engineering achievement into something everyone could understand. They would pay homage to the monumental proportions of the technological feat by combining it with art, and asked themselves whether they could get the artists to contribute during the actual construction. "In this way," they said, "three hundred years from now, people will say that a sensitive and visionary generation built this structure." Their prescience changed the nature of the Guri Dam (as it was also known), lifting it from the realm of industrial function and fixing it firmly as a milestone in the history of art and engineering.

So who would be worthy of the commission? The architects chose two internationally renowned Venezuelan artists: the painter and sculptor Alejandro Otero, and Carlos Cruz-Diez, known for his kinetic art (art that uses movement). "I felt insignificant when I was confronted with this vast space, where the ground and the walls reverberated with the deafening sound of the turbines," Cruz-Diez recalls. "A challenge on this scale is enough to frighten anyone."

The late Otero was commissioned to design *La Torre Solar* (Solar Tower), a rotating, steel sculpture in the open space close to the plant, while Cruz-Diez, who now lives in Paris, was asked to tackle the two huge turbine halls, through which employees passed 24 hours

a day. Cruz-Diez had previously worked on projects fusing art and architecture, using the urban environment as a canvas. In 1974, he created *Ambientación de Color Aditivo* for the floor of the Simón Bolívar International Airport in Venezuela; that decade, he also produced brightly patterned pedestrian crossings for Sabana Grande, a busy area of Caracas. His explorations of color, light, and movement have also made a mark internationally, with work commissioned for public spaces in France, Spain, South Korea, and the U.S..

Cruz-Diez spent months thinking about how he could bring the Guri Dam's vast space to life without hampering the engineers, technicians, and laborers already at work on the project. He wanted to provide a show of gradually changing colors in a place that offered nothing but vibration and earsplitting noise. "The dimensions were the dominant concern. I thought, drew, and made scale models until I came up with the idea of injecting more light into the walls and creating a structure high in the hall to indicate where the turbines were, in order to make the immensity of the space seem less overwhelming," Cruz-Diez recalls.

He then spent time researching the phenomenon of color and experimenting with a form of his own invention, which he calls "psychromie." A psychromie consists of a series of bands of color that interact with the viewer's movement and with the light source to create new chromatic ranges. For Cruz-Diez, color is something that evolves in time and space, transformed according to the angle from which it is seen.

He began work on the first turbine hall in 1977, covering its 78,500 square feet of wall area with what he calls "additive color." He used seven color planes that, when they touch, create a virtual line that appears darker. The result is that the eye perceives shades that differ from those the artist initially used. In the center of the hall the artist placed ten "chromostructures," each 46 feet in diameter and six and a half feet high. These work on the same principle as the psychromies. Made of glass fiber and supported by circular metallic structures, they stand on top of the power-generating turbines. "I designed them so that they could be moved whenever the turbines underwent maintenance work," Cruz-Diez explains.

The second hall is much larger than the first. On one wall, Cruz-Diez created a 580-foot psychromie in which colors evolve according to the viewer's vantage point. He also added ten chromostructures, as before pointing out the location of the turbines.

As a testament to the scale of the collaboration between architects, engineers, and artists, there was never any question about opening the Guri Dam to the public. From its inauguration, there have been tours of the engine rooms and the artwork, as well as

**"THERE'S A HUGE DIFFERENCE BETWEEN PAINTING A PICTURE IN YOUR OWN STUDIO AND A WORK OF ART OF THIS SCOPE"**

Previous pages: Cruz-Diez's *Ambientación Cromática* (Chromatic Environment), 1977, fills the first of the plant's two turbine halls. Opposite: in the center of each hall are 10 great "chromostructures." Made

of glass fiber, they stand above the power-generating turbines (top); Guri Dam's second hall features a 580-foot mural and a "chromosaturación" – a wall of colored light controlled by visitors (below)

views of the spectacular waterfalls. Always aware that the turbine halls resemble a vast gallery, Cruz-Diez placed an installation in one: a "chromosaturación," composed of a wall of color lit by over one thousand red, green, and blue lamps. Here, color appears in its purest, most intangible form – light. On the mezzanine, a control desk with three buttons allows visitors to manipulate the chromosaturación to create an enormous range of colors.

Creating the "chromatic environment" for the turbine halls of the hydroelectric plant project took a year to complete. "It wasn't a picture or a sculpture; it was a massive undertaking," Cruz-Diez recalls. "There's a huge difference between painting a picture in the privacy of your own studio and a work of art of this scope." From an artistic point of view, he explains, the scale itself was the biggest challenge. It required not just creativity but the ability to plan, schedule, set budgets, manage people from a range of backgrounds and areas of expertise – and keep the paperwork in order. (Cruz-Diez's assistant was responsible for the mathematical calculations required to establish the exact dimensions for each strip of color.) "You must act with sufficient clarity and authority so that no one tries to change what you have set out to do or play around with your ideas," adds Cruz-Diez.

As an artist, he is capable of clearly visualizing how a completed piece will look. What still surprises him about the Guri Dam project, though, is that a work of this nature ever came to fruition. It is a work on an almost unheard-of scale that is distinct in international contemporary art for its sheer size. It is also the perfect expression of Carlos Cruz-Diez's kinetic principles.

It is now almost 27 years since the Simón Bolívar Hydroelectric Power Plant was inaugurated and five of the 20 generators are now not in use, but visitors arrive every week to be shown around the plant by employees. Also, the project was the focus of a 2004 exhibition in Caracas entitled *Carlos Cruz-Diez: Guri Art*. Susana Benko, the curator of the exhibition at the Museum of Print and Design, remarked: "To create a building in which art, architecture, and engineering are integrated without losing sight of the kinetic assumptions that sustain all Cruz-Diez's work deserves great admiration and recognition. Venezuela has the privilege of holding this major work, unique in the world." ❖

*Translated by Isabel Varea*

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