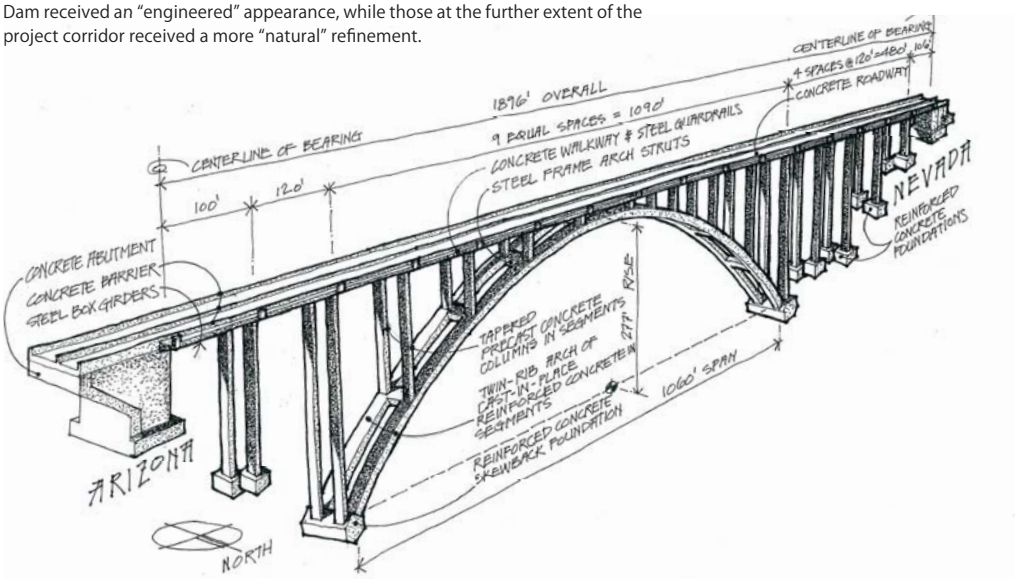
DESIGN PHILOSOPHY OF THE BYPASS CORRIDOR

The Project's Corridor Design Manual presented principles for combining design aesthetics with efficient structural engineering to assure that the design excellence of today would honor that of Hoover Dam in its day.

The Mission Statement called for delivering a cost-effective facility of the highest quality that is aesthetically pleasing; sensitive to environment, culture and history; that functions as intended; and is a source of pride to the nation. The Aesthetic Philosophy abides by the motto "form follows function." The design of project features was defined by appropriate engineering solutions as enhanced by architectural refinements to create a cohesive, coordinated corridor character. Furthermore, the corridor contains landforms in a natural state and as well as modified by humans. The aesthetic approach to the new Bypass designs responds to the differing conditions. Thus, slopes, retaining walls, and structures near Hoover Dam received an "engineered" appearance, while those at the further extent of the project corridor received a more "natural" refinement.

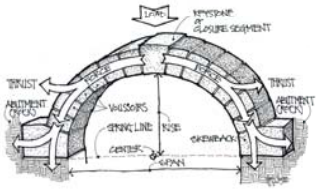


DESIGN THE DREAM
with Science & Art

THE SCIENCE OF ENGINEERING

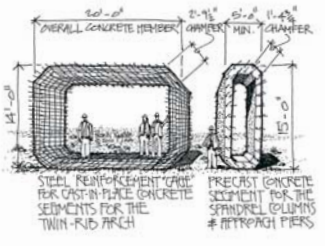
The engineering solution for the River Bridge responds to the same unchanging principles of physics addressed at Hoover Dam while using the latest advances of science in construction methods and materials.

The arch shape of the bridge spanning the canyon employs the same structural principles that the dam uses in holding back the lake. The upright bridge arch transfers vertical gravity forces downward into the canyon walls; the reposing dam arch transfers horizontal water pressure sideways the same way. The geometric symmetry of the arch balances the loads at both ends while locking together the tapered blocks composing the arch. Unlike the heavy, solid concrete dam, the lightweight bridge was built of hollow members combining steel and high-strength concrete. The off-site prefabrication of those members decreased the construction time and costs.



SCIENCE of the ARCH

THE ART OF ARCHITECTURE

The architectural refinements of the River Bridge structural elements complement the twentieth-century Modern character of Hoover Dam by creating artistic forms that express structural functions.

The shapes of the arch and column segments demonstrate how the engineers and architects blended science and art. To satisfy the functional need for a lightweight bridge structure, engineers developed a system of open box segments for the arch and stackable segments (like hollow building blocks) for the columns of the River Bridge. In detailing these enormous reinforced concrete units, the designers met structural and architectural needs by chamfering (cutting off) the corners of the rectangular segments. The chamfered edges are stronger than square corners and help "shed" the wind. The also create artistic highlighting of the bridge members in sunlight. This one seemingly simple detail unites the complexities of science and art.