

The High Bridge over the Mississippi River in Minneapolis-St. Paul, designed by T.Y. Lin, was completed in 1983.



## Aesthetics and Economics: Which First?

T. Y. LIN

**M**OST OF THE ANCIENT ARCH BRIDGES that still survive are graceful and beautiful. Economics was seldom, if ever, a formal consideration in the design of these structures. Bridges built of stone slabs and timber planks, though probably quite economical, were hardly considered works of art. Since the Industrial Revolution, however, roads and rivers have demanded many crossings. Engineers in a rush to build spans to meet this demand and limited by costs and budgets focused only on economics so as to be able to build more bridges. Although beautiful structures, such as the Golden Gate Bridge, were occasionally constructed, by and large bridges were standardized for economical mass production and engineered to serve functional purposes without regard to aesthetics. Engineers were often proud not to waste money on appearance and ornamentation.

Recently, the public has begun to demand more graceful bridges consisting of more than concrete beams and steel girders. Engineers are now often expected to improve structures both environmentally and aesthetically without destroying urban and suburban natural beauty. Some engineers, however, believe that aesthetic bridges are incompatible with economical design, and fail to realize that modern technology can in fact help produce space and forms that are both beautiful and economical. In fact, aesthetic bridges attained through technology

frequently represent the most economical designs as well. Therefore, the question is not which comes first—aesthetics or economics; rather, both can be achieved simultaneously.

An example is the proposed Ruck-A-Chucky Bridge over the American River in Auburn, California, which would span 1,300 feet on a horizontal arc across a 450-foot-deep waterway to be created by the planned Auburn Dam. Originally, a straight bridge was considered, requiring two tunnels, one at each end, piercing into the hillside and turning out. The proposed curved design would enable the route to follow contours without the two tunnels, thus achieving great economy with a beautiful formation of cables.

Another example is the High Bridge over the Mississippi River in Minneapolis-St. Paul, completed in 1983. The site naturally accommodates a high arch, permitting navigation. As a result of post-tensioning of the bridge deck with steel cables, the center span of 500 feet is flanked by two half-arches, joining smoothly into the approach spans. This winning design was selected from among 18 competing concepts, being deemed the most aesthetic while costing no more than the other designs.

Unfortunately, the coincidence of aesthetics and economics does not occur with every bridge. On some occasions, a good-looking bridge will cost more, or the most economical bridge will look cheap. In such cases, it is necessary to seek optimum solutions considering both aesthetics and economics—not deciding which comes first, but spending the necessary money to attain the aesthetics judged to be worthwhile.

---

*The author is chairman of the board, Lin Tung-Yen China, Inc.*