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Interview with Lead Architect
Rivka Night, AECOM

Q: What was your impression of the bridge design Andrew Leicester had developed when you first saw the sketches he provided for the project?

RN: I had the same the reaction as everyone when they first saw it—wow!—because it is very unusual and not at all a traditional design. My immediate thought was, 'is it really going to be constructed out of concrete?' It seemed that it might be a very complicated construction because of the unusual shapes.

It is not often that an architect is asked to collaborate with an artist on a bridge. Since I was just completing work on the Gold Line stations in East Los Angeles, where every canopy was unique and every platform had artwork, I thought this bridge project was a natural continuation for me, and very exciting.

When I first met Andrew, we spent a whole Saturday touring the Gold Line, looking at those individual station designs and talking about how my moving from the stations to working on his large-scale artwork with its architectural and structural elements was so exciting.

Q: What is AECOM's role in the project?

RN: AECOM was responsible for ensuring that the bridge design met the structural and maintenance requirements of the project stakeholders (the Construction Authority, Metro, and Caltrans) and that Andrew's original concept was implemented. To accomplish this, AECOM formed a team that consisted of Patrick Nicholson, the project design manager, as well as the company's structural and civil groups, landscape designers and me as project architect.

As the project manager, AECOM also developed the scope and budget for the entire project and provided the single point of contact for all the principles in charge (including coordinating with multiple agencies, the builder, Skanska, and the design team). Since this was not a traditional Caltrans bridge, we worked very closely with them and kept them informed of the construction technology. The plan went through considerable scrutiny to ensure its safety and constructability.

Q: What were some of the challenges?

RN: As the project evolved, the design binder became thicker and thicker. I looked at the first sketch I received compared to what was built, and it went through a lot of changes, specifically how we treated the different surfaces and how the top of the baskets and the reeds were handled. These went through several transitions once we applied constructability. It took a slightly different path after that, but we stayed very close to the original design. That was our goal. From the initial concept to the final design, you can see the

path of adaptation of art to the structure being buildable, functional and structurally safe. The final goal was to achieve a successful "marriage" of art and engineering.

To be more specific, there were many interesting creative challenges. Andrew and I worked together in front of the computer to see how the different elements of the design complemented each other. The reeds and the grooves on the columns are one continuous vertical line. It was our goal to make it one smooth piece. Each basket has nine horizontal layers and is connected by a horizontal piece called the "bent" which is supported by the two columns. We took the horizontal layers of the baskets and blended them into the horizontal bent, so those layers are consistent.

The reeds in the initial sketches were tall and skinny, and they couldn't be built like that due to structural considerations. The baskets needed to be larger because of seismic requirements, therefore they became wider, and the support columns became wider. During construction, it was determined that the tallest reed needed to be shortened by one foot. So, I went back and shortened everything else. There is a magic line that goes from the tallest reed to the shortest reed, and everything around it proportionately goes along that line.

Finally, Caltrans was initially reluctant to allow the grooves under the superstructure. They are used to smooth surfaces and it took a lot of back and forth to work through their concerns. In the end, Caltrans agreed to do it, and you have to give Skanska a lot of credit. There is a lot of unconventional detail in that bridge, and it is done manually.

It was really great working with Lawrence Damore of Skanska. He was very understanding and willing to "push the envelope" to accommodate the unusual design. The whole team was great. Even Andrew said he was pleasantly surprised how the design process had actually allowed the design to improve. It's not like he had an unshakable mind set with a specific end result. He let it evolve. Ultimately, it's about collaboration, particularly on a bridge project of this kind.

The entire process worked well, and although a few of the design elements needed to be augmented, the end result is a beautiful design that works for all project stakeholders.

Q: Andrew mentioned how crucial your advice and skills were with all the complex computer drawings and calculations in realizing the final built form. Tell us how CAD software added to the success of the process?

RN: I was charged with translating Andrew's concept of basket-designed columns and curved shapes into a buildable superstructure. The great thing about computers is that when you do a 3-D model, you can change the angle, rotate it and see how the light impacts the design. The visualization process is a lot easier. You don't have to build a physical model. CAD makes it much easier to change something without having to build another model. CAD was very instrumental in checking the accuracy and creating the right profile.

I integrated the various parts of the bridge using CAD to visualize it from many different angles, creating a harmonious structure with continuous lines, both horizontally and vertically for the curved profile of the basket and the horizontal wave on the face of the bridge. The technology enabled us to take a conceptual design through to final construction.

CAD changed everything. It sped up the process. It gave us unlimited possibilities to visualize what we were trying to do. When we do station design, we use it to detect any conflicts on the computer so you eliminate a lot of costly problems in the field. You can anticipate those issues before something is built.

Another great thing about CAD is, once you create the design, you can share those files when you need to get shop drawings, and you don't need to start from scratch. I give the engineers my files, and they build on that. There's a lot of cost savings. Not only did we create shop drawings from the basic CAD files, but we gave files to the person who does renderings. It's a basis for a lot of development throughout the process.

Q: **We are surrounded by huge monolithic structures every day and I am sure engineers find them beautiful in their own way. However, the average person may not see that. Andrew hoped that the Gold Line Bridge design might start a paradigm shift for bridge building in California. After working with an artist on the bridge and seeing the results, what are your thoughts on this possible paradigm?**

RN: I hope this could prove to be a shift. If you Google *iconic bridge,* you can see many beautiful bridges that have been built around the world. It's all in the hands of the client. The artist can present ideas and promote the creative possibilities in bridge design, but the bottom line is: how willing is the client to go outside the norm. I'm glad the Construction Authority took that chance with the Gold Line Bridge.

Habib Balian wanted a sculpture, and that was great. One of the best things about the art program with the Construction Authority is their dedication to investing in art. When I heard they were creating a bridge as an artwork, I thought it was wonderful and was delighted to be invited to work on the project. It was the ultimate professional experience to be so creative and contribute to the aesthetics of the bridge. Working on the bridge was an unusual opportunity and a very gratifying experience.

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