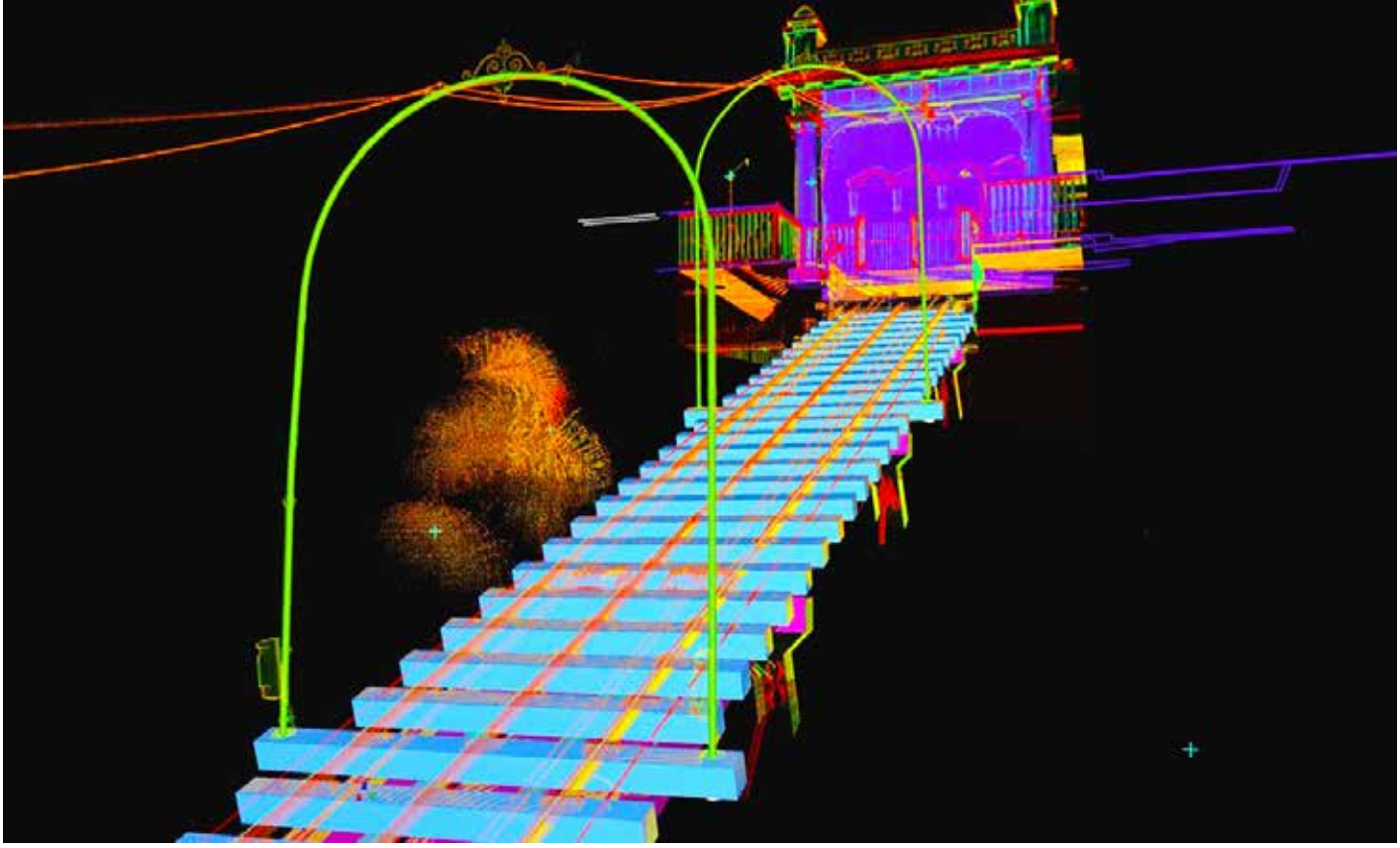
HEXAGON

CASE STUDY

SETTING THE WORLD‘S SHORTEST RALWAY BACK ON TRACK

As a passenger, a railway is meant to bring us to our next destination. This funicular, however, is meant to bring us back in time. Angels Flight – the world’s shortest railway standing at 99 metres in length – is an iconic landmark in the Bunker Hill District of downtown, Los Angeles, USA. This tourist novelty has carried more than 100 million passengers along its hillside track since its opening in 1901.



This city landmark, featured in more than 20 films, was last closed in 2013 due to safety issues. To carefully restore Angels Flight, Rick Engineering Company (RICK) supported the project with specialised 3D laser scanning.

RICK is far from your average engineering company. Founded in 1955, RICK has 63 years of experience, 280 employees that span across three states, and several multi-discipline specialties that, together, have completed more than 10,000 projects.

RICK's qualified experts understand that designing excellence begins with a comprehensive understanding of the existing conditions. This requires capturing the as-built conditions in a digital way, via 3D laser scanning, to leverage the construction process with smart data that is visual, actionable and interconnected. To bring back to life this iconic landmark, the site structure and railcars, named Sinai and Olivet, were captured with the Leica P40 ScanStation. The 3D CAD models, dimensioned exhibits, and interactive 3D maps obtained from the point cloud enabled the steel fabricators, Paramount Metal & Supply Company, to create a design to modernise both elements.

WHAT DO LASER SCANNING EXPERTS AND GOATS HAVE TO DO WITH IT?

Seemingly, the 99 metres of railway would be an easy fix, although projects of any size can present unforeseen challenges.

Before capturing the funicular, the site needed to be trimmed in a "green" way – goats, famous for eating noxious weed, were recruited for the job. It took nearly two weeks for 26 goats to eat all the weeds that grew during the four years of abandonment.

Once the noxious weed had been cleared and 26 scan points had been identified, two technicians set up the P40 ScanStation to measure with millimetre precision 1 million points per second. The generated point cloud was used to compile and deliver a 3D CAD model with an interactive 360° digital reality environment of the Angels Flight structure.

VISUALISING THE BUILT ENVIRONMENT TO ENHANCE DESIGN AND CONSTRUCTION

The client, contractor, alongside the design team and City, gazed at the photorealistic, interactive 360° digital reality model RICK created with Leica TruView. The software allows the project team to view and share data online which reduces site visits and offers an interactive navigation option.

"L.A. stakeholders didn't want the aesthetic structure to be tarnished and required that the new additions could be removed for movie production. TrueView offers just that: a true view that allowed the customer to see how the design would look like. Seeing the data with TruView, you will feel like you are on-site," said Brian Laird, manager for RICK.

RICK was able to quell any concerns through a TruView simulation, superimposing the new stair structures into the existing railway. Even more so, the Truview platform allowed RICK's laser scanning experts to:

- Show samples of the work to facilitate the procurement;
- Have a dimensionally-correct web view for the customer where the deliverables are actively demonstrated;
- Have a virtual tour where project partners could view, pan, zoom, measure, and markup; and
- Visualise the differentiating design alternatives including a design with installed stairs and a safe exit route in case of emergency.

After the first presentation with TruView, Paramount Metals requested technicians from RICK to add their proposed CAD designs of model alternatives into TruView. The CAD experts inserted the client's model to test and verify the design concepts. The professionals converted the polyface mesh, from a building information modelling software, into a 3D solid model using Leica Cyclone 3D point cloud processing software and published the models to TruView. Shortly after, all project stakeholders could visualise the design prior to construction.

A RICK laser scanning extraordinaire stated proudly: ***"By using the most updated and real-time technology, RICK has provided a great service for the client, which saves time and money,"*** said Jose Gonzalez.

"RICK delivered an accurate model of what is out there so the client will be confident with their final design without having to second-guess themselves."

"Visualisation of the built world continues to pay dividends during design and construction," concluded Laird.

JOIN US FOR THE RIDE

cFusing the real world with the conceptualised design in a virtual, photorealistic, and animated environment are tools to engage customers and collaborate with stakeholders while simultaneously constructing great buildings, spaces and structures more efficiently. Laser scanning, along with software solutions, allows teams from varied disciplines to access smart digital realities in intelligent ecosystems, just like TruView, that are user friendly, interactive and accessible.

Angels Flight opened for a single day in 2016 to capture a scene for the film "La La Land" where Ryan Gosling and Emma Stone exchange a kiss in the historic funicular. Thanks to the summed restoration works and RICK's 3D laser scanning services, locals and tourists alike can now step back in time into an orange, one-way, railway car for only a dollar.

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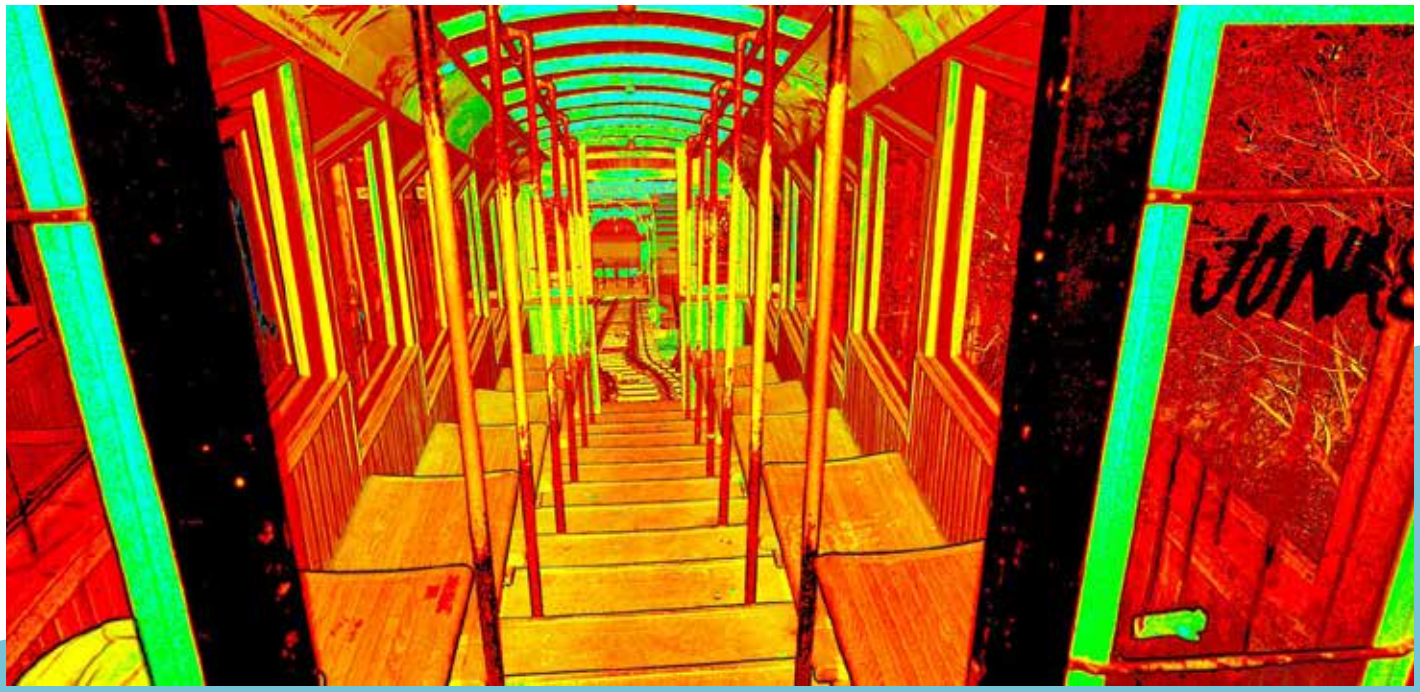
For more information, visit **railways.hexagongeosystems.com**



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