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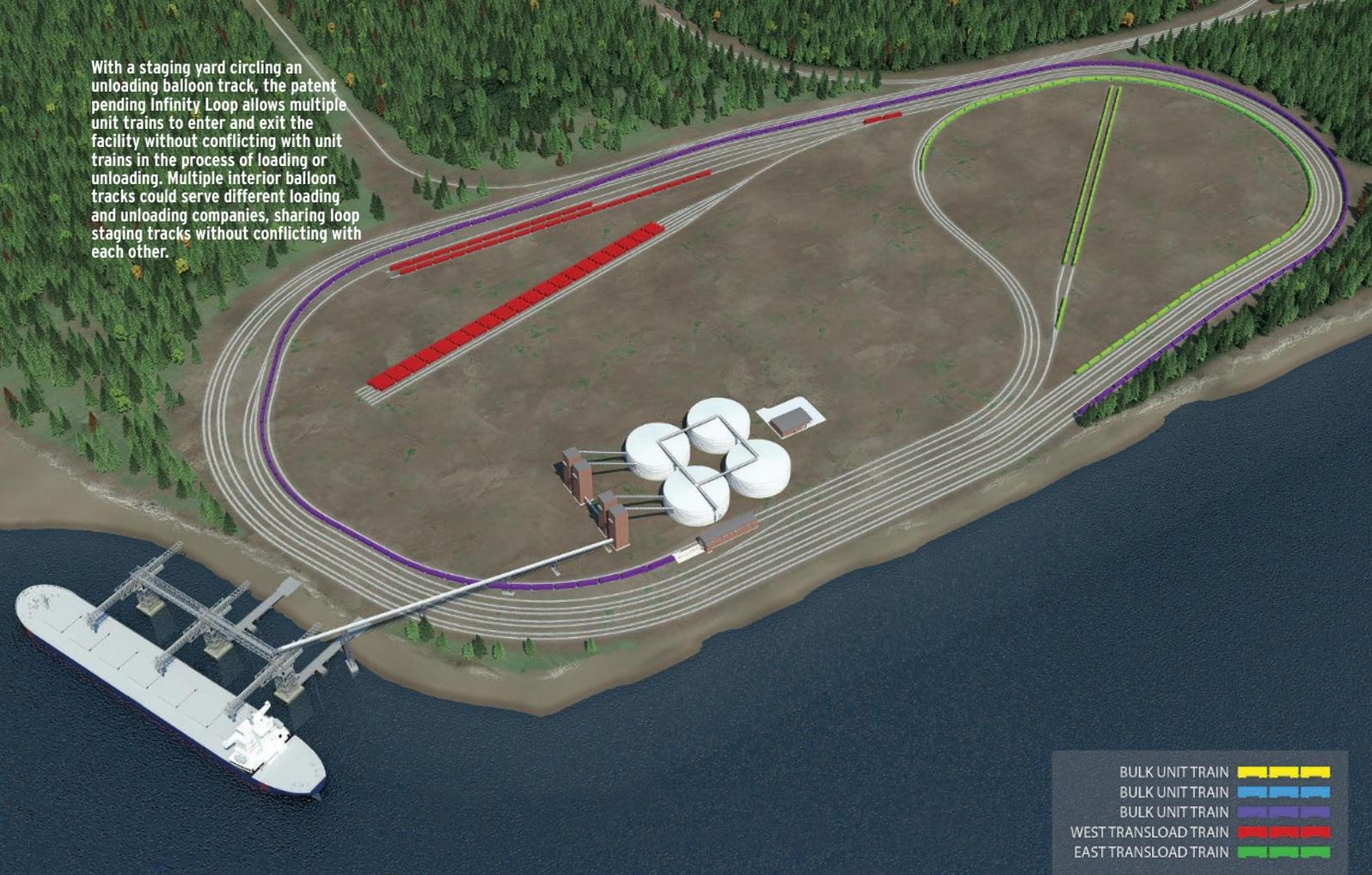
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With a staging yard circling an unloading balloon track, the patent pending Infinity Loop allows multiple unit trains to enter and exit the facility without conflicting with unit trains in the process of loading or unloading. Multiple interior balloon tracks could serve different loading and unloading companies, sharing loop staging tracks without conflicting with each other.



BULK UNIT TRAIN	Yellow
BULK UNIT TRAIN	Blue
BULK UNIT TRAIN	Purple
WEST TRANSLOAD TRAIN	Red
EAST TRANSLOAD TRAIN	Green

HDR'S REVOLUTIONARY DESIGN MADE THE IMPOSSIBLE SIMPLE

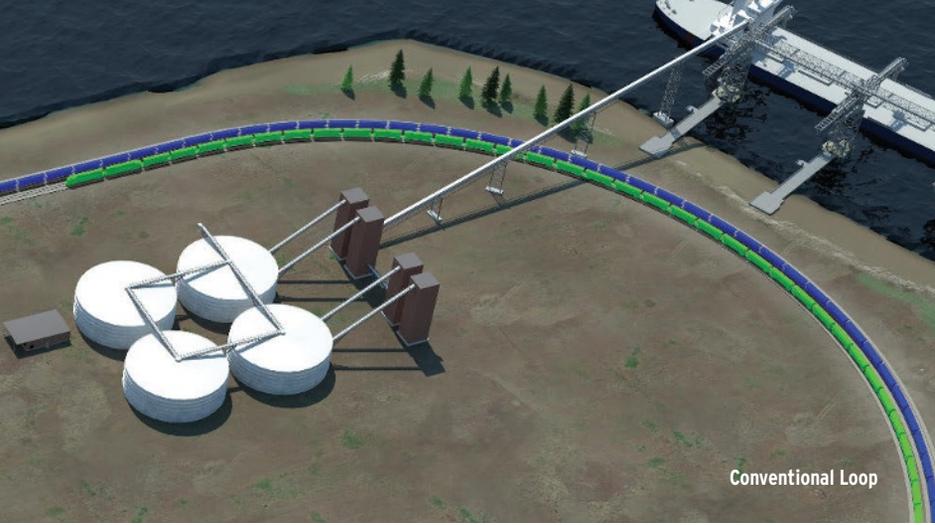
Infinity Loop could change the way bulk freight trains are processed

BY GERRY DONOHUE

On the face of it, the client was asking for the impossible. They wanted HDR to design a loading and unloading facility that could process eight 8,500-foot unit trains per day on a site that would be hard-pressed to process four per day. Furthermore, the facility was hemmed in on all four sides by a river, an industrial site, a capped contaminated site, and a state highway.

“Our initial configurations were sprawling and involved moving the highway and a whole bunch of other things,” says Kurt Reichelt, vice president at HDR. “We looked at each other and asked is this the best that we can do?”

The answer to that question was a resounding no. Within a few days the team developed a revolutionary design concept that met all the needs of the client and could fundamentally alter the way bulk freight trains are processed in the future.



the railroads and the shippers to minimize transportation costs.

At the origin and destination sites, shippers and receivers routinely use one or more loop tracks to load and unload the commodities. The tracks are arranged in a circle large enough to accommodate an entire unit train. At the throat area, crossover tracks allow trains to enter the loop from the mainline, offload their material, and return to the mainline.

While loop tracks are used at hundreds of rail terminals around the country, they have several critical drawbacks. Current designs cannot efficiently accommodate multiple unit trains

“When we completed the first schematic, we thought it was too good to be true,” says Paul Weber, senior rail project manager at HDR, who, along with Reichelt, has a patent pending for the new design. “We thought there had to be a flaw somewhere, but there was not.”

UNIT TRAINS AND LOOP TRACKS

Railroads are a primary mode of conveying commodities and other goods in the United States, and since the 1960s, a key component of that system has been the unit train. Unit trains transport a single commodity between a single origin and destination for a single shipper. Typically 100-plus-cars long, unit trains allow

arriving and departing while processing is taking place. Terminals can build additional loops, but that requires more acreage and track, and there are inevitable traffic conflicts. Trains cannot navigate independently of other trains in the facility because the throat and crossover track arrangements require they cross paths. Furthermore, because the loop is designed to be the length of a single unit train, the interior cannot be accessed without grade separations or multiple, strategically located at-grade crossings, resulting in significantly underutilized property. Finally, if the train needs to leave the loop in the direction from which it came, the locomotive must be moved from one end to the other, further congesting the facility.



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“Our client had never seen anything like it. Once we explained how it would operate and the

benefits of it, they were on board.”

KURT REICHELT
VICE PRESIDENT
HDR

The Balloon Loop, which was introduced in the 1990s, solves one of those problems, allowing the train to turn around without switching the locomotive from one end to the other, but the design requires a separate yard in front of the loop to stage trains upon arrival or before departure.

THE INFINITY LOOP

Facing the size constraints of the client’s site and the problems of the conventional yard designs, Reichelt and Weber came up with an innovative solution. They designed a staging yard with eight loop tracks, spaced 15 to 25 feet apart, and inserted a balloon

loop loading and unloading track in the interior.

“The staging yard with an interior unloading balloon track connected by a dual lead effectively forms a linear path ‘Infinity Loop’ design that allows multiple unit trains to enter the facility without conflicting with a separate unit train in the process of loading or unloading,” Reichelt says.

Unit trains now can be loaded or unloaded in succession, following the same path from the outer-loop staging tracks onto the balloon track, through the loading and unloading facility, and then either depart to the main line directly or return to the outer-loop staging tracks for later departure, never crossing paths with any other trains.

“Our client had never seen anything like it,” Reichelt says. “Once we explained how it would operate and the benefits of it, they were on board. They were excited about getting the throughput on such a small site.”

“The railroad also had to buy into it,” adds Weber. “When we presented it to them, I do not know if ‘shocked’ is the word, but they were pretty amazed about how it worked. It solves a lot of the problems they have been dealing with for many years.”

Because of its revolutionary design and potential impact on the nation’s freight transportation system, HDR’s Infinity Loop received a Grand Award in ACEC’s 2019 Engineering Excellence Awards. ■

Gerry Donohue is ACEC’s senior communications writer. He can be reached at gdonohue@acec.org.

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