

# WITH CRANEMASTERS THE IMPOSSIBLE IS POSSIBLE

Cranemasters dismantles the old Tower 55 diamond in Fort Worth, TX, and lifts the new diamond—a massive 3x2, 126'-2" by 93'-9" 252,270-pounds interlockings—and moves it in one piece to 1/8" to 1/4" tolerance in just 15 hours.

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# Historic Tower 55 Crossing Gets a Lift from Cranemasters

Everything is bigger in Texas, including Tower 55, one of the nation’s largest, busiest track diamonds. It’s a six-diamond set with three north-south and two east-west tracks forming a critical junction of the Union Pacific (UP) and BNSF—North America’s two largest freight railroads. Over 100 freight and passenger trains pass through it daily, with Tower 55 connecting freight and passenger travel between the West Coast, Southeast, Midwest, Gulf Coast, Mexico, and Canada.

With so much traffic, scheduling a time window acceptable for all carriers is nearly impossible. The proximity of six diamonds beside each other—with limited room to maneuver and work—also makes maintenance exponentially more difficult.

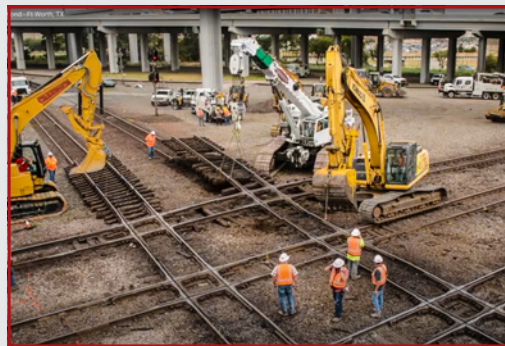


The typical approach for replacing interlockings is to do one diamond at a time because they are cumbersome. However, replacing one diamond a day would take six days to replace Tower 55. That would be incredibly disruptive, creating delays across North America. So UP decided to replace the six-diamond set all at once, swapping all six simultaneously. But could it be done?

## Project

### Fort Worth, Texas Tower 55 3x2 Diamond Replacement

A massive 3x2, 126’-2” by 93’-9”, 252,970-pounds diamond lifted and moved in one piece.



WATCH THE VIDEO  
OF THIS AMAZING TRANSFORMATION

### Deployed Equipment

- Four 200 RS 100-ton cranes
- One Dozer
- Three Trackhoes
- Three Loaders
- One Roller
- Ten Light Plants
- Three swamp mats

### Crews

- Chicago
- Kansas City

### Scope of work

Replace 3x2 Diamond, 126’-2” by 93’-9”, 252,970-pounds in one piece



Lifting and moving the new 3x2 diamond in place to within 1/8" to 1/4" tolerance

## Cranemasters' Solution

### Unprecedented Magnitude

One option was to use an enormous overhead crane with a heavy counterweight, but UP decided to engage Cranemasters for several reasons:

- It would take approximately 10 days to transport a huge overhead crane to the site.
- The site was located among a labyrinth of highways and overpasses just south of downtown Fort Worth, making access and setup impractical for a huge crane.
- Cranemasters could mob four of their 200-RS crawler cranes onsite within 24 hours and maneuver underneath the overpasses.
- As experts in lifting non-standard loads, Cranemasters' innovative purpose-built heavy-lifting equipment was more maneuverable and safer for this mammoth job.

- Finally, confidence in the capabilities of the crews and equipment was a primary consideration. It had to be done safely within a short timeframe. Cranemasters' proposal made sense, and UP has always found Cranemasters to be transparent and honest about what they can or cannot do. They could trust Cranemasters.

### No Margin for Error

With smaller diamonds, it's possible to cut them out and lift them to the side. If something goes wrong while placing the new diamond assembly, the old one can be put back in quickly. In this case, the existing 3x2 diamond had to be dismantled in pieces, eliminating any contingency plans.

What if the new 3x2 diamond was damaged during the lift—a risk if it started swinging and twisting? It would take a month to custom-fabricate another diamond like it. The only option would be to put back the 3x2 diamond that had just been dismantled, ripped out, and dragged to the side in pieces.

Having to reassemble it would take at least another 24 hours. Straight-railing was not an option because it would sever the north-south or the east-west bound traffic. With so much at risk and no plan B, there was no margin for any mistakes or mishaps once they tore out the old diamond.

Once someone made the first cut, the work had to go as planned and finished within the curfew. Otherwise, traffic would be backed up nationwide across the main line from New Orleans to Los Angeles and Canada to Mexico.

### Cranemasters Strategic Systems Operations™

After reviewing the original schematics and specifications, Cranemasters' Strategic Systems Operations engineering team went to work. They identified and custom-designed equipment and developed an innovative approach for replacing the massive diamond weighing 187,000 pounds.

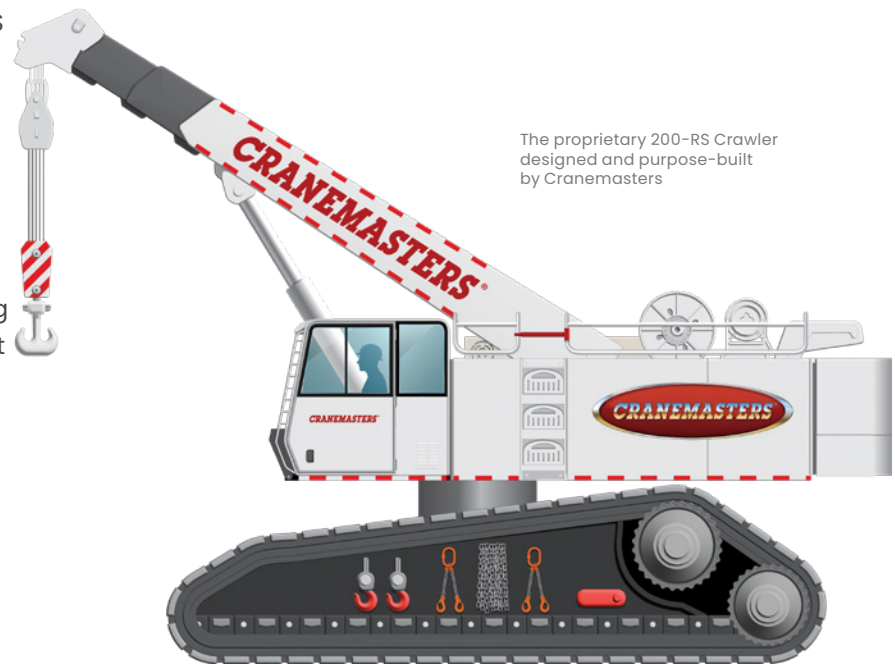
The team determined it would require four of Cranemasters' 200 RS 100-ton crawler cranes with extra-wide lift beams that Cranemasters designed and custom-built for the project.

A primary consideration was keeping the massive diamond perfectly level and preventing flexing or twisting while lifting and moving it into position. The custom lift beams were tethered to each other to maintain a constant width between them to avoid drifting apart. The engineering team also determined precisely where to position the four crawlers, where to set the rigging and the exact position of 32 pick points on the six-diamond set.

After the onsite crew reviewed the work plan and had a safety briefing, Cranemasters moved its 200 RS cranes in position, placing swamp mats across the rails to walk them to the middle of the crossing. UP made more than 20 torch cuts around the existing diamond. Cranemasters used their cranes, bulldozers, and backhoes to remove it before grading the surface for the new diamond.

Cranemasters oriented the cranes, setting rigging and pick points according to the engineering team's details. The result was a perfectly executed plan as Cranemasters kept the 3x2 diamond panel level while lifting and moving it into position. The new diamond was set well within the tolerance of one-eighth to one-quarter of an inch..

Once surveyors lined the diamond, UP cut off the overlap and tied in the joints. Cranemasters applied new ballast to support the UP surfacing crews, who tamped the diamonds to achieve finished elevation and alignment. Then, the signal department began wiring and testing.



The proprietary 200-RS Crawler designed and purpose-built by Cranemasters

## Results

The dimensions of the complex track structure that Cranemasters lifted to replace Tower 55 were 126'-2" by 93'-9", 252,970-pounds. This was significantly larger than the original specs because additional panel rails needed to space the insulated rail joints further out were welded to the 3x2 diamond. Doing this before the lift expedited the installation process.

If there had been a disruption with 100 trains needing to move over the diamond, it would have caused costly delays and a backlog extending well beyond Texas. Instead, Tower 55 was replaced without incident within the 15-hour curfew from noon to 3 am. Cranemasters had completed the massive job efficiently and safely, as promised.

I would've never thought it could be done. Typically, you do one diamond a day. But there are very few places in the country with that much traffic. So, it had to be done in one shot. There was no plan B. Just one mistake would have been a disaster.

In our industry, it's pretty simple. Be safe. Be transparent and do what you say you're going to do. It's one of the reasons we work with Cranemasters. They're more like a partner than a vendor."



**Shane Keller**  
 Sr. Vice President  
 (retired)  
 Union Pacific Railroad

**CRANEMASTERS®**  
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