

CONSTRUCTSIM HELPS CIANBRO COMPLETE SUCCESSFUL REDIRECTION

By Dale Granger

SUCCESSFULLY retraining 500 redundant and unskilled workers to build the largest refineries in the United States at a transformed, abandoned paper mill plant, won Cianbro Constructors a top international award at the Bentley's, Be Inspired Symposium and Awards Ceremony in Charlotte, North Carolina.

Cianbro took on a tough challenge after being awarded the contract to build 53 giant modules of the Moltiva Expansion Project in Port Arthur, Texas - shipped by barge from Maine to the Gulf of Mexico where it increased production by 350 000 barrels a day.

Besides retraining the workers, the company also introduced key personnel in the project, notably engineers, master riggers, steel superintendents and iron workers, to Bentley's ConstructSim 3D visualisation software that was used to plan and monitor progress.

Finalists in the innovation in oil and gas category included the \$5 billion Tangguh LNG facility in Indonesia, owned by British Petroleum, and CNGS Engineering's design of the LAM-B Wellhead Platform in the Caspian Sea.

Jurors Tom Fisk and Dave Bradbury explained how bold training initiatives and the use of technological innovation had swayed the judging panel in favour of the Cianbro project.

"The impact on the community, transforming a paper mill plant to a processing facility

designing modular units for a refinery, that was a major factor, along with the innovative use of technology," said Mr Fisk.

Mr Bradbury said the panel had also been enthused by Cianbro's reuse of data.

"The fact that you are starting the data once and reusing it as much as possible means you don't have to redesign it for the construction of work packages to create schedules every week. It was the innovative use that really swung us," he said.

Lead Work Package Engineer Cheryl Brackett collected the award in North Carolina and said Cianbro were eager to expand into the oil and gas industry in Australasia.

"Absolutely, we have earned all of this knowledge and want to continue with it on another project right behind this one. We can do all kinds of module construction, it does not have to be a refinery. Anything that can be 'modulised' and put on a barge, we can build," said Ms Brackett.

She described the US\$100m revitalisation of the defunct paper mill into a manufacturing facility as an "awesome achievement" critical to economic regeneration of an area hard hit by tough times.

"When the paper mills started closing down, infrastructure also started to crumble. Jobs involving pipe fitters, welders, mill rights, these skilled workers had nowhere to go.

"Thus when Cianbro announced they were going to be hiring 500 people and also training

unskilled workers to learn these skills, there was excitement and everyone in the State was hopeful that this would change the economy around," said Ms Brackett.

Venturing into new territory with the construction of the refinery, some modules five stories high and 120 feet long, was one challenge. Hitting the ground running using 3-D visualisation software to create work packages from the start, was another.

"The project was fast track, so it was always used as a training tool for all of us. First the engineers came on board, they could see what we were going to build.

"Then we would bring in the masters riggers, the steel superintendents and the iron workers themselves. They would gather around the ConstructSim screen and we would fly them around so they could plan how they wanted to build these modules. "They would devise an erection sequence by blocks and they would be able to see what they had planned in their mind and we would show them how each block would interlock and if the plan worked," she said.

The payoff was measured in time saved and labour costs.

"We were able to crate work packages with a smaller number of work package engineers and that was a time saving. Software collaboration enabled numerous people involved in the project to access information that was updated showing changes to the inventory and progress on the 3-D model itself, simulating real time construction of the modules.

Collaboration was a key component of a project requiring buy in from all parties involved to be successful.

"It allowed us to gather live quantities of information very quickly. This was also quite a time saver because there are all sorts of people looking for information.

"Once we had placed this pipe master on the server, anybody can see it, access it and filter it the way they want. We were able to have some of our interns gather information and actually place orders for items, freeing up the engineers from spending all their time doing it," said Ms Brackett.

On the 3D model colour codes were used to track the status of each pipe, enabling planners to tell at a glance how far work had progressed.

Cianbro also wrote a programme tracking materials used, enabling personnel to view the

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One of the refinery modules being shipped to the Gulf of Mexico.



Another module on its way to the Gulf of Mexico passes under a bridge which was also constructed by Cianbro.

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construction of data and compare it to the warehouse inventory - highlighting a single isotope or pipeline and checking if material was available, what had been ordered and when it would be shipped.

Another challenge in the construction phase was Maine's harsh winter, which forced Cianbro to encase the modules in plastic envelopes and rely on all available technology to relieve human suffering.

"What we learned is that we also gained human comfort in conditions where you are building and its -26 Fahrenheit below zero outside, any time savings you can give are appreciated.

"In snow all the steel would come off the containers and we would have it all in one area. But then you start building by blocks and someone had to go out there and sort all that out.

When the pipe installation calls for a piece of pipe to be picked out of the yard, the yard crew has to go and physically find it. In some cases it is buried in snow, so they come and ask us what the piece looks like. Instead of trying to find a label on a pipe, they can visually find it through ConstructSim.

"They would come in from the freezing cold asking for our screen shots, also requesting, for instance, could we label everything on level A so that it could go smoother.

"Once they realised that it would bring them in from the cold, they were all onboard," she said. "Once they got used to using our technology, everybody benefitted. It really evolved as we went along, because once they started using it and gained respect for it, they would pass it on to the next discipline.

"This was the first time we had used ConstructSim and it was impressive. We had one week of training on it and the demand of turning

out 5000 work hours a week. As soon as we came back from our training, within that week we started turning out work packages for steel erection, pipe fabrication and pipe installation while our crews were on a learning curve."

Success, nevertheless, was not without teething problems, albeit short-lived.

"One of the challenges was just getting the word out that we had this technology. They were used to seeing work packages just as a folder full of papers. They didn't realise we would have screen shots that would help show them where the modelling of the pipes were.

"We brought the first crew of iron workers in to look at the module. Iron workers are usually a bit of an independent crowd, they generally just disregard drafts and erect modules as they go along.

"The first modules they came in, sat down and we flew them around. We started building by small blocks and after the first erection of the module, they could see they could erect it in the larger walls by the right pick up...so we changed our strategy and started building work packages in larger formats.

"Seeing they could have input into what was happening, they were much more eager to come in, sit down and plan their work with us. The same attitude really echoed all the way through production.

In one instance, at a critical phase of construction, Cianbro were left thin on the ground when two of three engineers working on work packages were called away to National Guard duty for three weeks.

Nevertheless, software technology was able to bridge the gap.

"That left me with two summer interns, one fresh out of high school. So we set them down to ConstructSim, trained them and very shortly they were doing steel module work packages. It was really very user friendly." ■



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