THE PANAMA CANAL

Spillway

Vol. XXXVI, No. 25

Friday, December 4, 1998



ower-than-normal n Gamboa. Above, fer the boom and he boom, were reane can swivel the ass it over the top of

e guerra anitán de la

apitán de la grúa flotante, Joe n viejo hoyo de granada en el quinaria de metal, hecho durante Mundial. Novelich ha trabajado adécada de 1970, y ha compartido sobre la grúa con el personal de a del Canal.

ane Master Joe Novelich points
netal machinery cover made by
orld War II. Novelich has worked
the 1970s and has shared his
with Canal crane operations per-

Crane operations team gives Titan a lift

By Susan Harp

Dredging Division crane operation crews performed a one-of-a-kind lift with the floating crane *Titan* at the Panama Canal in November. They used the giant *Titan* to literally lift itself up to new heights, raising its boom (the crane's horizontal arm) to a higher angle. The 317-ton boom had been lowered for the crane's journey to Panama and passage under the Bridge of the Americas in May 1996.

"There is probably not a crew in the world that could do the job the way they did – there wasn't even one pinched finger during the entire procedure," said Engineering and Industrial Services Director T. W. Drohan about the Dredging Division heavy lift team's expertise and safety. He added, "They deserve the title of "world-class team" for the lifting of heavy loads with floating cranes."

The 60-member team performed the lift in about 15 days, but preparations for the lift took about three months. Another large crane at the Long Beach, California shipyard where the *Titan* previously was based had lowered the boom of the *Titan* from its minimum height of 282 feet so it would fit under the 220-foot-high span of the Bridge of the Americas. Costs estimates for bringing another large crane to Panama to return

the boom to its correct operating position approached \$2 million, so research began on reassembling the *Titan* here.

The Titan was built by Adolph Hitler in 1941 and served the German navy until captured by the United States in 1945.

The Canal contracted with the U.S. Army Corps of Engineers Marine Design Center to study several methods, and a California naval architecture company, Argonautics Marine Engineer-

ing, created a computer model of the crane to test several proposals. After consulting with crane operations chief Karl C. Marohl and Engineering Division civil engi-

neers Daniel Ulloa, Fernando Guerra and Ramiro Parada on the feasibility of the work, a method was devised to use the *Titan*, supported by a land-based crane and the Canal's two floating cranes, the *Goliath* and *Hercules*, to perform the job.

"The method of self-erection is the least expensive, but not the easiest, method. For every man-hour of actual heavy-lift operation, 10 hours of prepa-

ration are normally required, but because of the height and size of the crane, 20 hours of preparation were needed," said Marohl about the actual performance of the job. Worker safety and protection of the crane's structure from damage due to overstressing were the two most important considerations

During the entire month of October, crews worked under the direction of Support Branch Manager Jorge Solis, crane operations chief Marohl, master-in-charge Braulio Girón, construction and maintenance supervisor Allen Sheppard and floating crane masters Fred Highley and Jorge Santiago. They set up staging platforms on the 8-story-high crane tower, installed devices for holding 60-ton jacks and 300-pound pins in place and added structural supports and 150 extra tons of weight to the counterweight. They also installed boom extensions on the Goliath

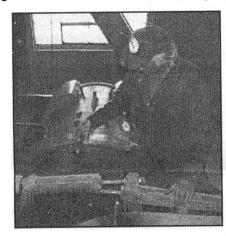
and the land crane to extend their reach from 120 to 220 feet and from 90 to 210 feet, respectively.

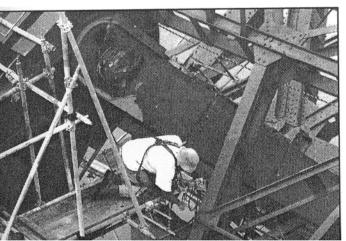
The procedure used the principle of leverage (weight held at a distance, like a

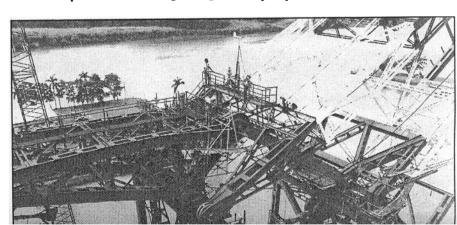
seesaw) to raise the boom and its leveling link, a smaller arm that gives the boom stability. The leveling link was lifted first, before raising the boom, and preliminary rigging and reinforcements had to be tediously removed and reinstalled in new positions to avoid overstressing before the second lift took place. This was the first time the *Titan* had ever been self-erected without using the assistance of a drydock or another large crane.

"What made it all possible was the professional skills and concentrated effort of the team," said Marohl. Dredging Division Manager Adriano E. Díaz recognized the *Titan* reassembly team with a new title, "World-Class Heavy-weight Lifters of Gamboa" because this was the most difficult lift ever performed on the Isthmus.

The next steps to making the *Titan* fully operational are to replace its main hoist wire rope and recondition its onboard facilities to meet Canal marine safety and occupational health regulatory requirements.







World-class team

performs

one-of-a-kind job