Harvey Titanium Proves Itself in Conversion Unit

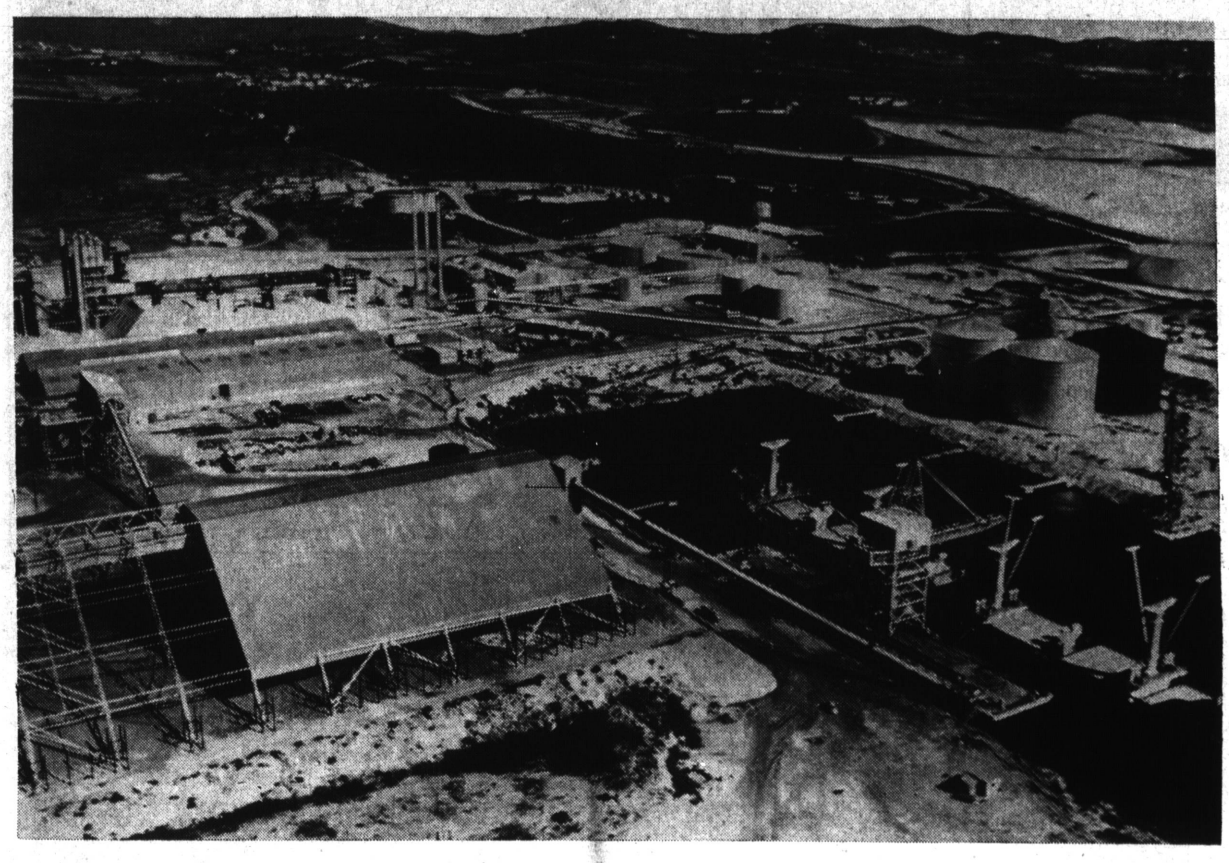
In late January, 1968, Harvey metallurgists and technicians faced the crucial moment of truth regarding their revolutionary use of seamless titanium tubing in the flash evaporator desalination plant adjoining the company's multi-million dollar alumina plant.

Five years earlier at Harvey corporate headquarters in Torrance, engineers laid out plans for an extraordinary alumina plant. Space age technology was applied to the crucial demands of converting bauxite into alumina. Highly advanced application of the new science of automation and computerization would be basic in the concept, design, and construction of these key additions to Harvey designs for a totally integrated company.

The project was top secret. In cooperation with several of the nation's top manufacturers, company engineers made innovations in computer design and use. Many of these technical achievements new wear U.S. patent numbers.

A key installation necessary for the maintenance of human life and the alumia process would be the sea water desalination plant. Throughout its corporate existence, Harvey management has been characterized by skillful planning, timing, and economy in operations. The challenge of the sea gave promise of a new imaginative response by company leadership.

A desalination facility is costly to build and maintain. Lawrence Harvey wrestled with the enduring problem of keeping the conversion plant from eating up manhours, manufacturing costs, and ultimately, profits. A chronic problem is the tubing in the units because leaks and breakdowns are a constant expense. The plant's isolated location in the Virgin Islands plus Harvey's propensity for economy of operation, required the use of a material which would prevent downtime and hold maintenance to a bare minimum.



Virgin Islands Plant

Ân aerial view of the Harvey Aluminum plant at St. Croix, Virgin Islands, shows the most modern automated ore plants in the world. It was at the Virgin Islands facility that Harvey engineers proved that titanium is the most efficient metal for use in desalting plants.

Titanium tubing used for more than two years in a salt water conversion unit showed no measurable wear when it was examined by engineers.

Titanium appeared to be the best material available because of its anticipated resistance to the effects of salt water at a high velocity. However, titanium had no record of experience in a production unit; and there were disturbing reports of salt water corrosion, particularly of the crevice type, based on laboratory data developed by reputable laboratories. Counting all the costs, a decision was made. The Westinghouse designed multiple flash evaporator would use seamless titanium tubing.

Now, more than two years had slipped by and Harvey personnel were excited about the performance of titanium seamless tubing supplied by the Titanium Division of Harvey Aluminum. There had been no leaks, no breakdowns, no downtime! Desalination experts from industry, the military and government expressed optimistic interest in the experiment.

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Just what was the condition of the 100 miles of seamless titanium tubing after five billion gallons of sea water had passed through them? Had cracks developed inside? Were the walls scored? Had the metal worn down to the breaking point Was there erosion or corrosion?

In moments, the metallurgical inspectors would have the answer. The cover plates were removed to expose the tube entrances. Using a damp cloth, the investigators easily removed brown slime to reveal the original machining marks. Boroscopic examination revealed original production dic lines identical to I.D. superficial indications observed when the tubes left the production plant. The ends of the tubes, the area most susceptible to attack because of rolling and welding operations, showed no evidence of corrosion or pitting.

All tubing was found to be in perfect, like new, condition. At the inlet area, for more than two years, some 5,000 to 8,000 gallons per minute of raw sea water, together with abrasive mollusk shells and shell particles, had surged through the titanium tubes. There was no sign of erosion, corrosion, or abrasion. Other materials used in similar evaporators have had failures in less than a year's operation.

In the evaporator and brine heater areas, high temperatures ranging from 175 degrees to 250 degrees Fahrenheit hold sway, and still there was no evidence of pitting or the much feared crevice corrosion. The desalination had been substantiated.

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The Harvey metallurgists had originally selected a tube thickness of .028 inches but were now convinced the wall thickness could be reduced even further, thus enhancing the conductivity of the condenser. Other materials could not have met this challenge. The tubing is completely resistant to corrosion in sea water environments including those in and around brackish inlets and industrial areas. It is extremely resistant to velocity-cavitation attack and erosion. Greater velocities may be used in order to increase efficiency in the heat exchange system, as well as to decrease marine fouling.

Harvey's experiment justifies the original concept that titanium is the most practical and dependable material for desalination facilities. Titanium on a make water basis is now more economical at the initial installation time, all factors considered, than all other types of tubing. It is estimated competitive material would have to be 100 per cent replaced within a ten-year period. The big dividends of no downtime, less maintenance, greater efficiency, add up to greater profits.

The original design was for an output of 750,000 gallons during a 24-hour period. However, due to the success of titanium, the operation can, and has been, producting a million and a half gallons during the same period. The seamless titanium tubing is expected to last more than 30 years without replacement.

Sales, Earnings Increases Noted

Harvey Aluminum, Inc., reported net sales for the first six months ending March 31, 1968, were $78,471,711, up 12.7 per cent from $69,632,047 for the same period last year. This has set a new company sales and earnings record.

Net income for the six months period was $7,258,828 (including investment tax credit of $302,772) an increase of 14.8 per cent over the $6,323,262 (including investment tax credit of $1,211,000) earned in the comparable period last year.

Earnings per share were $1.14 on 6,371,922 shares outstanding March 31, 1968, an increase of 3.6 per cent above the $1.10 per share earned in the same period last year.