MAXON
INDUSTRIES, INCORPORATED

# Redland Genstar Pond Sediments

Job Report

## MAXCRETE IV MIXER FOR MINE TAILINGS PROCESSING

### Project Overview

Redland Genstar, Inc. in Baltimore, Maryland purchased a New Maxon Maxcrete for use in processing mine tailings from a sediment pond. The process included the excavation, mixing and pumping of the material into an abandoned underground mine located adjacent to the sediment pond.

*The two adjacent sediment ponds have been in service for over 60 years and consist of over 250,000 cubic yards of sludge to process.*

### The Pond Sediments

The pond sediments consisted of:

65% calcium carbonate
10% magnesium carbonate and
25% various acid insoluble materials (including iron pyrite, clays and chalcopyrite)

Particle size was generalized as 100% passing 30 mesh and 70% passing 325 mesh, but there were considerable extraneous materials ranging from sticks, roots, tree stumps and other foreign objects disposed of in the pond over its 60 year life.

One cubic foot of sludge weighed 120 lbs, and the approximate percent, solids ranged from 74% to 78%.

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# REDLAND GENSTAR POND SEDIMENTS - MAXON MAXCRETE

## Sludge Excavation

The sludge was excavated from the pond using a one cubic yard drag line bucket. When excavated, the material was similar in consistency to a chalk-like paste. When the slump test was performed, the material ranged from 4" to 10."

The drag line bucket excavated the material and dumped directly into the top of the Maxcrete. The Maxcrete was modified to include a charge hopper 5' wide by 10' long positioned at the charge end of the mixer. The charge hopper was mounted directly to the top of the Maxcrete and included a steel grizzly with a 4" by 8" configuration. The grizzly would catch larger items including stumps, roots and other miscellaneous items.

*The top 3 to 5 portions of the pond have solidified, but when the material is agitated by the drag line bucket, the sludge liquefies, having the appearance and consistency of paste.*

The drag line bucket continuously fed sludge to the Maxcrete at a rate of 1 yard per 40 seconds while the Maxcrete mixed and discharged the material. Total product per hour was 120 tons/80 cubic yards per hour.

*The drag line bucket dumps the sludge into the Maxcrete. The grizzly keeps large objects from entering the Maxcrete. This is primarily to protect the concrete pump.*

Production was primarily limited by the capacity of the concrete pump and the loading time of the drag line operation.

## The Cement Mixture

A grout mixture of cement was added directly into the Maxcrete. The cement was mixed and pumped into the Maxcrete to reduce the dusting caused by handling cement in dry form. The grout mixture was introduced into the Maxcrete at a rate of 170 lbs. dry cement to one cubic yard of sludge (approximately 5% cement to tailings ratio).

In addition, it was advantageous to increase the slump from 9.5" to 10", thus requiring the introduction of water. Along with the 5% cement, water was added on demand based upon random slump testing and visual observation.

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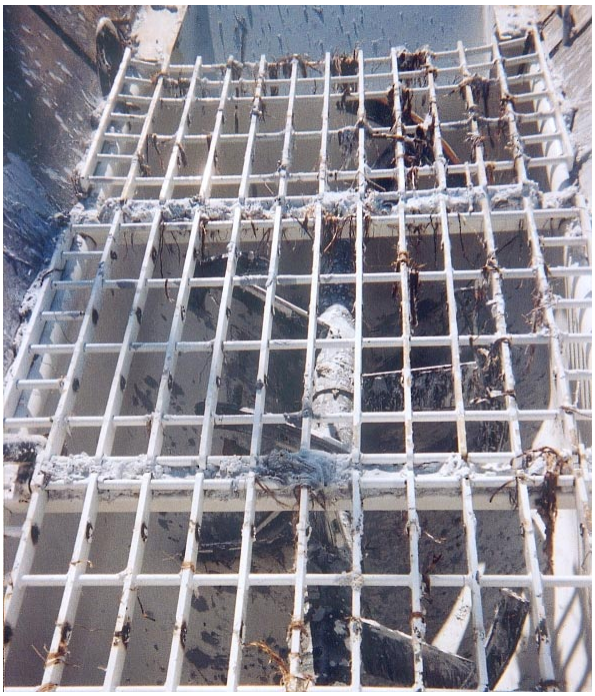

*This view shows the top of the Maxcrete with a charge hopper and grizzly. The mixer shaft of the Maxcrete is bi-rotational with three speeds.*

## The Mixing

The cement grout mixture was added to the sludge inside the Maxcrete to increase the psi of the material. Thorough mixing was confirmed through both visual inspection and testing performed regularly on the output from the Maxcrete.


*A Schwing concrete boom truck was used to pump the cement/sludge mix from the Maxcrete to various dropholes to backfill the underground mine. The silo in the background was used to feed a grout pump for introducing the cement into the Maxcrete.*

## The Discharge

The Maxcrete fed the cement/sludge mixture to a Schwing 900 pump with a truck mounted 28 meter boom. The Maxcrete was equipped with the optional discharge screw auger which provided a constant flow to meet the pump rate.


*The Maxcrete can be charged at the same time it is mixing and feeding material to the Schwing pump. The discharge screw auger allows the Maxcrete to maintain a low profile for easy loading while feeding the pump, so elevation of the Maxcrete is not required.*

The discharge screw auger speed can be varied for 0 to 5 cubic yards per minute discharge rates and is bi-rotational.

The discharge screw auger allows the Maxcrete to be placed on grade while discharging into the hopper of the pump. This configuration provides a low profile for easy loading and visual inspection.

## The Drophole

The Schwing pump then pumped the sludge into a drophole. The dropholes were bored at various locations above the abandoned mine. The sludge then fell through the drophole an additional 60 feet. The material did not release water upon being deposited in the underground mine.

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The entire remediation process was mobile, allowing the contractor to move the Maxcrete and pump around the pond, minimizing the distance the drag line had to move.

*The Maxcrete is quickly set up on grade, requiring no footings or special site preparation. The power unit for the Maxcrete can be located at any position, (shown here on the left to feed a grout pump to protect it when charging the Maxcrete).*

## The Results

The final product provided a flowable fill to backfill various mining cavities. The project allowed the owner of the sediment pond to accomplish three tasks:

- The site owner was able to reclaim valuable real estate covered for over 60 years with calcium carbbonate mining tailings.
- Rather than trucking the sludge off-site for disposal, the contractor was able to treat and dispose of it on-site.
- And, by pumping the sludge into the underground mine, the contractor was able to reduce exposure to liability for an abandoned mine.

*The discharge of the screw auger on the Maxcrete can be adjusted to meet the exact speed of the pump. Note the dark gray, even consistency of the sludge after adding the cement.*

For complete details on all of Maxon's equipment for handling concrete, sludge, mine tailings and other waste streams, please visit our web site or contact us.

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