

Listening to the Lake Radio Program
Harbor Corrosion
6/29/05, KUMD Radio, Duluth, MN
8:14 minutes

(Opening music)

Welcome to Listening to the Lake. This is Marie Zhuikov with Minnesota Sea Grant, which is part of UMD.

The focus of today's program is harbor corrosion. Just what is eating holes through steel structures in the Duluth-Superior Harbor is a mystery. Thanks to a panel of corrosion experts and funding at state and federal levels, we may find out before the docks and pilings disintegrate much further.

But first, I'd like to let you know what the lake had to say yesterday morning on Park Point at the Tot Lot entrance.

(Enter lake sounds)

It was a gorgeous morning, enjoyed by a kayaker and sunbather. Yes, a sunbather on the beach at 8:30 a.m. It's never too early for sun, I guess. The water temperature on the western end is warming up, averaging 50 degrees. The nearshore marine forecast calls for a northeast wind 15 to 25 knots, with a chance of thunderstorms. A small craft advisory may be needed. Tonight the wind will decrease to 10 to 15 knots, veering to the southwest around midnight. Continuing chance of showers and thunderstorms. Waves 3 to 5 feet, subsiding to 1 to 3 feet.

(Fade out lake sounds)

Upon returning to Duluth from the East Coast 7 years ago, Chad Scott, a structural engineer and deep sea diver, plunged into Lake Superior on his first dive in his new job. Scott, who works for Krech, Ojard and Associates, was inspecting some steel pilings in the harbor for signs of weakening. What he found surprised him.

"The first dive inspection that I did here when I got back was the Coast Guard, the Coast Guard station down here. ...The big thing that caught me was, those were steel H pilings....When we started inspecting those, we found holes in those the size of a football that had corroded through. And I don't think they had realized at that point in time that they were that bad."

Scott first thought it might just be an isolated case.

"...Then we started doing other docks in the harbor, sheet pile docks, and just started noticing this trend of the heavy pitting. And the heavy pitting lead to other structures

throughout the harbor."

The pitting, or shallow holes, in the steel are termed accelerated corrosion. The increased wear on structures of steel in the Duluth-Superior harbor is a mystery and a big worry for organizations that own and depend upon such structures for their livelihoods, especially the U.S. Army Corps of Engineers, the Duluth Seaway Port Authority, the City of Duluth, and commercial businesses.

Jim Sharrow, facilities manager for the Port Authority, says there are about 14 miles of dock face and break walls in the harbor. He describes what the accelerated corrosion problem means to the Port Authority.

"What you're talking about here is about a hundred million dollars of potential replacement of steel dock frontage...and that this could occur possibly decades earlier than would normally be expected. So we're very concerned about what might be causing this to occur...and want to find a solution. To firstly try to stop the rate of corrosion; somehow protect the steel that is currently installed. And then secondly, provide for any new steel that's being installed, provide for ways to protect it also."

Sharrow likened his first thoughts about a possible fix to the problem to flossing and brushing. Like flossing rids your gums of harmful bacteria, he was hoping for a simple solution – like blasting the pilings with a high-pressure water gun to rid them of whatever was causing the problem. He found out that the path to a solution is not that easy.

The search for answers has involved several organizations, a panel of corrosion scientists, and help at state and federal levels. The Port Authority approached Minnesota Sea Grant looking for research help. Sea Grant staff recommended pulling together a panel of scientific experts to review information and help prioritize areas of productive research.

The panel convened in the fall of 2004. Panel members were chosen by a steering committee comprised of representatives from the U.S. Army Corps of Engineers, the Port Authority, Krech and Ojard Associates, UMD and its Natural Resources Research Institute, and the Wisconsin and Minnesota Sea Grant programs.

The panel met for 2 days in Duluth. The first day, they took a boat tour of the harbor to view corrosion on both new and old structures. Jeff Gunderson, associate director for Minnesota Sea Grant, describes the next steps the panel went through.

"Then, once that was through, we basically shut them into a room and let them talk amongst themselves and try to figure out what might make sense and what might not be causes for this corrosion. We also wanted them to really look at whether we had accelerated corrosion in the Duluth-Superior Harbor. It was kind of an assumption that we were experiencing accelerated corrosion from sometime in the late, mid-to-late 70's, but we weren't sure, and we wanted them to offer their judgment on whether we really were experiencing this accelerated corrosion or not."

"The second day of the workshop was more of a public meeting, and that's where we presented the results from the expert panel. But first we invited in a number of the sheet pile owners....We invited them in to kind of lay out the issue and potential causes and what this expert panel had done. And then the expert panel presented their results of their discussions. Again, they didn't solve the problem for us, but their job was to try to narrow down the potential causes and give us a list of priorities that we could work on."

The panel confirmed that accelerated corrosion was indeed occurring in the harbor, at a rate similar to that found in salt water environments (which is about 2 to 10 times faster than normal). They recommended that other Great Lakes ports be surveyed for similar corrosion. Among their other suggestions are that detailed inspections of Duluth-Superior Harbor pilings be conducted, that harbor water chemistry be surveyed, that steel coatings be tested, and that the corrosion itself be tested for organisms that can cause corrosion.

Sharrow, with the Port Authority, summed up the value of the panel's efforts.

"These corrosion experts reduced our list of possible contributing factors by about 60 percent, so their efforts last fall will help the study to be more focused and directed, which will be a great benefit to use whatever dollars are available as economically as possible."

But who is going to do the work and how will it be funded? Sharrow said that a legislative bill for one hundred thousand dollars to research the corrosion problem and finance control methods has passed the state senate and is currently in conference committee deliberations.

The U.S. Army Corps of Engineers has been promised three hundred thousand dollars in federal funding to begin an in-depth study, thanks to efforts by Minnesota congressman James Oberstar and Wisconsin congressman Dave Obey. The Corps will use the expert panels' recommendations to guide their efforts.

Will the Army Corps find a cause that's easy to fix? Sharrow still has hopes for a simple cure.

"We're not expecting to be able to change whatever chemically is going on in our harbor that might be causing the corrosion, but it would be nice if there were a silver bullet where we could undo what appears to be a change in our water chemistry that's created the conditions for this steel to start corroding now."

To see a copy of the panels' report, visit the Sea Grant Web site at www.seagrant.umn.edu/water. This has been Marie Zhuikov for Listening to the Lake from the Minnesota Sea Grant Program at UMD. Sea Grant is celebrating 30 years of funding superior science this summer.