

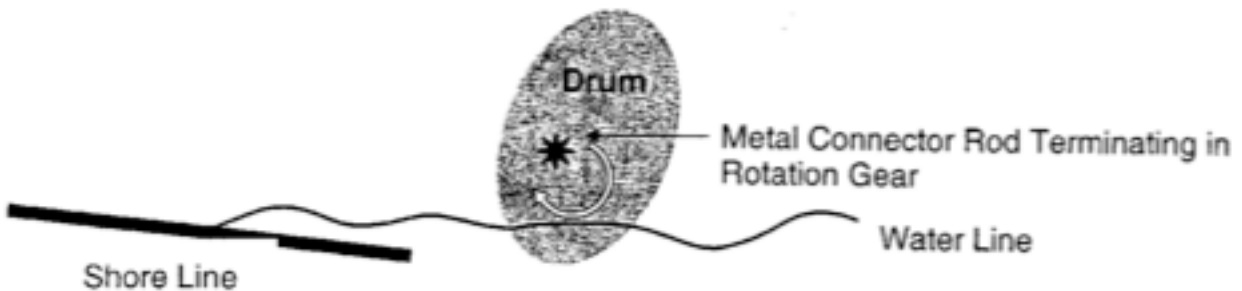
Wave Making Machine Description

Machine Overview

The wave maker is a mechanism designed to create waves that will allow shoreline birds at the New City Aquarium to feed in a natural environment. By rotating an oblong drum at controlled intervals, the wave maker creates varying heights of water swells at the shoreline. These varying heights provide not only the unique habitat needed for species consumed by the New City Aquarium's shoreline birds, but also an appropriate noise level to encourage feeding. Without the correct environment to develop the feed species or to accommodate the birds' sensitivity to excessive noise, the New City Aquarium's shoreline birds will be forced to rely on less natural means of survival: direct feeding from humans. The wave maker is specifically designed to provide a natural environment that will meet the needs of the targeted bird population.

Machine Construction

As illustrated in the following diagram, the wave maker consists of several specific parts: the **oblong drum**, the **connector rod**, the **rotation gear**, and the **controlling computer**. Each component is specifically designed to address the unique needs of the New City Aquarium.



The **oblong drum** is a closed container designed to make contact with the water. Like a the big bass drum of a high school marching band, this oblong drum has two flat sides attached to a rounded cylinder. In profile, it is a rounded oval, smaller at the top and bottom than it is in the middle. At all times, a part of the smaller bottom of the oblong drum remains in the water while the larger middle and smaller top remain out of the water. The oblong drum is kept in place both in and out of the water by the connector rod, which runs through both of the drum's flat sides. The oblong drum is empty, except for a portion of the connector rod.

The **connector rod** is a long, cylindrical bar. As suggested by its name, the connector rod connects the oblong drum to the mechanism responsible for rotating the drum. It serves as an axis which can turn the attached drum. The connector rod is fastened outside the far end of the oblong drum, runs through the drum, and then terminates at the rotation gear.

The **rotation gear** moves the connector rod—and, consequently, the oblong drum—in alternating clockwise and counterclockwise motions. Much like the back and forth swing of a grandfather clock pendulum, the rotation of the connector rod is timed to move back and forth with specific precision.

The **controlling computer** is connected to the rotation gear. This controlling computer is programmed to regulate the frequency of the rotation gear's movements. In turn, the rotation gear's movements rotate the connecting rod clockwise and counterclockwise to specified extents. The connecting rod's rotations move the oblong drum, alternately torquing the top and the bottom forward and back. As the smaller bottom of the oblong drum moves forward, it pushes the water toward the New City Aquarium's shoreline, thereby creating the waves found in a natural shoreline.

Machine Use and Benefits

The wave maker is designed to be used in the unique New City Aquarium environment. The general shape of the shoreline allows this wave maker to produce a water environment that cultivates the kind of species consumed by the local birdlife. Furthermore, the wave maker's surf is quiet enough to encourage rather than discourage birds from feeding naturally on the resulting feed species.

The shape of the oblong drum combines with the frequency of rotations (as programmed into the controlling computer and executed by the rotation gear and connector rod) to create a specific size and variation of shoreline waves. When the small bottom portion of the drum moves forward, it creates an initial wave. Once the initial wave hits the shore, it bounces back to sea and hits the oblong drum again. However, because the drum is still in the process of rotating forward, the water hits the drum at a different location and bounces back once again toward the shore. On this second approach to the shore, the wave is smaller. Yet it hits the shore and returns to the drum to be pushed back to the shore three more times during the drum's rotation. Each time the wave returns to the shore, it is smaller, until the drum begins another rotation.

This variation in wave size results in an environment that will not disrupt natural bird feeding habits. Larger waves often create a loud slapping noise on the shore, which discourages birds from feeding. The wave size variation also supports the growth of species within the natural food chain of local shorebirds. Without proper design considerations, a wave machine can stir up too much sediment and completely cloud the water, killing off the species the wave machine is supposed to help create. While some clouding in the water is acceptable, this wave maker has been designed to limit turbidity and still promote feed species growth.

When properly used, the wave maker is designed to create a natural environment hospitable to shoreline birds. The wave maker is an innovative approach to ensuring shoreline birds rely on their natural environment rather than direct human contact to continue their natural life cycles.