



A Rockwell Automation Company

White Water West Industries Ltd. Typhoon Lagoon & Lost City Resort Wave Pools

The Client:

White Water West Industries Ltd. of Richmond, British Columbia, designs wave pools and water slides for resorts and communities all over the world. The wave pools vary in size and complexity from small community recreation

centers to large water parks. White Water has installed two very large pools, Typhoon Lagoon for Walt Disney World, Florida in 1989, and the Lost City Hotel in Sun City, Bophutswana, South Africa in 1992.

The Requirement:

White Water's large pool design is comprised of two separate wave generating systems. The pneumatic wave system uses large fans and air chambers (distributed along the back of the pool) to create a wave. The air from each fan is alternately directed by a flop gate into two adjacent air chambers, which are vented below water level. The gate flops back and forth at a constant interval alternately charging one chamber with the pressurized air, while exhausting the other. The pressurization of the chamber displaces the water out of the bottom of the chamber. The exhausting of the chamber allows water back into the chamber. This rhythmic action creates a "chop" or "diamond" wave. The wave patterns can be altered by

modifying the flop gate interval as well as changing the sequence of operation for each fan and chamber pair.

The second wave machine, which generates much larger waves, consists of four large volume water pumps and large water chambers which span the width of the back of the pool. The water chambers rise 10-15 ft. above the static water level. The wave is created by pumping water up to the chambers and then quickly releasing it through a large gate at the bottom of the chamber. The surge of water from all the chambers creates a single large wave. The wave size is varied by the amount of water in the chamber. The wave shape can be varied by changing the sequence the gates are opened.

The Design Solution:

Hinz has provided White Water with electrical and control design on a number of projects. The first was Typhoon Lagoon for Disney World, with the most recent project being the Lost City Resort in South Africa.

For each pool, Hinz was required to design a power distribution system, including the main switchgear and motor control centers, to supply the wave generation equipment. In addition, each pool required design for an electrical equipment room to house the electrical and controls equipment. The Typhoon Lagoon Power System was fed from a 600V, 3 Phase Distribution System, while the Lost City Project was supplied at 380V, 3 Phase.

The Typhoon Lagoon Pool was slightly larger, consisting of 12 chambers as compared to 10 at Lost City. The Disney Project included four 200 Hp Pumps, six 75 Hp fans and twelve 5 Hp hydraulic pumps (one for each chamber's gate). In comparison, the Lost City Pool had four 150 Hp pumps, five 75 Hp fans and ten 5 Hp hydraulic pumps. The water pumps and fans used reduced voltage starting to minimize starting currents and thus reduce the size of the power service required. Autotransformer starters were used at Disney, while a Star-Delta configuration was utilized for Lost City.

Both pools used a PLC for control and an electronic Human Machine Interface (HMI). The Disney pool had an Allen-Bradley PLC, while the Lost City Pool used a Square D. Both Pools used the same Nematron liquid crystal display for the HMI.

The PLC controlled the motors, as well as the activation of the water chamber gates and the pneumatic system flop gates. The gate timing and sequencing was programmed into the PLC and was easily changed via the HMI (some items were password protected). The Nematron HMI allowed the operator to step through a series of menu type screens to configure the system. The operator made selections such as method of wave generation, size of wave, type of wave, interval between waves, and duration of the wave set. The HMI also had status indication and alarm screens to provide the operator with a complete picture of the operation.

Hinz provided the complete electrical and controls design as well as assisted in the selection of the electrical contractor and supervised installation. Hinz personnel were also responsible for site commissioning the control systems of both wave pools.



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System Specifications:

Lost City Resort

- Square D Model 400 PLC
- Nematron Series 123
- 20 Motors
- 150 I/O

Typhoon Lagoon

- Allen Bradley PLC 2/17
- Nematron Series 123
- 24 Motors
- 175 I/O

For further information or to contact a Hinz office near you, please check our website at:

www.hinz.com