



A Rockwell Automation Company

## Whitewater West Industries Ltd. Yong-In, Korea & Sunway Lagoon Wave Pools

### The Client:

Whitewater West Industries Ltd. of Richmond, British Columbia, is a leading authority in the design of water parks and in the supply and installation of water related rides around the world. The installations vary in size and complexity from small community recreation

centers to entire water parks. Whitewater has installed two very large wave pools, Yong-In Aquatic center near Seoul, South Korea, in 1996 and Sunway Lagoon near Kuala Lumpur, Malaysia, in 1997 which is currently the largest wave pool in the world.

### The Requirement:

Whitewater's large wave pool design is comprised of two wave generating systems. The pneumatic system creates a series of waves in a diamond pattern by using fans to push air into the water. The air from each fan is alternately pushed into chambers controlled by a solenoid powered flop gate. The gate flops at a constant interval, charging one chamber with pressurized air which is released below the surface of the pool and venting air through the other. The wave patterns can be adjusted by modifying the flop gate frequency.

The surf system generates ocean type waves from 4 to 8 feet in height. Four large pumps transfer water into chambers above and across the width of the pool. Once the proper amount of water is in the chambers, it is released through a gate at the bottom of each chamber and into the pool. This creates a single large wave. The size and shape of the wave can be varied by altering the amount of water in the chambers and the sequence in which the gates are opened. The chamber gates are controlled by a hydraulic unit.

### The Design Solution:

Hinz provided Whitewater with electrical power and controls design for both the Korea and Malaysia wave pools.

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 Korean power system was fed from a 3-phase 380V, 60Hz system with 220V control power and the Malaysia system was 415V, 50Hz with 120V control power.

The Korean wave pool consisted of 10 water chambers, one 15HP compressor, ten 5HP hydraulic pumps, five 75HP wave fans and four 150HP wave booster pumps. The Malaysian pool was slightly larger with twelve water chambers, one 15HP compressor, twelve 5HP hydraulic pumps, six 75HP wave fans and four 200HP wave booster pumps. For both wave pools the wave fans and wave booster pumps used Benshaw soft starters.

Both pools used Allen-Bradley 5/20Bs and PanelView 1500 HMIs for control of the operation. The Korean

pool used an Allen-Bradley "hot" backup system via two 1784-BCM modules. One PanelView was used to provide control in the main equipment room and another PanelView was used for monitoring in the indoor wave pool control room. The Malaysia pool used a single 5/20B processor c/w one PanelView HMI.

The PLC controlled all motors, pneumatic flop gates and chamber gates. The HMI allowed the user to select whether surf or pneumatic waves were produced as well as wave times, heights, shapes, and cycles. A "Day" system was programmed that would run pneumatic and surf waves alternately on an hourly basis from the water park opening to closing. The HMI also had a variety of status and alarm screens. The Malaysian PLC was tied into special effects computers to allow for better coordination between pool operations and special sound and lighting effects.

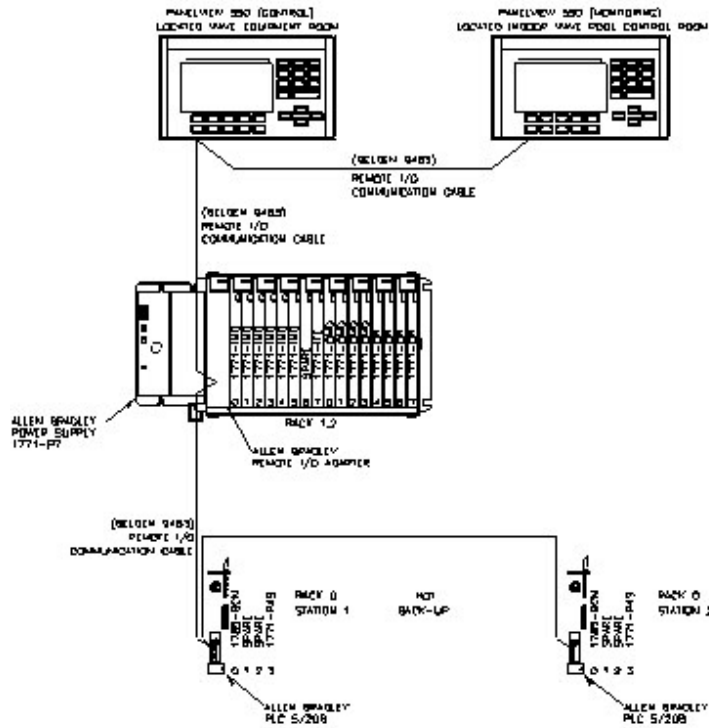
Hinz provided the complete electrical power and controls design as well as selection of panel vendors and purchase and specifications of all PLC equipment. Hinz personnel were also responsible for the site commissioning of both the Korean and Malaysian pools.



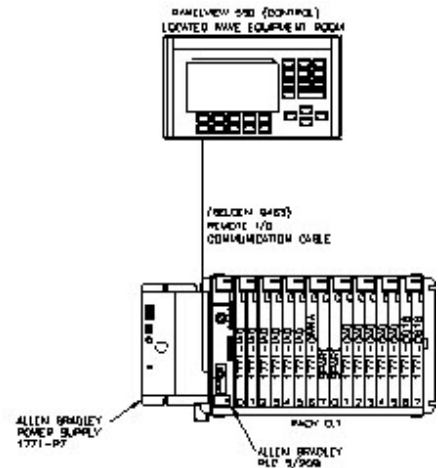
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### YONG-IN AQUATIC CENTER, KOREA



### SUNWAY LAGOON, MALAYSIA



### System Specifications:

#### KOREA

- 2 Allen-Bradley 5/20B processors with 1784-BCM backup modules
- 2 PanelView 1500 HMIs
- 20 Motors
- 150 I/O

#### MALAYSIA

- Allen-Bradley 5/20B processor
- PanelView 1500 HMI
- 23 Motors
- 170 I/O

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

[www.hinz.com](http://www.hinz.com)