Automatic Dam Control System with Vidyut Cable Saver DI-731 for Automation of Barrage Gates

VIDYUT INDUSTRIES, Ahmedabad
email: vidyut_gate@yahoo.com
Mob: +91-9898149917, +91-9996736087
Advantages of Cable Saver System DI-731

- Saves around 90 percent Cable.
- *For example*: In normal system for a Dam or Barrage with 10 gates, we require 3 cables per gate, each cable of 4 core, so in total we require 30 cables of 4 core.
- But by using Vidyut cable saver DI-731 we require only 1 cable of 2 core.
- So,
  - Traditional method → 30 cables of 4 core
  - Vidyut Cable saver method → 1 cable of 2 core

So we *save around 98.333 % of cable cost ...*

*A genuine Cable saver !!!!!!!*

- **Low maintenance and High Reliability**
Other Advantages-

• Contains all the Features of ARMAC with other Extra Features
• Artificial Intelligence Based algorithm based system for automatic operation of Gates along with Computerized PLC system
• Automatic system to maintain the water level in dam reservoir by opening and closing the gates of the dam by itself as configured using Fuzzy Logic.
• In-Built Digital Dial Indicator for Gate Position. (No need to buy Gate Position Indicator)
• In Built Limit trip for Gate Full Close & Full Open Limit Switches.
• In Built Limit Trip Indications.
• Data logging for Water Level, Gate Position, etc
Indications

- Provision of indication of Gate Position of all Gates in the Remote Control Room
- Provision of Graphical Visualizations for Gates
- Provision for Trends for Gate openings for Gates
- Provision of water level for both the banks
- Provision of Graphical Visualizations for Water Level
- Provision for Trends for Water Level for both the Banks

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Gate Operation Panel

Operation Screen to Raise, Lower or Stop Gates

Gate Position Analyzing Panel

Alarm Annunciation Panel
System Highlights

Automatic Dam Control System

• New and efficient complex control method based on the integration of *classical proportional-derivative controller* and *artificial intelligence controller* for real-time operation of spillway gates of a reservoir.

• Artificial intelligence based automatic system to maintain the water level in dam reservoir by opening and closing the gates of the dam by itself.

• A dynamic algorithm for water inflow and level estimation based on remote measurements (suitable for any dam.) to give advance warning for floods

• The optimal dam operation scheme which minimizes environmental and ecological impacts caused by water level fluctuations with adequate dam safety requirements

• Self diagnostic –automatic fault detection system
Gate Opening Trend Graphs

Gate Opening with respect to time

Multiple Gate Openings with respect to time
Database Management

- Data logging for:
  - Gate Position of all Gates
  - Water level
  - Alarms

- Data is logged every second, minutes, hours as per requirement

- Data is logged in:
  - Microsoft Excel
  - Microsoft Access
  - Microsoft Word

- Graphs and Tables can be created according requirement

- Alarms are recorded with time

- All Gate Open-Close Events are recorded with time

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Alarms

- Alarms and Annunciations for
  - Gate Full Open
  - Gate Full Close
  - Gate Stuck
  - Gate Faulty
  - Sensor fail
  - Customizable Alarm
  - Customizable Event Indications

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# Data- Logging

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Comparison

Traditional Method
- No of cables required = $3 \times \text{number of Gates} \times 4\text{core}$
- More costly
- Maintenance is difficult
- Low Reliability
- Difficult operations
- Gate Position indicator is required
- Limit switches are required.

Vidyut- Cable Saver
- 1 cable of 2 core required (saves 90 percent cable costs)
- Less Costly
- Maintenance is easy
- As number of cables is less, reliability is high
- Easy operations
- Inbuilt Gate Position indicator
- Inbuilt limit switches, so need to buy them
Vidyut Cable-Saver Method

Remote Control Room

Only 1 Cable Required

Vidyut Remote Control Unit

GATE-1

4.76 Mts

GATE-2

1.50 Mts

GATE-3

0.00 Mts

GATE-4

3.00 Mts
About us - VIDYUT INDUSTRIES

More than 30 years of service in field of Automation Remote Indication and Controls, we provide total automation solutions like Design, Development, Manufacturing, Installations and Maintenance of the Equipment delivering the Turn Key Solutions.

Managed by Engineers having more than 40 years of experience blended with young innovative execution team to attain to the customer’s need.

We are well-positioned to provide leading edge solutions for Reservoir Water Level Measurements, Dam Automation & Specialized Automation – Control Equipments with Remote Data Transmission with Remote control.

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Some of the major projects where we have supplied our Control equipments are as under:

(1.) 14 Gates of Mahanadhi Project, Raipur, M.P.
(2.) 24 Gates of Behar Project, M.P.E.B(M.P)
(3.) 21 Gates of Bargi Reservoir Project, via.Jabalpur, M.P.
(4.) 8 Gates of Dev Project, via Halol, Gujrat
(5.) 13 Gates of Somsil Project, A.P.
(6.) 13 Gates of Som-Kamla Project, Rajasthan.
(7.) 13 Gates of Tawa Reservoir Project, Via.Itarsi, M.P
(8.) 18 Gates of Bisalpur Irrigation Project, Rajasthan.
(9.) 87 Gates for Sardar Sarovar, Narmada Main Canal from 13 Km to 263 Km.
(10.) 28 Gates of Tanakpur Barrage,NHPC, U.P.
(11.) 7 Gates for Owen Falls, Project,Uganda.
(12.) 9 gates of Kaka Saheb Gadgil Project, Mandsor,M.P
(13.) 10 Gates of Madikheda project, MP
Some of the major projects where our water level indicating equipment are supplied are as under:

   Measurement of water level of upper dam and lower dam and transferring through Fiber Optic Cable to Switch Yard Control Room at a distance of 9 KM and connecting to Turbine Control PLC.

(2) Tehri Hydro Development Corporation, Tehri, Uttranchal.
   120 meter measurement of water level for the reservoir and displaying in remote control room with RS232 output along with Datalogger with hard copy on paper.

   Measurement of water level for dam upstream, tail race level and displaying at dam control room and transmission to remote display in power house control room on 90 mm large display.

(4) Baspa HEP, Himachal Pradesh in the year 2000.

(5) ALLMITY Dam, Karnataka in the year 2002.

   Measurement for water level for the diversion dam and displaying in dam control room with output signal of 0 to 10 VDC.


   Service Back-up provided till 2006 and continued.
   Measurement for water level and displaying in barrage control room complete with remote control system for 22 nos. Barrage gates & 6 nos. Power Channel gates.

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TO WHOM IT MAY CONCERN

This is to certify M/s. Vidyut Industries, Mumbai-Ahemdabad, have manufactured and supplied Digital Water Level Indicator and remote reservoir water level Indicator for Kurichhu Power House. The Digital level indicator supplied and installed for main reservoir since 2001 and for tailrace water level remote indicator for powerhouse are working satisfactorily.

CHIEF ENGINEER

Chief Engineer
Kurichhu Hydro Power Corporation
Gyalpozhiing : Bhutan
MITSUI & CO., LTD.
Purulia Power Office

24/12/2007

To whom so ever it may concern

This is to certify that M/s. Vidyut Industries has carried out Supply, Erection, Testing & Commissioning work of Remote Indication of Water Level for Upper Dam & Lower Dam for our 2 * 225 Mw Purulia Pumped Storage Project thru Mitsui & Co. Ltd. For West Bengal State Electricity Distribution Company Limited, Purulia West Bengal in the year 2006-07.

The total works executed value is Rs. 2,637,549.10.

The system is working satisfactorily since its commissioning.

For Mitsui & Co. Ltd.

Sanjay Kumar
Asst. Project Manager
Certificates and Testimonials

TO WHOM SO EVER CONCERN

This is to certify that Remote Control Panel and Digital Gate Position Indicators, supplied and installed for 21 Nos. Radial Gates of Bargi Dam in the year 1989 by M/s. VIDYUT INDUSTRIES, MUMBAI, is working satisfactorily. The equipments are serviced and repaired regularly as and when required by the Department.

TRUE COPY

(SMT. S. J. SHAH)
A. O. & D.D.O.
CIT, GANDHINAGAR,
AHMEDABAD.

Executive Engineer,
EIII Division No. 2
Dharanagar,

VIDYUT INDUSTRIES, Ahmedabad
email: vidyut_gate@yahoo.com
Mob: +91-9898149917, +91-9996736087