

## TEESTA DAM SPILLWAY STAGE – V, SIKKIM



### SALIENT FEATURES

Location	: Sikkim
River	: Teesta
Power Generation	: 510 MW
Maximum Discharge	: 9500 m <sup>3</sup> /s
Type of dam	: Concrete Gravity Dam Height 50 m
Spillway	: 5 Spans of 9.0 m wide separated by 7 m thick piers
Radial Gates	: 12.0 m (H) 9.0 m (w)
Energy dissipator	: Bucket type

### MAJOR STUDIES

#### Comprehensive model scale 1: 50

- ☺ Approach flow conditions upstream of spillway and power intake
- ☺ Assessment of discharging capacity & pressures on spillway and sluice
- ☺ Performance of bucket
- ☺ Alignment of Power Intake



### RESULTS

- 📄 Design of spillway and breast wall was evolved by CWPRS in consultation with NHPC
- 📄 The discharging capacity of the spillway with breast wall was adequate
- 📄 Approach flow conditions are satisfactory
- 📄 Performance of ski jump bucket is satisfactory for partial gate operation with reservoir at FRL
- 📄 Performance of ski jump bucket is impaired for free flow operation of spillway up to a discharge of 3000 m<sup>3</sup>/s
- 📄 Modifications in divide wall for improvement in flow conditions
- 📄 Dressing of hill on left bank downstream of spillway for better flow conditions
- 📄 Pre-formed plunge pool recommended



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Service Through Research

CENTRAL WATER AND POWER RESEARCH STATION,  
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## AREAS OF ACTIVITIES AT THE CWPRS

- \* HYDROLOGY AND WATER RESOURCES ANALYSIS
- \* RIVER ENGINEERING
- \* RESERVOIR AND APPURTENANT STRUCTURES
- \* COASTAL AND OFFSHORE ENGINEERING
- \* SHIP HYDRODYNAMICS
- \* HYDRAULIC MACHINERY
- \* APPLIED EARTH SCIENCES
- \* MATHEMATICAL MODELLING
- \* INSTRUMENTATION AND CONTROL ENGINEERING
- \* FOUNDATION AND STRUCTURES
- \* INFORMATION SYSTEM (WATER AND POWER)

## RESERVOIR AND APPURTENANT STRUCTURES

### FACILITIES

Large size covered and open model trays, Glass sided and Tilting flumes for hydraulic model studies. Precision Equipment for measurement of hydraulic parameters with data acquisition system. Workshop facilities for fabrication models Equipment for Field data Collection, Computer Center Numerical models for aeration devices and water hammer analysis.

### AREAS OF SPECIALIZATION AND MAJOR STUDIES

#### STORAGE AND DIVERSION STRUCTURES

The study of storage and diversion structures include spillways, energy dissipators and appurtenant structures such as training walls, divide walls, downstream protection works.

❖ Spillway and Energy Dissipators : Bhakra, Salal, Sardar Sarovar, Chamera, Srilsailam, Nathpa Jahakri, Dhauliganga, Tala (Bhutan), Kurichu (Bhutan), Chukha (Bhutan), Bekhme (Iraq), Bakurman (Iraq), Khaliikan (Iraq), Sedwagyi (Myanmar), Ukai, Kadana, Dharoi, Baira-Siul, Mahi Bajaj Sagar, Matrikundai, Ranjitsagar, Icha, Rajghat, Khandong, Thoubal, Doyang.

❖ Appurtenant Structures : Assessment of hydrodynamic pressures/forces and bending moments on divide walls, chute, baffle blocks, breast walls, stilling basin apron and plunge pool lining for Sardar Sarovar, Salal, Bekhme (Iraq), Icha, Ranjitsagar, Ranganadi and Koyna Projects.

#### CONTROL STRUCTURES

The study of structures controlling and guiding high velocity flows include gate, tunnels and outlets. The major studies include assessment of hydrodynamic uplift and downpull and estimating air demand of gated outlets. CWPRS is the only laboratory in India using the state-of-art equipments for studies with the help of hydraulic models.

❖ Gates : Sardar Sarovar, Tala, Chamera, Supa, Beas, Mahanadi, Malaprabha, Cheruthoni, Kadana, Ukai, Idukki, Bhira.

#### CONVEYANCE STRUCTURES

The studies include intakes, penstocks, surge shafts, tunnels.

❖ Projects : Sardar Sarovar, Bhira Surge Tank, Indira Sarovar, Kakkad, Indravati, Doyang, Baira-Siul, Beas P3R, T1, T2 Tunnels, Pandoh Baggi, Koyna and Salal Tail Race Systems, Koyna Lake Tape, Srisailam Intake, Kalinadi Surge Shaft.

❖ Mathematical Modelling for water hammer analysis for Ghatghar and Kal Projects.

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