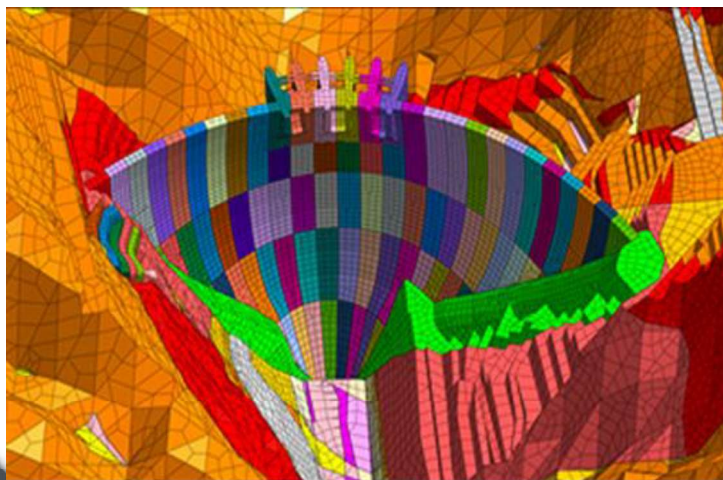
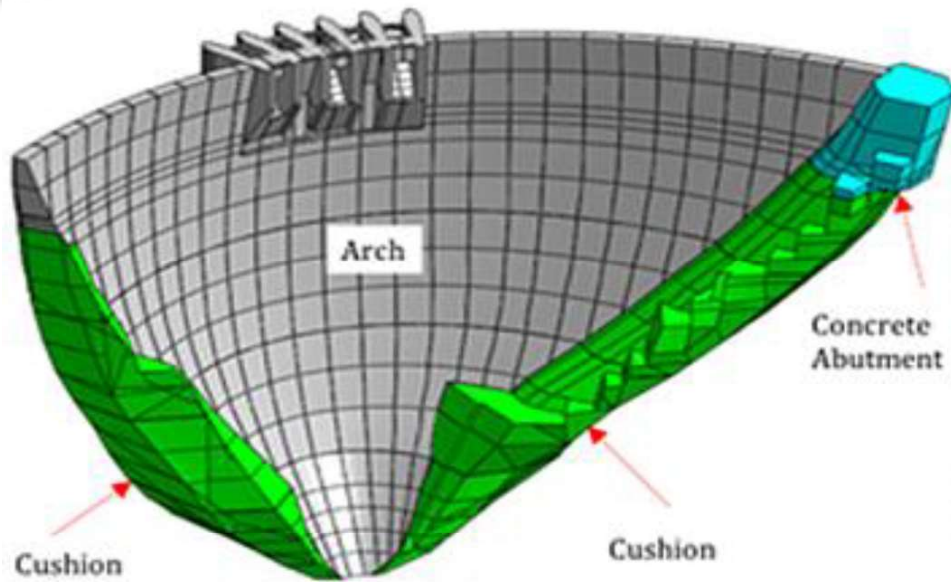


Project Applications & Case Studies

- Yusufeli Hydroelectric Project, Turkey
- Buhang Dam, South Korea
- Shahpurkandi Dam Project, Punjab
- Shongtong Karcham Hydroelectric Project, HP
- Tehri Pumped Storage Plant, Uttarakhand
- Polavaram Hydroelectric Project, AP
- Kundah Pumped Storage Plant, TN

Yusufeli Hydroelectric Power Project, Turkey

FEA NX

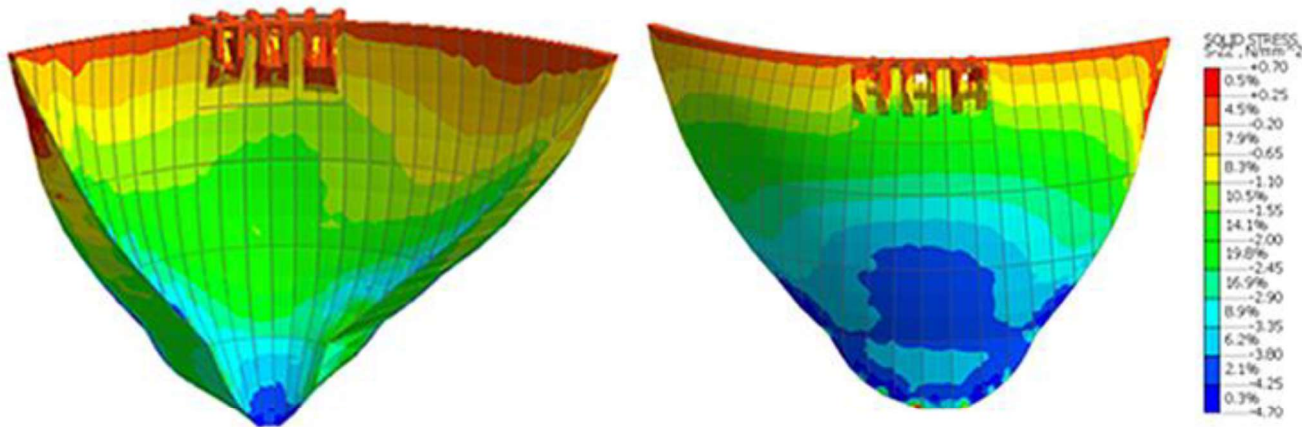


Yusufeli Dam is a 275 m high variable thickness double-curvature thin concrete arch dam (**Figure 1**) that forms the water impoundment for a 580 MW power station on the Coruh River in Artvin Province, north-eastern Turkey. Being Turkey's highest dam, the facility meets the electricity needs of nearly 2.5 million people.

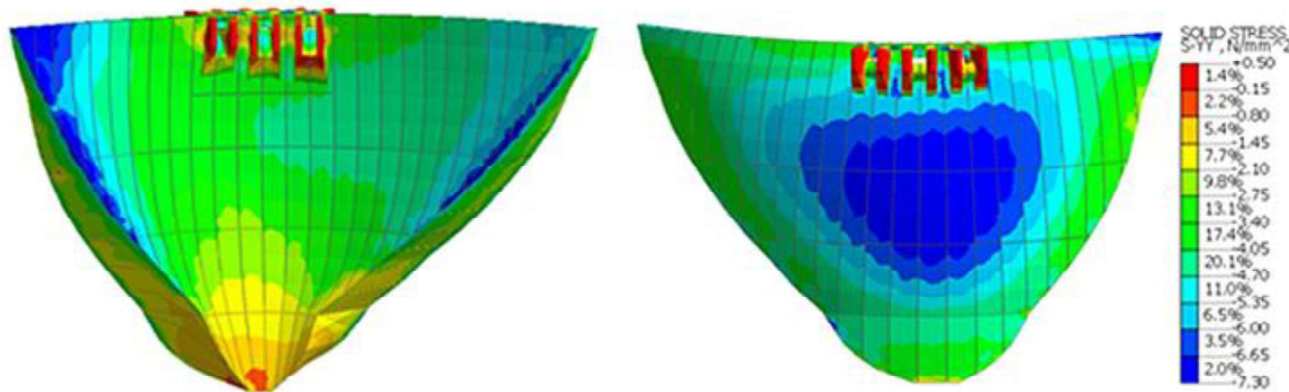
Engineering Consultant: ARQ Consulting, South Africa
Owner: General Directorate of State Hydraulics, Turkey



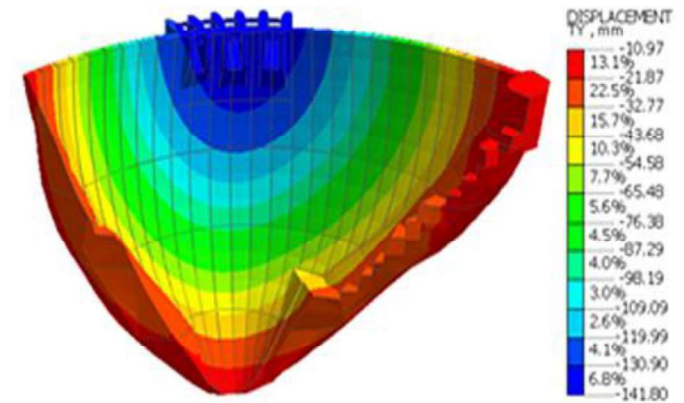
Analysis Results



Vertical (cantilever) stress results on the downstream and upstream face of the dam



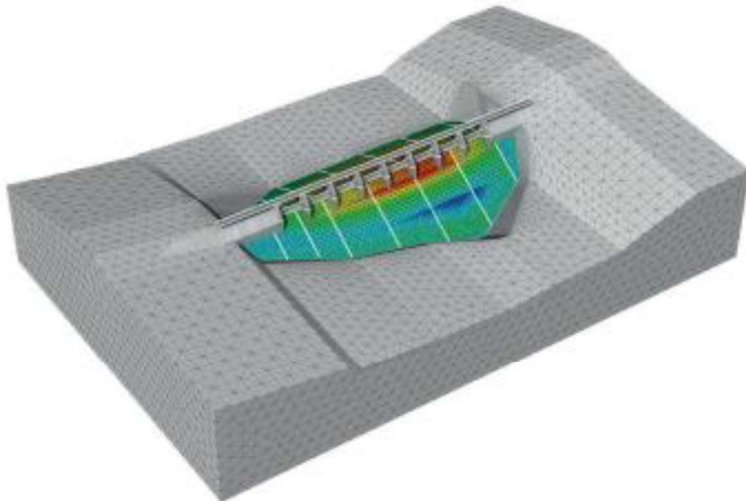
Horizontal stress results on the downstream and upstream face of the dam



Radial displacement results of dam body

Buhang dam South Korea

FEA NX



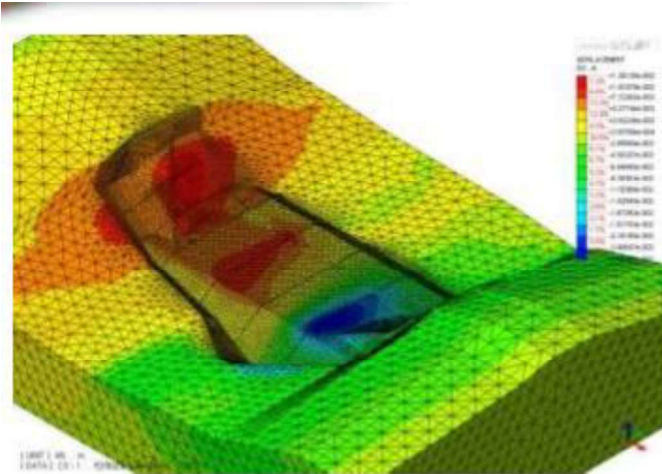
Buhang Dam is a 472m long and 75m high concrete gravity flood control dam located in South Korea. After typhoon Rusa passed, a dam was deemed to be necessary to prevent flood damage. It is expected to contribute to the development of local communities through the supply of river maintenance water for dams and minimization of flood damage in the Gimcheon coastal area around Gimcheon City.

Engineering Consultant: GS Engineering & Construction

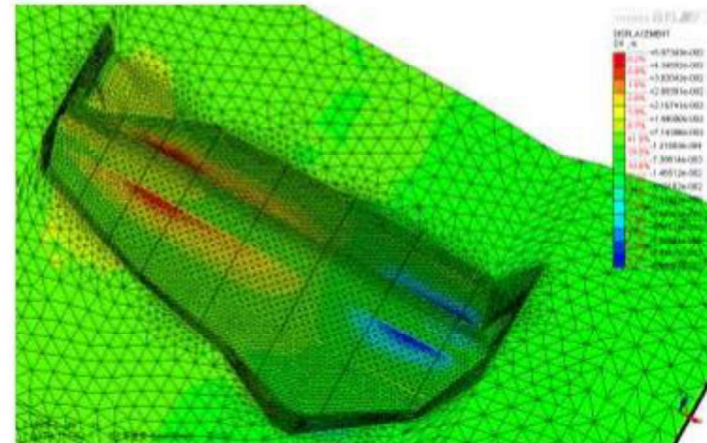
Owner: Korea Water Resources Corporation



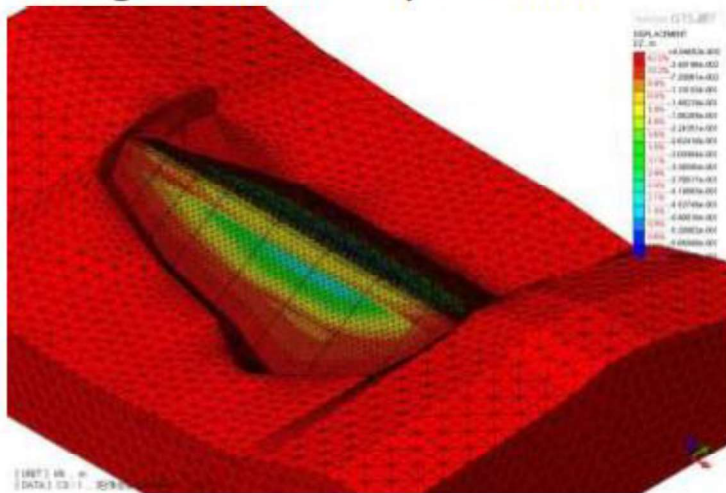
Buhang dam South Korea



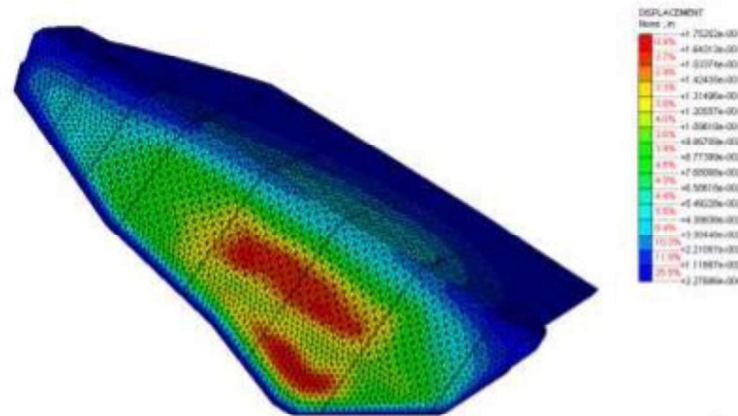
Stage 2: Total Displacements



Stage 5: Horizontal Displacements

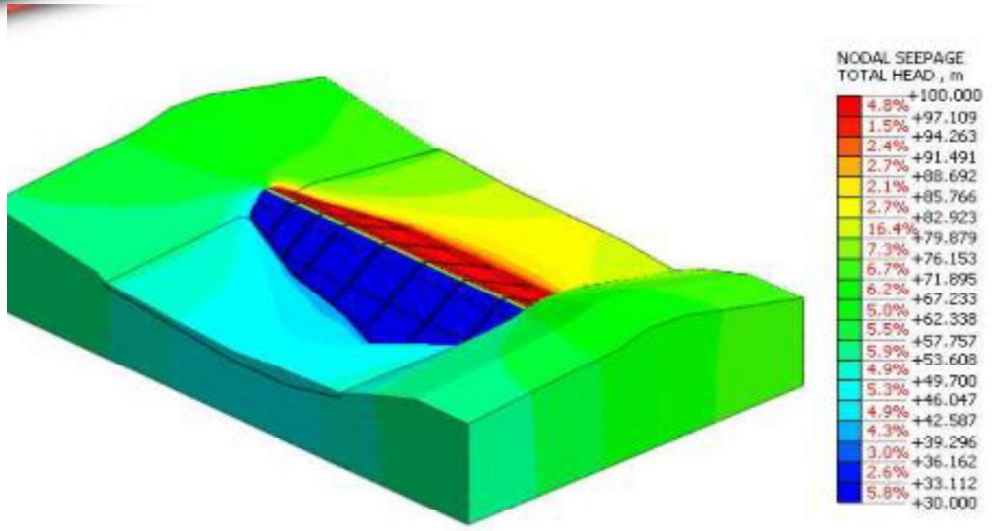


Stage 4: Vertical deflection

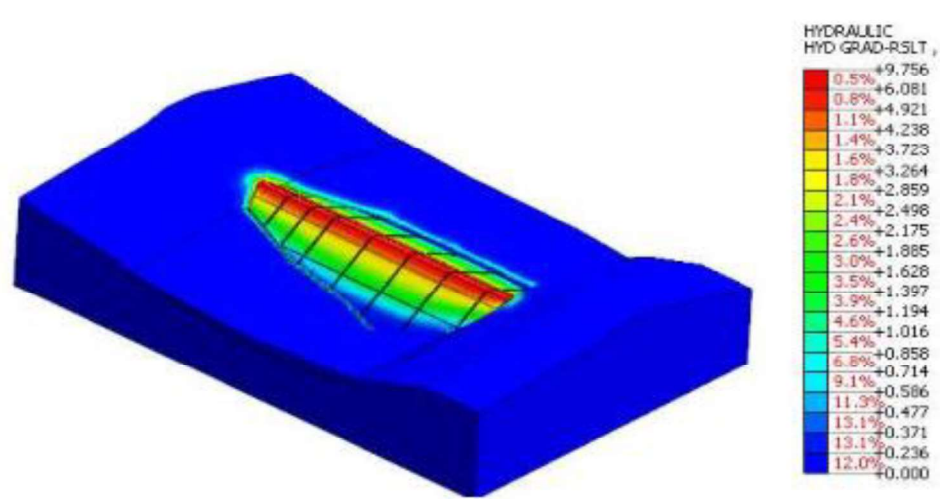


Stage 5: Hydrostatic pressure

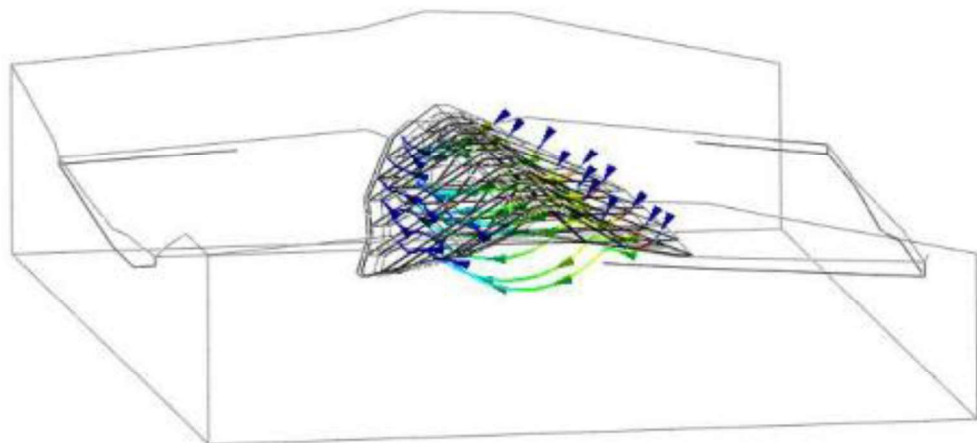
Buhang dam South Korea



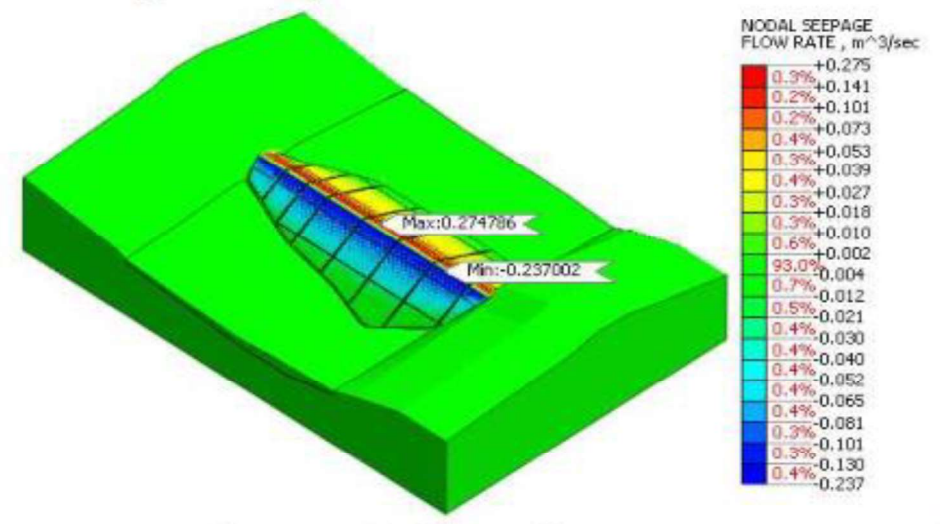
Stage 5: Total Head



Stage 5: Hydraulic Gradient



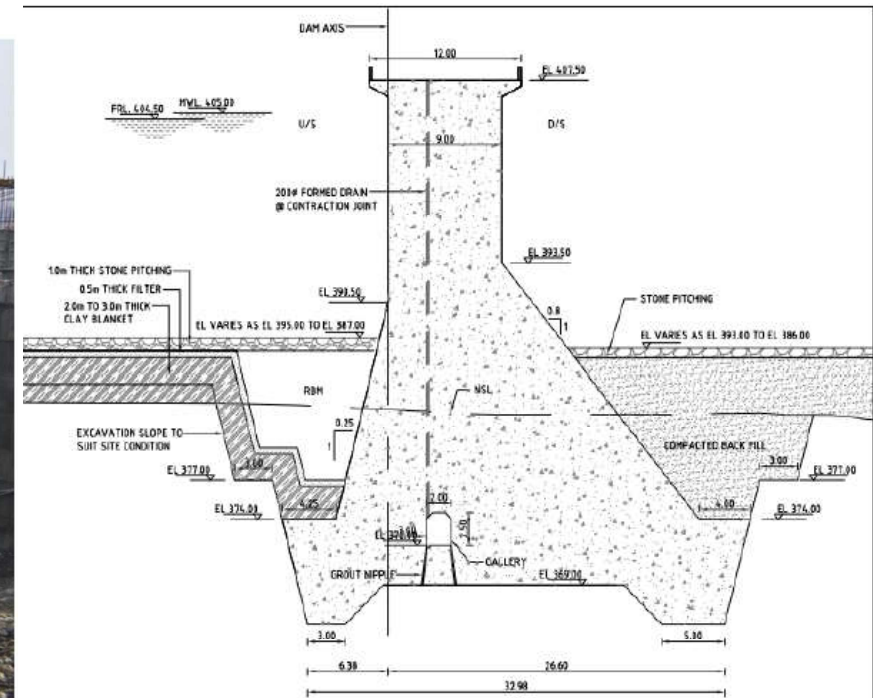
Stage 5: Flow Paths



Stage 5: Flow Rate

Shahpurkandi Dam Project, Punjab

FEA NX



Shahpurkandi dam project is presently under construction across the river Ravi near Shahpurkandi village in Pathankot district of Punjab state. The project envisages, construction of 54.50m high concrete dam across river Ravi which is located 11 km downstream of existing Ranjit Sagar dam. The water from the Ravi River will be stored upstream of the proposed dam and diverted to feed to the canals, namely Shahpurkandi Hydrel channel taking off from left bank. This will harness the supplies released from Ranjit Sagar dam for providing irrigation to high lying areas of J&K and for power generation of 168 MW. This will also act as balancing reservoir for ensuring uniform supplies and to enable Ranjit Sagar power plant to work during peak hours.

Owner: Water Resources Department Punjab

Engineering Consultant: AFRY India (hydraulic structures) and SMEC India (concrete dam)

Contractor: SOMA Developers and Constructors

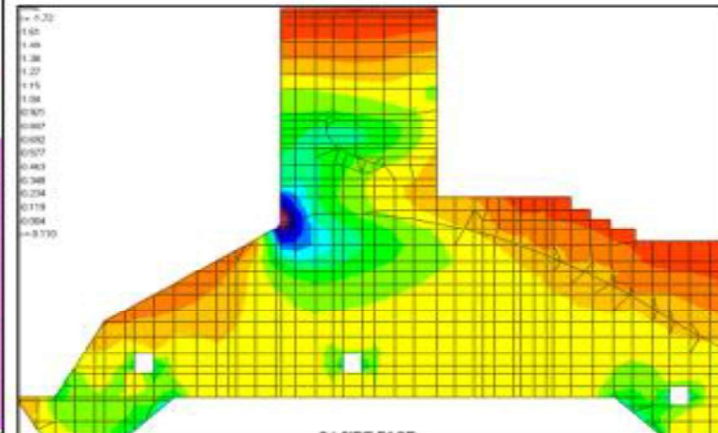
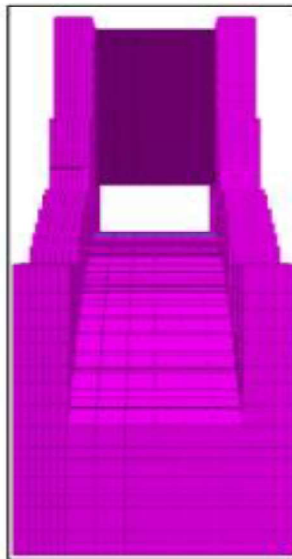
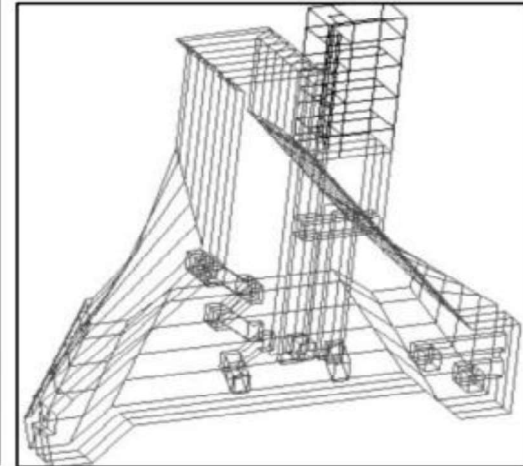
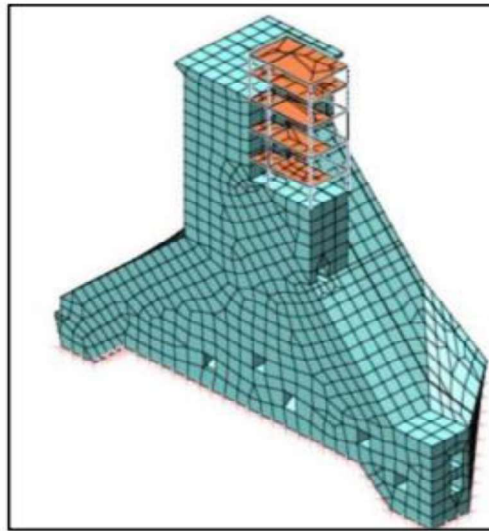
Type of Structure: Concrete gravity dam blocks and powerhouse

Program used: 3D stability and stress analysis using Midas FEA-NX software

MIDAS

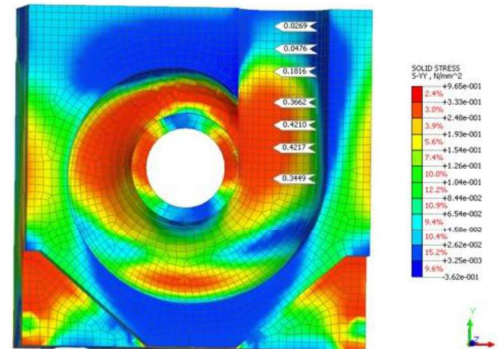
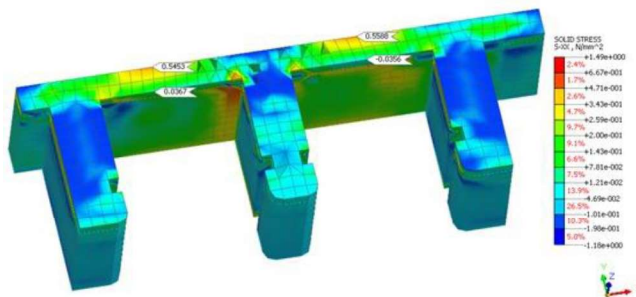
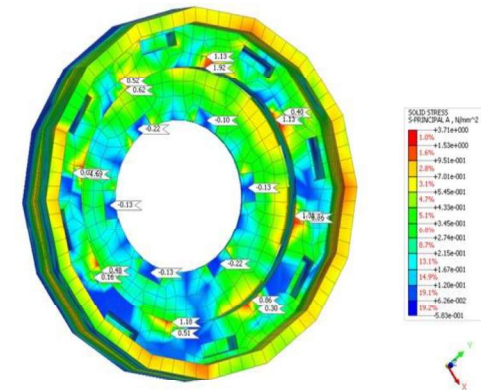
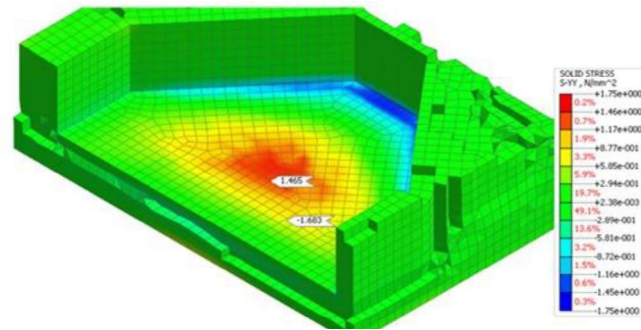
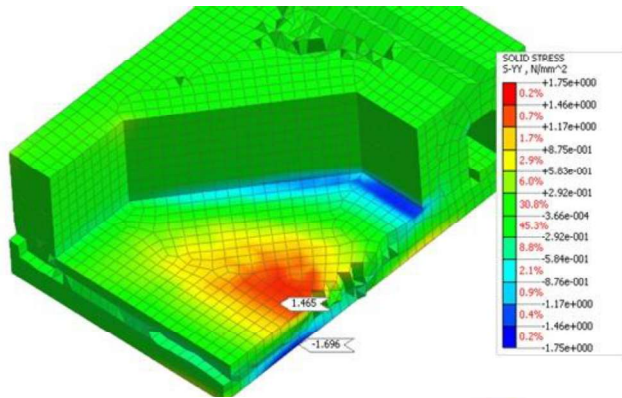
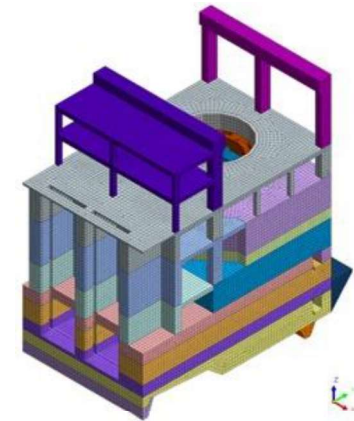
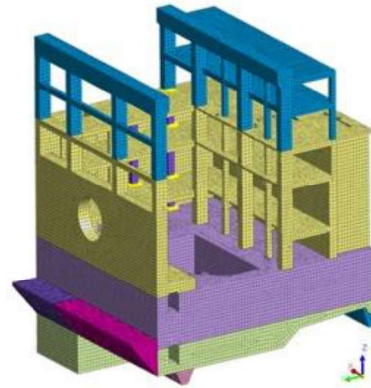
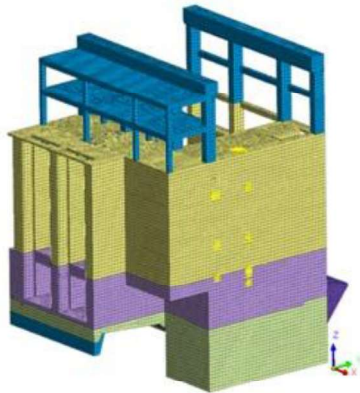
Shahpurkandi Dam Project, Punjab

FEA NX



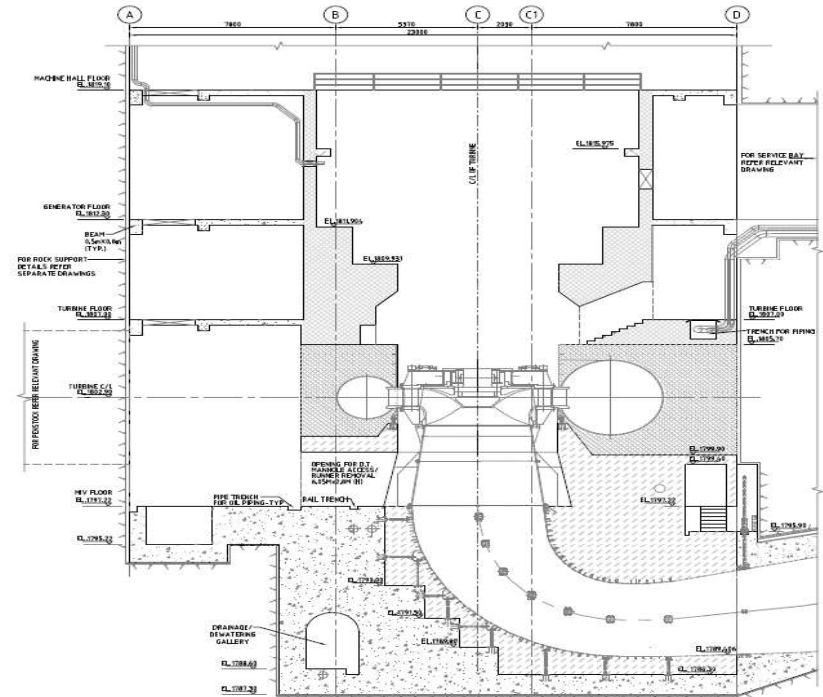
Shahpurkandi Dam Project, Punjab

FEA NX



Shontong Karcham Hydroelectric Project, HP

FEA NX



Shongtong Karcham Hydroelectric Project is a run-of river project, proposed on the River Sutlej in the Kinnaur district of Himachal Pradesh with barrage. This project envisages construction of a 24m high barrage, about one and half kilometre upstream of the confluence of Tangling Khad with Sutlej River near Powari village.

Three vertical axis Francis turbines are proposed to be installed in the underground Powerhouse having 450MW (3X150MW) installed capacity. All the components of the projects are proposed to be located on the left bank of the Sutlej River

Owner: Himachal Pradesh Power Corporation Ltd (HPPCL)

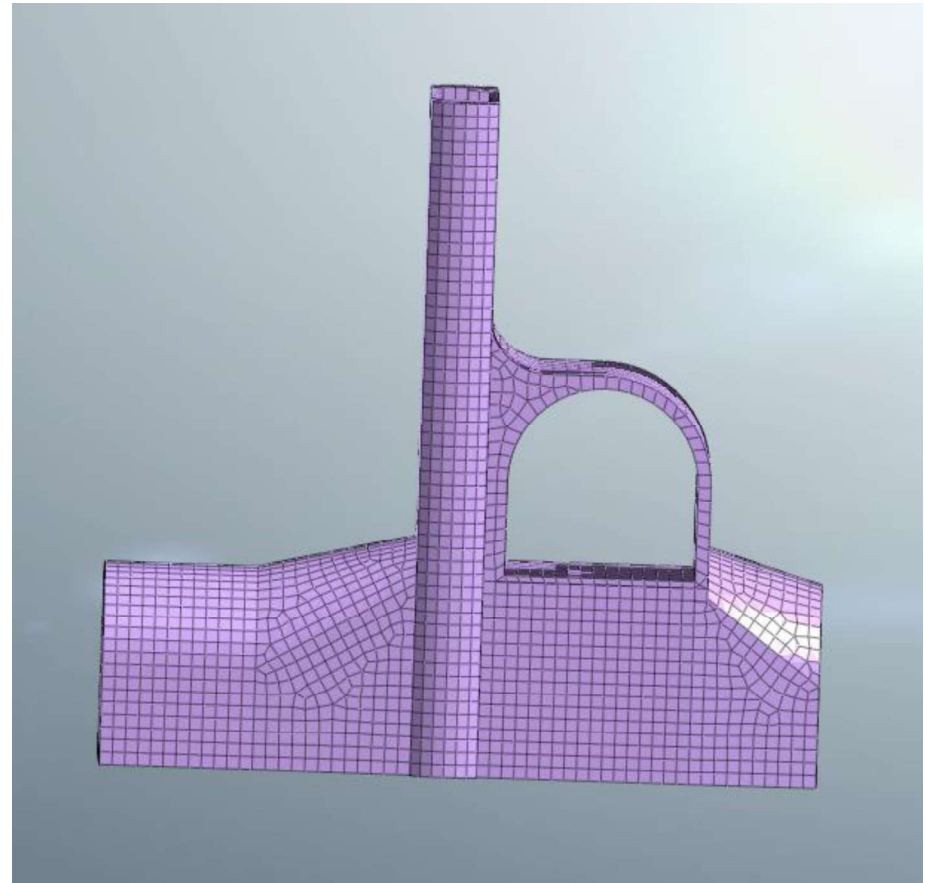
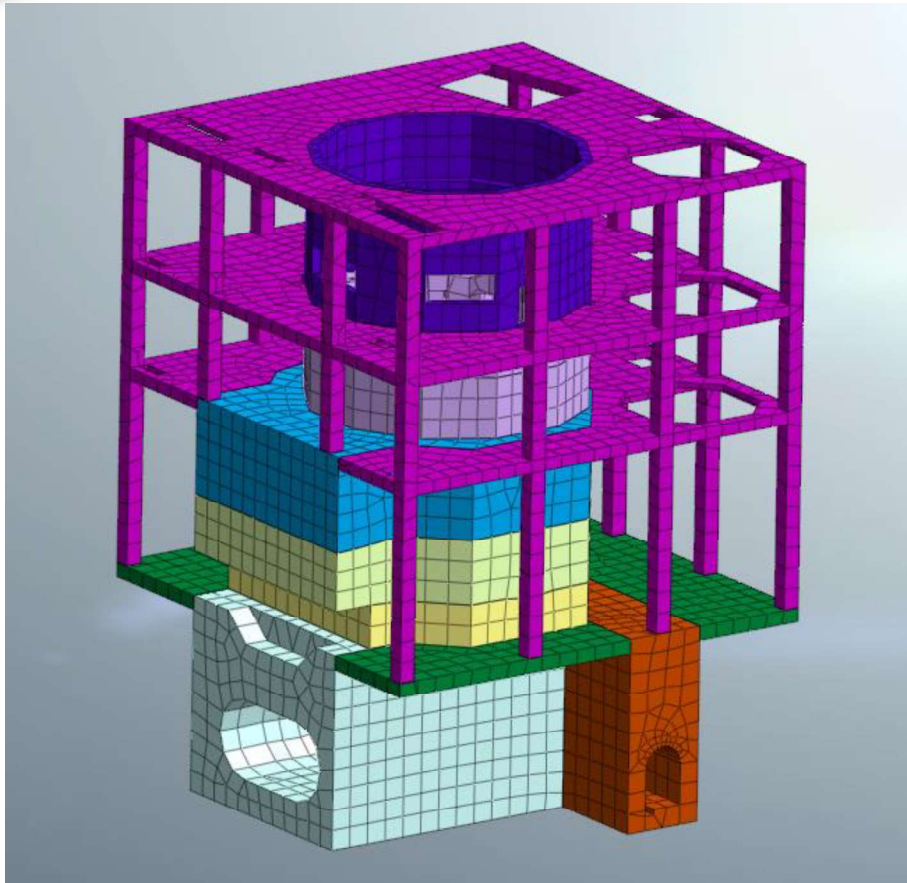
Engineering Consultant: SMEC India

Contractor: Patel Engineering Ltd

Type of Structure: Hydroelectric powerhouse, junction of draft tube, surge gallery and GOC

Program used: 3D stress analysis using Midas FEA-NX software

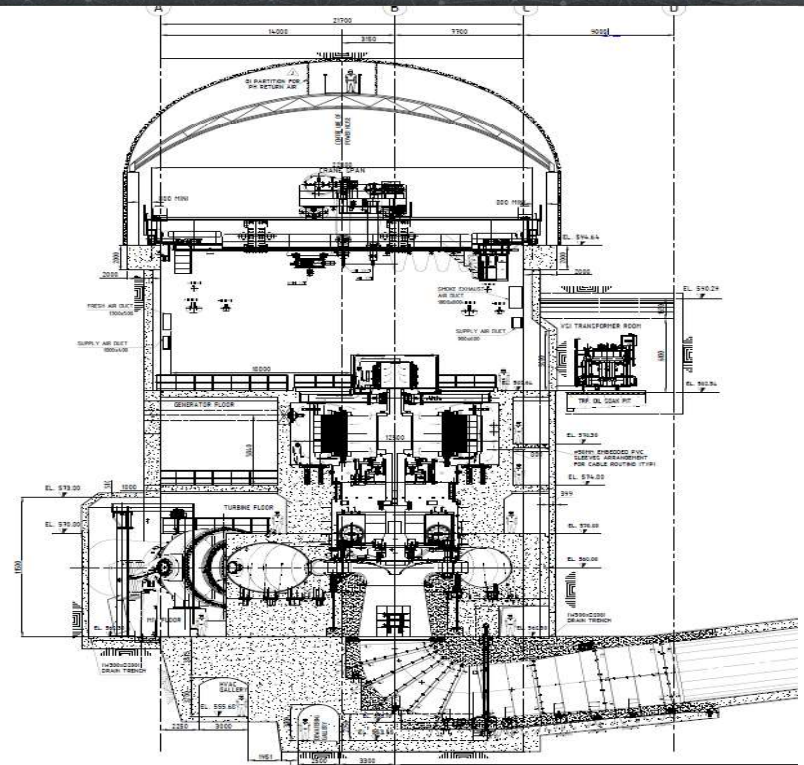




The powerhouse structure total length at level of the Service Bay (EL 1819.1) is 131.5 m including control room building and a transverse width of 23 m. It comprises a machine hall for the three-unit bays each separated by transverse contraction / expansion joints. Service Bay is located adjacent to Unit bay- 1 and is separated by transverse contraction / expansion joints from Unit Bay 1. Control room building is located adjacent to the unit bay-3 and its size is about 23.0m x 20.0 m. The building is envisaged to be a six-storey reinforced concrete frame structure.

Tehri Pumped Storage Plant, Uttarakhand

FEA NX



The Tehri Dam Project is a prestigious hydropower cum pumped storage project and is the first major attempt to harness the vast hydropower potential of the Bhagirathi River which is fed by the Gangotri Glacier. The storage project lies in the Bhagirathi valley in Uttarakhand in Northern India. The project envisages impounding of surplus monsoon water of river for utilizing it in a regulated manner for hydropower generation and irrigation. The mega project when completed will have an installed capacity of 2450MW.

Owner: THDC Ltd.

Engineering Consultant: SMEC India

Design Proof Checker: AFRY India

Contractor: Hindustan Construction Company (HCC)

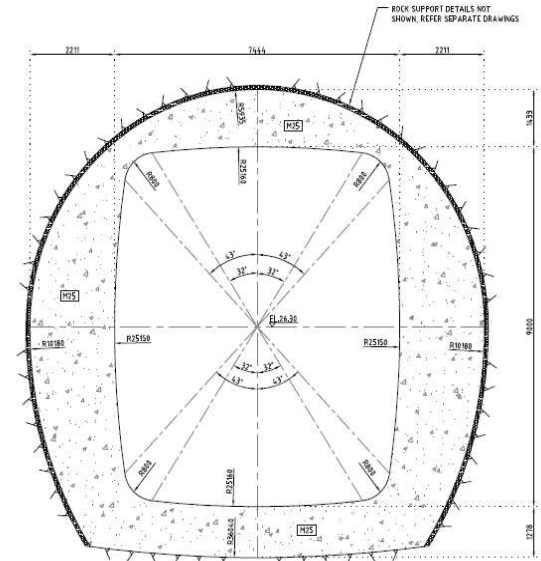
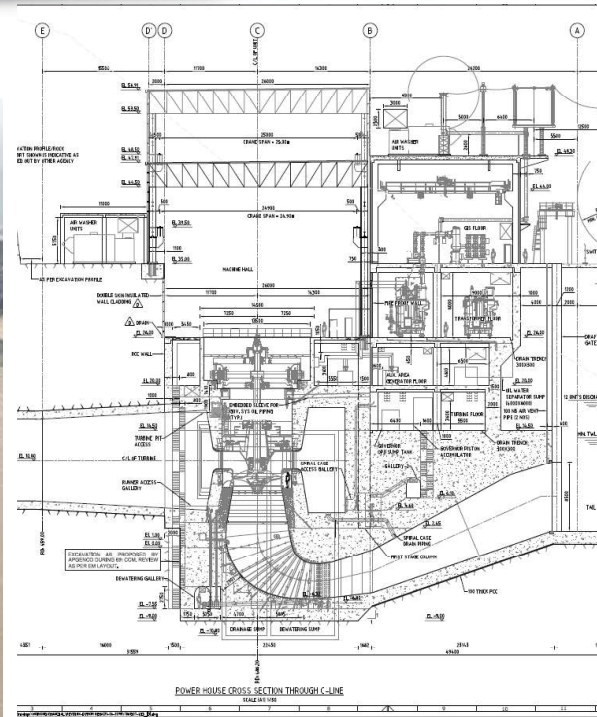
Type of Structure: Powerhouse

Program used: 3D stress analysis of turbine generator foundation using Midas FEA-NX software



Polavaram Hydroelectric Project, Andhra Pradesh

FEA NX



The Polavaram Project is a multipurpose project, proposed across Godavari River near Polavaram village, situated at about 42 km upstream of Godavari Barrage at Dowlaiswaram. The proposed Power Generation Complex is aligned across an existing ridge on the left bank of the river Godavari with the Intake just upstream of the left flank of Earth Dam and the Tail Race releasing just downstream.

Owner: Polavaram Hydroelectric Project Corp Ltd

Engineering Consultant: SMEC India

Contractor: Navayuga Engineering Company Ltd

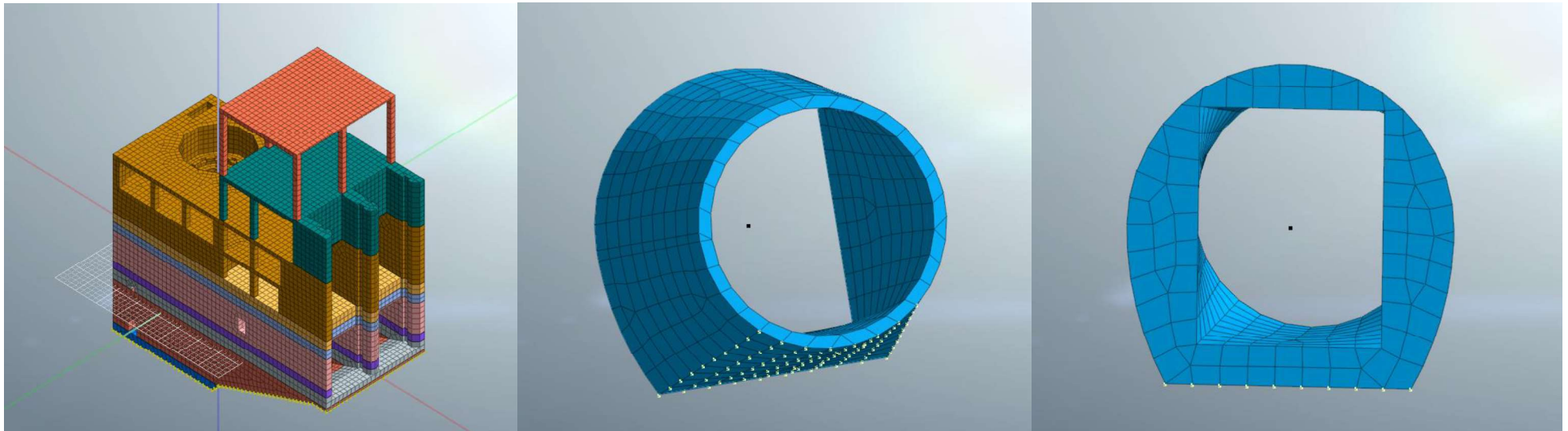
Type of Structure: Hydroelectric powerhouse

Program used: 3D stress analysis using Midas FEA-NX software



Polavaram Hydroelectric Project, Andhra Pradesh

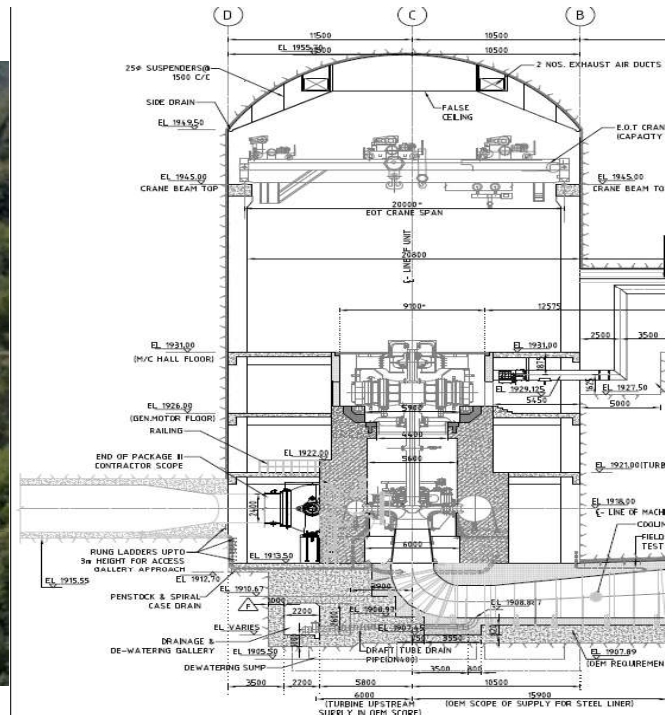
FEA NX



The Intake structure is provided with a rectangular profile at gate location. The size of 7.0m (W) x 9m (H) has been proposed for vertical lift service gates and one set of stop log gates which are to be operated from the platform at El 48.22m. For smooth hydraulically efficient flow, a transition (d/s of service gate) of length equal to 9.0m from rectangular section of 7.0m (W) x 9m (H) at the gate to the 9.0m diameter circular section of Pressure Tunnel has been proposed.

Kundah Pumped Storage Hydro-electric Project, TN

FEA NX



The proposed Kundah Pumped Storage Hydroelectric Project is located in Nilgiris hills of Tamil Nadu. In this project proposal, no new reservoir is proposed. Both the reservoirs will be connected with tunnels which will serve as Head race and Tail race water conductor system. An underground powerhouse with 4 units of 125MW will be constructed between the two reservoirs and connected with the tunnels. The project site is about 27km from Udthagamandalam (Ooty) and 125km from Coimbatore Airport.

Owner: Tamil Nadu Generation & Distribution Corp Ltd

Engineering Consultant: SMEC India

Contractor: Megha Engineering & Infrastructure Ltd.

Type of Structure: Hydroelectric powerhouse

Program used: 3D stress analysis using Midas FEA-NX software



Kundah Pumped Storage Hydro-electric Project, TN

FEA NX

