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SARDAR SAROVAR DAM PROJECT (SSDP)

Mr. Saigaurav. D. Dambhe1, Mr. Piyush.M. Karmarkar2, Mr. Sanket P. Turankar[3], Prof. Y.R.Borkar[4]
[1,2,3]*UG Student, Dept. of Civil Engineering, JDIET, Yavatmal, India*
[4]*Asst. Professor, Dept. of Civil Engineering, JDIET, Yavatmal, India*

ABSTRACT
The Sardar Sarovar Dam is a gravity dam on the Narmada River passing from Gujarat in India. It is the major dam and part of the Narmada Valley Project, a large hydraulic engineering project pertaining to of a series of large irrigation and hydroelectric multi-purpose dams. The project take form in 1979 as part of a development scheme to raise irrigation and assemble hydroelectricity. The state governments of Gujarat and Madhya Pradesh allege that the Sardar Sarovar Project (SSP) and the Narmada Sagar Project (NSP) would irrigate 1.9 million ha and 0.14 million ha of land and generate 1,450 megawatts (mw) and 1,000 mw of power, respectively. After exploratory current status of the project on the freedom of benefits as per official data the squabble is always in favour of the Sardar Sarovar Project as the repayment are so large that they to a large extent dominate over the costs of the immediate human and environmental interruption without the dam, the long term costs for people would be much greater and lack of an income source for future generations would put escalating pressure on the situation.

KEYWORDS: Sardar Sarovar, Gravity dam , Narmada River.

INTRODUCTION

The Dam on river Narmada was expected for the welfare of four states namely-Gujrat, Madhya Pradesh, Rajasthan and Maharashtra.

Under this award, Gujarat was allocated 11,000 Mm^3 signifying about one-third of the 75 percent trustworthy usable annual water flow, and was authorized to implement a project comprising: (i) the Sardar Sarovar Dam, (ii) a 1,200 megawatt (MW) river bed source of power (RBPH), (iii) a 250 MW canal head powerhouse (CHPH), (iv) a canal system to irrigate 1.87 m. ha in Gujarat and 70,000 ha in Rajasthan, and (v) a water supply system for about 30 million people in the drought- prone areas of Saurashtra and Kachchh.

On this basis, Gujarat geared up the Sardar Sarovar Project in 1980, which was to be implemented in various phases over a period of about 20 years. Phase I comprised of: (i) the Sardar Sarovar Dam, (ii) the RBPH, (iii) the CHPH, (iv) the first 144 km of the main canal up to the Mahi River, and (v) a network of branch and distribution canals and drainage system to irrigate about 450,000 high.

In the history of human endeavor to intervene and tie together the natural chattels for its welfare, Sardar Sarovar Project emerges as one of the very few projects across the globe that have played a significant role in bettering the quality of life for millions. With its unique features and unparallel magnitude, SSP has unquestionably occupied a remarkable position on the world atlas of water resources development. Apart from its assorted benefits in terms of long term water, energy and food security and thereby sustainable development of Gujarat State, SSP has overcome many engineering and technological challenges during its journey from concept to its present stage. In true sense, it is the Engineering Marvel. TIME quarterly, in 1994 the Narmada Project as one of the "Eight Modern Wonders Abuilding". Such a appreciation brings to the Project that glory which the Tajmahal enjoys in the field of primordial structures.

Specifications and Capacities

The SSD is a 1,210 m stretched concrete gravity dam with a proposed final height of 163m above the deep foundation. Its present height is 121.9 m. Its creation required torrential of about seven million cubic metres of chilled concrete. The Sardar Sarovar reservoir, built for the main dam, has 0.95 million hectare metre (M.Ha.m) of gross storage capacity and 0.586M.Ha.m of live storage capacity.

It occupies an area of 37,000ha with an run of the mill length of 214km and width of 1.7km. The river catchment area above the dam site is 88,000 square kilometres. It has a spillway discharging capacity of 87,000 cubic metres a second.

The dam and the reservoir outside edge have been installed with refined seismological instruments for calculating the stresses. Seven chute spillway radial gates and 23 service spillway gates are installed for flood bridle.The full reservoir level of the SSD is 138.6m, the ceiling water level is 140.2m and least draw down level is 110.6m. The tail water level is about 25.9m.

PROJECT DESIGNING

The project preparation and organization took a span of four years from identification in the year 1979 to pre- appraisal in 1983.

It was completed by Narmada Planning group with assistance from the United Nation Development Program (UNDP). Later in the year may 1988, responsibility for the implementation of the project was transferred from the Narmada Development Department, a government agency, to the Sardar Sarovar Narmada Nigam Ltd. (SSNNL), a parastatal corporation organized along functional lines.

The Bank and borrowers reviewed the basic hydrological data used for the project design and gave a satisfactory report.

The Narmada Water Dispute tribunal had set the annual 75 percent dependable water availability for the project at 28 million acre feet (MAF) (34,580 Mm^3) with 65.2 percent allocated to Madhya Pradesh, 32.1 percent to Gujarat. 1.8 percent to Rajasthan, and 0.9 percent to Maharashtra project design.

The project vested its first priority to water supply, second to irrigation and the last to power generation.

As per the original design of the project, the Sardar Sarovar dam was to irrigate 17.92 lakh ha land in Gujrat and 73,000 ha of land in two districts of Rajasthan.

The beneficiary states claimed that in the first phase of command area development, a total of 2.46 lakh ha land of would be irrigated. At the time of raising the height the height of the dam to 121.92 m, it was estimated that 3.5 lakh ha of additional land will be brought under irrigation.

In May 1994, Narmada Bachao Andolan sued in the Supreme Court of India to restrain further construction, technically by asking the question of whether the terms of the NWDT Award and related agreements regarding resettlement were being carried outvi. The apex Court responded in January 1995 with a stay order restricting construction of the Sardar Sarovar Dam which has already-attained 80.5 meter (263.3 feet) height for five years to provide additional time for resettling oustees. Sardar Sarovar Dam (SSD), on the Indian Narmada river, is located in the village of Kevadia in the state of Gujarat. It is one of the largest and most controversial interstate, multipurpose river valley infrastructure development projects in the country. The Sardar Sarovar Project (SSP) also consists of auxiliary works and a 1,450MW power complex.

SSP was estimated to have cost INR400bn ($8bn) in 2010-2011, revised from the initial estimate of INR64bn ($1.25bn) in 1988. It is part of the Narmada Valley Development Project, a major plan to generate power and supply water for drinking and irrigation to states of Gujarat, Madhya Pradesh and Maharashtra.

The scheme was conceived by the late Sardar Vallabhbhai Patel in 1946-1947. It envisages the construction of 30 major dams, 135 medium and 3,000 smaller dams along the river, with SSD being the largest of them all. They are expected to generate about 4,000MW of power in total.

Sardar Sarovar Dam (SSD) :

Dam:

Type: concrete gravity
Length of main dam: 1210.02 m.
Top R.L. of dam: 146.50 m.
Maximum height above deepest foundation level: 163.00 m.
Spillway:
Type: ogee
Energy dissipation arrangement: Stilling basin with Sloping apron
Crest level of spillway: R.L.121.92 m.
Type: Radial
Number and size: 7 nos.
18.30 m × 18.30 m
23 nos.
18.30 m × 16.76 m
Spillway capacity: 84949.25 cusec (30 lakh cusec)

Height of the Sardar Sarovar Dam in Gujarat was increased to 121.9m in 2006.

Power Installation:

River bed power house Canal head power house
Number of unit: 6 5
Rated capacity
Of each unit: 200 mw 50 mw
Installed capacity: 1200 mw 250 mw
Type of turbine: Francis vertical Kaplan (Reversible) (Convention surface)
Type of power
House: Underground Surface

Canal System:

F.S.L at H.R: 91.45 m (300 ft.)
Main canal:
Length: 460 km.
Base width in head reach: 76 m.
F.S.D in head reach: 7.6 m.
Discharge capacity in head reach: 1132.66 cumec (40,000 cusec)
Type of canal: Lined contour canal.

BENEFITS OF PROJECTS:

After probing current status of the project on the delivery of benefits as per official data the dispute is always in favour of the Sardar Sarovar Project as the benefits are so large that they considerably

preponderate over the costs of the immediate human and environmental disruption. Without the dam, the long term costs for people would be much greater and shortage of an income source for future generations would put mounting pressure on the environment.

If the waters of the Narmada River continue to flow to the sea unutilized, then there appears to be no unusual to swelling human deprivation, particularly in the dry areas of Gujarat and Rajasthan.

The Project has the budding to nosh 20 million people, supply domestic and industrial water to 30 million, and provide employment to more than 1 million. Apart from the above benefits it provides valuable summit electricity in areas with high unmet power demand.

Gujarat has arriving Rs 4,887 crores and Rajasthan has received Rs 625 crores under the Accelerated Irrigation Benefit Programme from 1996 to 2008 from the Central Government for the Sardar Sarovar Project (SSP) command area for creation of the canal network which is filling behind.

However the drinking water remuneration of the SSP have always been presented as a strong argument in its favor, whenever it was gripped by controversy. The government of Gujarat also planned to generate solar power by placing solar panels over the canal, and making it beneficial for the surrounding villages to get power and to reduce the vanishing of water.

The Narmada Basin hydro-meteorological (hydromet) network for forecasting flood and reservoir procedure is another important project component.

The dam will also irrigate 17,920 km2 (6,920 sq. mi) of land spread over 12 districts, 62 talukas and 3393 villages (75% of which are drought-prone areas) in Gujarat and 730 km2 (280 sq. mi) in the waterless areas of Barmer and Jalore districts of Rajasthan. The dam will also provide flood safety to riverine reaches measuring 30,000 ha (74,000 acres) covering 210 villages and Bharuch city and a population of 400,000 in Gujarat.

• International special symbol for works and installations containing dangerous forces

• Dam failures are generally catastrophic if the structure is breached or significantly damaged.

Causes of Dam Failure:

• Routine deformation monitoring and monitoring of seepage from drains in and around larger dams is handy to anticipate any problems and permit remedial action to be taken before structural failure occurs.

• Most dams integrate mechanisms to permit the reservoir to be lowered or even drained in the event of such problems. Another solution can be rock grouting - pressure pumping Portland cement slurry into weak fractured rock.

• During an fortified conflict, a dam is to be considered as an "installation containing dangerous forces"due to the massive impact of a possible demolition on the civilian population and the environment.

• To facilitate the identification, a protective mark consisting of three bright orange circles placed on the same axis is defined by the rules of IHL.

• The main causes of dam failure include inadequate spillway capacity, piping through the embankment, foundation or abutments, spillway design error, geological shakiness caused by changes to water levels during filling or poor surveying, poor protection, especially of outlet pipes, extreme rainfall, and human, computer or design error.

CONCLUSION:

1) The Sardar Sarovar Project will provide irrigation facilities to 18.45 lakh hec. of land, covering 3112 villages of 73 talukas in 15 districts of Gujarat. It will also irrigate 2,46,000 ha. of land in the strategic desert districts of Barmer and Jallore in Rajasthan and 37,500 ha.

2) A special allocation of 0.86 MAF of water has been made to provide drinking water to 131 urban centres and 9633 villages (53% of total 18144 villages of Gujarat) within and out-side command in Gujarat for present population of 28 million and prospective population of over 40 million by the year 2021.

3) There are two power houses viz. River Bed Power House and Canal Head Power House with an installed capacity of 1200 MW and 250 MW respectively. The power would be shared by three states - Madhya Pradesh - 57%, Maharashtra - 27% and Gujarat 16%.

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