

Organization Chart for Design Wing

Chief Engineer (Design), SSNNL, Gandhinagar.					
Superintending Engineer, Narmada Project Design Circle, Gandhinagar.					
	Unit-1	Unit-2	Unit-3	Unit-4	Unit-5
Activities allotted	CR Planning	Canal Syphon	Mech. Design of Radial & Vertical Gates,	All types of Bridges- UVRB, VRB, SHRB, NHRB , ODRB & design of foot bridge	Flood Memorandum
	Stability of Canal Bank Section	Drainage Syphon	Design of Stop log and Hoists		Permission for Utility Crossings.
	Design of Combined structures	Head Regulator	Canal Automation		Quarterly Progress Report
	Super Passage	Cross Regulator			Website Updating
	Escape	Fall CR/Fall			Digitalization of maps – drawings etc
	Overseen of design & drawings , GFC approval of Statue of Unity Aqueduct				Training, Meeting & Presentation

Looking to the Capacity of Canals, the Canal Network is categorised as under.

Sr.No.	Canal
A	Narmada Main Canal –off taking from Pond No -4
B	Saurashtra Branch Canal
C	Kachchh Branch Canal
D	All Other Branch Canals
E	Distributory
F	Minor
G	Sub Minor

NARAMADA MAIN CANAL

The Narmada Main Canal is a contour canal and off takes from pond no 4 located at the foot of vadgam saddle. It is 458 km long up to Gujarat-Rajasthan border. Its capacity at the head is 1133 cumecs (40,000 cusec) and taper down to 71 cumecs

(2500 cusec) at the Gujarat-Rajasthan border. The cross section at its head is 73.0 x 7.60. The canal bed gradient is kept as 1 in 12500 up to Mahi river crossing (144.50 km) and flattened to 1 in 15500 beyond Mahi crossing to Rajasthan border. The canal, in its journey up to Rajasthan border, passes through regions which divide in agro-climatic zones and crosses numerous streams, major rivers, railway, road etc. Cross Drainage structures feasible to site situation are designed & constructed along with Regulating Structures & Communication Structures. NMC is flowing since 2008 round the clock.

Saurashtra Branch Canal off takes at Ch. 263.20 km of Narmada Main Canal near Kadi. It has a peculiar feature in its 104 km long alignment. It falls down through 40.71 m upto Ch 68.480 km and raises by 70.85 m before tailing into Bhogavo reservoir. It is proposed to generate hydro power at 3 fall locations and then pump the water in five stages from the lowest point in to the canal. Seven Sub Branch Canals- Narsinhpur, Vallabhipur, Maliya, Dhrangadhra, Limbdi, Botad and Morbi offtakes from SBC and are also executed completely and flowing with Water for irrigation, drinking & industrial usage in Saurashtra region.

Kachchh Branch Canal is 358 km long and off takes from NMC with designed enhanced discharge of 220 cumecs and serves net CCA of 175811 hectares in Banaskantha, Patan & Kachchh districts. It crosses Little Run and Great Run of Kachchh. There are three pumping stations on KBC. The works of these pumping stations are completed. The canal works beyond 190 km is divided into 23 slices (IR-0 to IR-22). Kachchh Branch Canal is already in operation up to Tapar Dam and beyond which, it is partially completed and under progress. Gagodhar, Wandhiya & Dudhai Sub Branch Canal off takes from KBC. Gagodhar & Wandhiya Sub Branch Canal is almost completed & Dudhai sub branch canal is in progress.

Branch Canals

Forty four (44) canals are off taking from Narmada Main Canal. Seven Sub Branch Canals from SBC. All branch canals are executed completely.

This office deals with civil design of :

Cross Drainage structures like - Drainage syphon (syphon aqueduct), Drainage Culvert (DC), Canal siphons, Aqueduct, Super Passage etc.

In DSY : drains/kotars/ small rivers /nala etc passes under canal with syphonic action.

In CSY : Canal passes below road, railway, river or drains with syphonic action.
Aqueduct wherein canal crosses over rivers in concrete trough under atmospheric pressure. The trough is supported on piers and abutment.

Super Passage wherein discharge of river /kotar passes through concrete trough over the canal flow. Both flow - Canal & drain are free / atmospheric

Narmada Main Canal and its branches cross many drains, roads, railways, pipe lines etc. enroute and depending upon the site conditions, necessary changes in the layout are made in these structures. Model studies are also carried out wherever found necessary.

Cross Regulating structures like CR , HR , Escape :

Head Regulator (HR) located on canals is the structure which acts as a controlling device for regulation of discharge and provided where another canal off take .

Open type HR for discharge more than 8.5 cumecs with Radial Gate,

Open type HR for discharge of 3.00 cumecs to 8.5 cumecs with Vertical Gate & for discharge less than 3.0 cumecs , Pipe type HR with vertical gates are provided.

Cross Regulator (C.R.) : For regulating the canal flow and discharge and effective operation & maintenance of canals - Cross Regulators structures are provided. All the canals having discharges more than 8.5 cumecs are planned to run on Controlled Volume Concept (CVC). Cross Regulators are essential for the effective operation of the Canal System. Depending upon the design discharge of canal , radial gate /vertical gate are provided with hoist mechanism .

Escapes ; for safety of canal and structures , escapes are provided to release excess water in to the drain/nalla or river primarily to safeguard the canals from overtopping. When surplus water is available, these escapes release water normally in to rivers/streams/tanks for their recharge purpose

CR cum Fall: They are essential when ground is undulating or canal is excessively in banking or to balance excavation and banking

Communication Structures :

For communication of public over the canals , bridge type structure are provided. Depending upon the type of road – village road, district road-ordinary /major , state highway , National Highway , nomenclature of bridges are done as VRB,MDRB.SHRB. ODRB/SHRB/NHRB .

There are total 270 Nos. of Bridges on the Narmada Main Canal. Out of these, 7 are National Highway Bridges (NHB) and 26 are State Highway Bridges (SHB). The structures are designed as;

- a) Substructure RCC Piers and Abutments with open foundation
- b) Superstructure - simply supported RCC T-Beam Deck Slab type
- c) Carriageway-5.5 m/7.5 m is provided for Unclassified/Classified Road Bridges
- d) For National Highway Bridges the carriageway width is kept as per MOST/MORTH, New Delhi.
- e) Standard Plans as per existing / proposed number of Lanes for which approval from Road & Building Department of GOG and Ministry of Road Transport &Highways (MORTH)

Combined Structures :

Combined structures like CR cum CSY and CR cum all kind of bridges are provided in Narmada Canal Net works as per prevailing site conditions .

Design of Gates:

The design of gates (for regulation) and stoplogs (for maintenance and repair of gates) for different types of regulating structures such as Cross regulators, Head regulators, Escapes etc. are provided on Narmada Main Canal and its Branches (including Kachchh Branch Canal, Saurashtra Branch Canal and its sub-branch canals) is carried out in-house and standardized.

Mainly two types of gates, i.e. Radial gates and Vertical gates (open type and pipe type) are provided on the regulating structures depending upon the discharging capacity of the structure as under.

- (i) Radial gates of size varying from 12.2 x 13.5 m to 2.15 m x 2.10 m.
- (ii) Open type vertical gates of size varying from 1.9 x 3.35 m to 0.75 mx1.25 m.
- (iii) Pipe type vertical gates of size varying from 2.9 mx 2.6 m (fixed wheel type) to 0.70 mx 0.70 m.
- (iv) Rope drum type hoists (for Radial gates) of various capacities 2 to 90 MT
Screw type hoists (for Vertical Gates) with various capacities 1.4 to 13 MT

The preparation of design and drawings of Gates, Stoplogs and Hoists for various regulating structures and CSY structures on Kachchh Branch Canal, and Dudhai Sub Branch Canal is in progress.

Design of Canal Bank Section

Looking to the size and magnitude of the Narmada Canal System, the design of canal section is carried out as an earthen dam. The zoned section consists of impervious sand semi-pervious material to suit the technical requirement with a focus of utilizing the excavated soil to the maximum. Apart from the design and stability of canal bank section, various aspects (thickness, joints, contraction etc.) of canal such as canal lining, canal under drainage and surface drainage arrangement requirements are considered during the design of canal bank section

Earthen dowel towards water prism is now taken care by extending lining up to top of bank level and providing with C.C. wall.

Cross Regulator (C.R) Planning

The scrutiny of C.R. Planning in respect of type of structures, head loss , profile of ground level, canal bed gradient , Top of Lining, Top of Bank Level provided for

various structures, draw down condition between two C.R cutting and embankment proposed etc. is being carried out for Narmada canals net works.

Network Planning

It involves the work of survey for Block contouring preparation of plans, planning and design of micro level canal network system and structures right from distributary down to 5 to 8 ha. Sub chak, its main objective is to establish an efficient and reliable planning so as to ensure equitable supply of water to the farmers. It also takes care of effective drainage system in the command area. This work is carried out by field offices.

Scrutiny to the crossing proposal :

Narmada Canal Network is already executed in Central, North, Saurashtra & Kachchh region. Proposals of crossing of various utility lines like – Gas pipe lines , optical fibre cable, water supply lines , waste water pipe lines, railway like DFCCI , Metro & High Speed Rail, extension /widening of National highways , Express ways etc cross the canal net work are received from the concerned Chief Engineer. As per SSNNL circular, proposal for crossing are to be approved by MD, SSNNL, Gandhinagar on receipt of opinion of CE (Design).

Digitization of Drawings / Maps & Documents :

In order to protect drawings, maps and documents of structures already executed on Narmada Canal Net work are decided to be digitized and keep in soft version .The work of digitization is given to Guj. Info Petro. Limited and work is in progress.

Flood Memorandum – Disaster Management Plan :

As per SSNNL circular, this office had been assigned the work for preparation of flood memorandum /Disaster Management plan for Narmada Canal net work for every year . The required data/information are furnished by the concerned field Chief Engineer for their jurisdiction and compiled and circulate the flood memorandum volume to all concerned in hard copy as well as in soft copy in compact disc after obtaining approval of competent authorities. The flood memorandum is also uploaded on Nigam's web site.

Canal Automation :

In order to deliver water within 24 hrs of demand by tail ender farmer, for judicious delivery in whole command area and to increase irrigation efficiency, it was decided to implement the “**Remote Monitoring & Control System**” for SSP canal system. SSNNL had engaged M/S GERSAR –ECI of France & USA and awarded the works of canal automation in five tasks on pilot project.

Original tender documents and specifications were finalized by TCIL in 2010-11 which needs to be updated and modified as per revised scope and present technology. **Gujarat Info Petro Ltd., Gandhinagar** (Experts in IT Solutions) has been awarded for consultancy assignment for updating the same in February 2018. M/S GIPL has also appointed the hydraulic expert for this assignment in August 2018.

The updating and modification work for canal automation by M/S GIPL is under progress.