

WORLD'S LARGEST SCREW TURBINE BASED HYDROPOWER PROJECT OF 5.15 MW ON WATER CONVEYANCE CANAL



Location:

The project is located near Nimeta village on the outskirts of Vadodara city. The locations of six falls on 18km patch of Vadodara Branch Canal are at chainage; Ch 6720 m, Ch 11080 m, Ch 14580 m, Ch 21000 m, Ch 22500/22800 m and Ch 24290 m.

About the project:

Sardar Sarovar Narmada Nigam Ltd, a company wholly owned by Govt of Gujarat owns the canals supplying water from the Sardar Sarovar Dam on river Narmada to various areas of the state for irrigation. The Vadodara Branch canal is fed by Narmada Main Canal and distributes water near Vadodara and adjoining villages for the purpose of Irrigation. Project is envisaged to generate electricity by tapping these six sites on the Canal having falls varying in height from 3m to 6.5m. Turbine technology was kept open and was to be proposed by EPC contractor and project offering best technology with lowest cost was to be considered.

Ideal Technology for Power Generation

Being an Irrigation canal the flow during different seasons vary widely and in dry season, the flow could be lower than one third of designed flow. Also, close proximity to decades old water logged canals would make extensive and deep civil work a difficult proposition. In addition to this, few sites had very low head of 3m. All these parameters made use of conventional turbines a very costly proposition.

Screw turbines are capable of operating between 15% to 110% of designed flow. Also, unlike conventional turbines the civil work depth required for screw turbines would have been same as that of existing canals. Hence, Jash Rehart proposed use of its Archimedean screw turbine technology which is most suitable in such situations.

Rajkamal Builders based their bid proposal on this technology and ultimately their bid was found to be over 25% economical than that given using conventional turbines.

Project Details	
Project	SSNNL VBC 5.15 MW HYFRO-POWER PROJECT
Owner	Sardar Sarovar Narmada Nigam Ltd.
EPC Contractor	JASH ENGINEERING LTD-RAJKAMAL BUILDERS JV
Consultant	URS Scott Wilson India Pvt. Ltd.
Contract No.	SHP-11-2013-6-PT.II-HP dtd. 03/12/2015

Power-plant Details					
SHP	HEAD (mtrs)	FLOW (m ³ /sec)	RATED POWER	TOTAL Nos OF TURBINES	TOTAL POWER
1	4.5	7.57	263 kW	4	1052 kW
2	3	7.57	175 kW	4	700 kW
3	3.7	8.13	234 kW	3	702 kW
4	3.3	7.87	200 kW	3	600 kW
5	6.5	7.45	375 kW	4	1500 kW
6	3	8.67	200 kW	3	600 kW
Total Rated Power Generation Capacity					5154 kW

Archimedes Screw turbines from Jash Rehart:

Site parameters required Screw turbines of huge sizes, up to 4300mm diameter, 17930mm length and weighing over 57tonnes. Such huge Archimedean Screws were never made until then. Rajkamal joined hands with Jash for this project because Jash Rehart has best and biggest facility in the world for making Archimedean screws.

Jash has in-house facility of CNC Laser jet and CNC water jet cutting machine to accurately cut the required profiles. Jash has patented CNC flight forming machine capable of making Flights up to 5500 mm diameter which provides perfect profile to ensure the efficiency of the Screws and reduce losses. Jash also has automated flight welding machine of 24 meters length rendering minimum human interface in welding of flights. This inhouse design and manufacturing capability enables Jash to develop precision screws that meet performance during variable flow and continue generation during very low flow.

Some hinderances like Canal banks soil being too soft for Cranes, civil levels not being precise and water levels being higher than that given in project specifications were faced. Jash's commissioning team took care to resolve these amicably and complete commissioning of the project. A total of 21 turbines were supplied to cater to the power generation of 5.15 MW and these turbines were transported, installed and commissioned by Jash successfully, building a benchmark in Screw turbine technology and its capacity. Today these turbines are working successfully and generating power as envisaged



For more details on SSNNL VBC 5.15 MW Power Project, please follow the link : <https://youtu.be/8YSGPfsjeU4>

JASH ENGINEERING LTD,
 31, Sector-C, Industrial Area, Sanwer Road, Indore-452015 (MP), India
 Phone : +91 (731) 2720143, 2721143,
 Email : info@jashindia.com,
 Website : www.jashindia.com

SUBSIDIARIES:
 Rodney Hunt INC, **USA.**
 Mahr Maschinenbau Ges.m.b.H, **AUSTRIA**
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