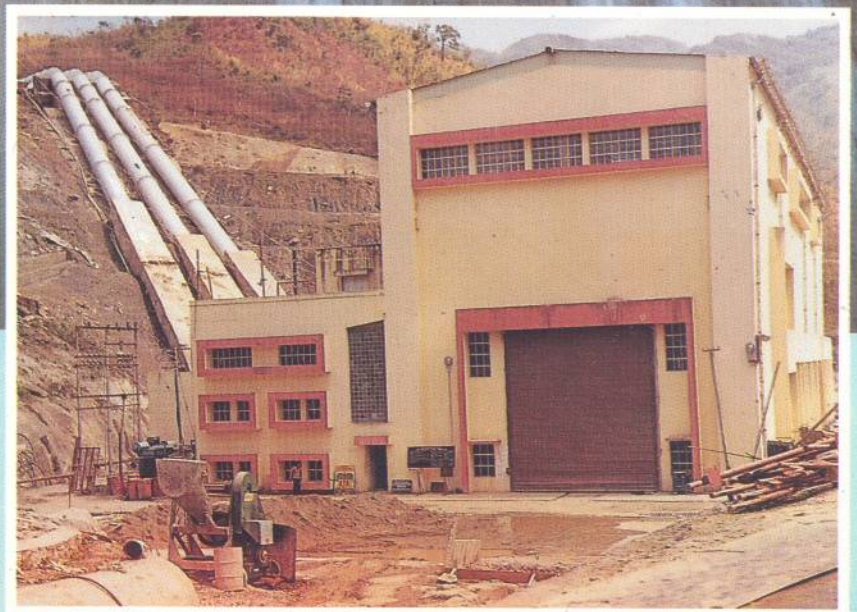
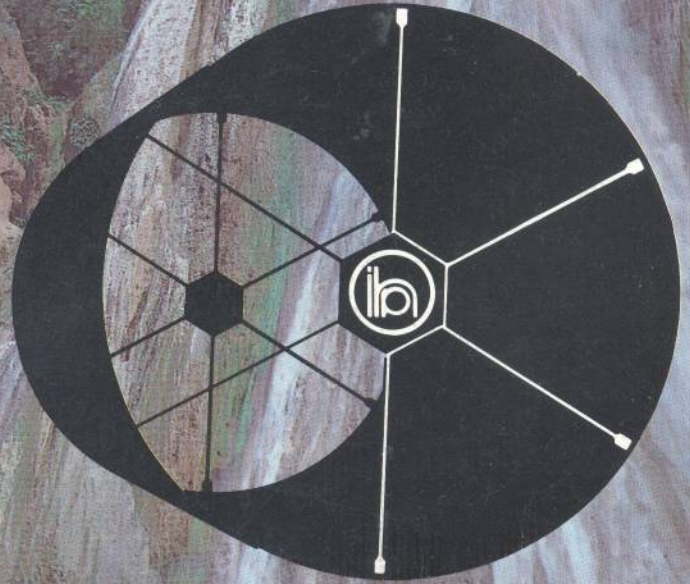


PENSTOCK PIPES

A link between water and power



THE INDIAN HUME PIPE CO.LTD.

The Company—

The Indian Hume Pipe Company Limited (IHP) was established in 1926 with the object of manufacturing, popularising and marketing Hume Pipes and allied products. A small mechanical workshop was also established simultaneously for production of specialised equipment required for making HUME Pipes.* During the 60 years since its inception, the Company has diversified into several other lines, like HUME Steel Pipes*, Reinforced and Prestressed Concrete Poles, Welded Steel Penstocks, Welding Electrodes and Flux, Prestressed Concrete Pipes, Prestressed Concrete Railway Sleepers etc; and recently, the Company has also diversified into the Sports Goods line: the Precision Air Rifles.

The Company has a well spread out and wide network of over fifty factories all over India. The Penstocks Division of the Company is located at Hadapsar Industrial Estate, Pune in Maharashtra State. This plant was established in 1958 in technical collaboration with M/s. Giovanola Freres S.A. of Monthey Switzerland. The Company has earned a reputation for timely execution of the Penstocks contracts entrusted to it, a reputation established through long experience, technical excellence, high level of workmanship and resourcefulness.

*'HUME Pipe' and 'HUME Steel Pipe' is a proprietary trade name for the Reinforced Cement Concrete pipes and Welded Steel Pipes, lined and outcoated with concrete.



Our factory

In early days, we used to fabricate penstock pipes at fabrication shops set up near the site of the respective hydel projects. However, in the year 1958 when the Company secured the prestigious contract for fabrication, supply and erection of steel liners for Head-race and Penstock tunnels of the underground Koyna Hydro-electric project, not far from Pune, it was decided to set up a very modern and well equipped penstock fabrication plant at Hadapsar, in technical collaboration with two well known Swiss firms M/s. Giovanola Freres S.A. of

Monthey and Conrad Zchokke S.A. of Zurich.

The factory boasts of most sophisticated machinery and equipment required for the fabrication and erection of penstocks and penstocks specials like expansion joints, wye pieces, bulk heads etc. This factory has thus been well equipped with latest machinery and equipment not only to handle all types of penstock jobs but also other sophisticated products like LPG Storage Tank, boiler shells, cement kilns etc.

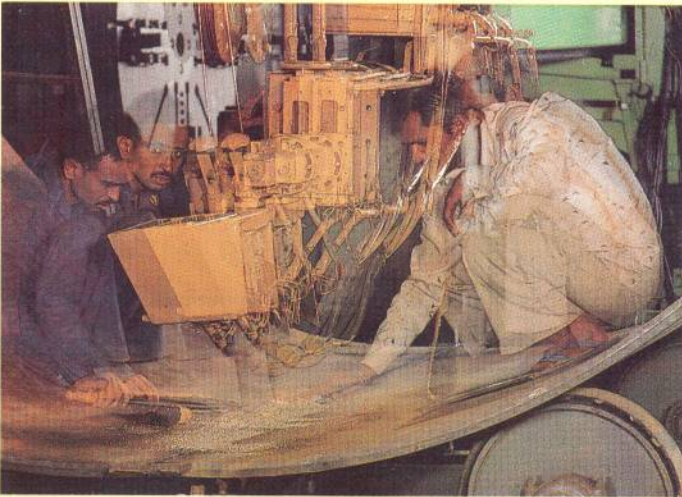
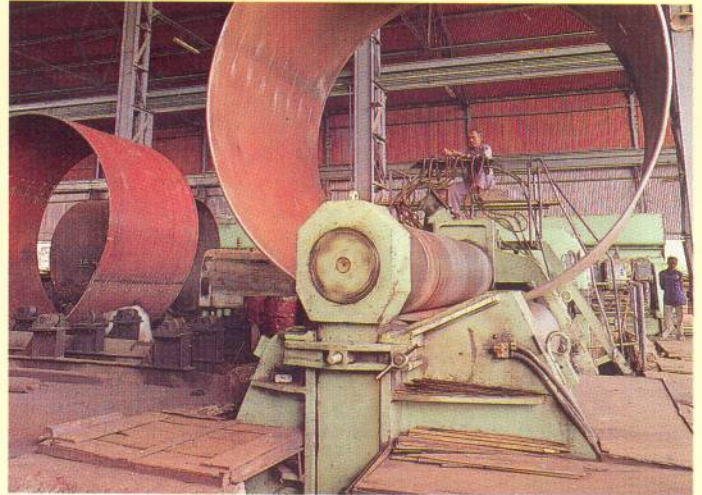
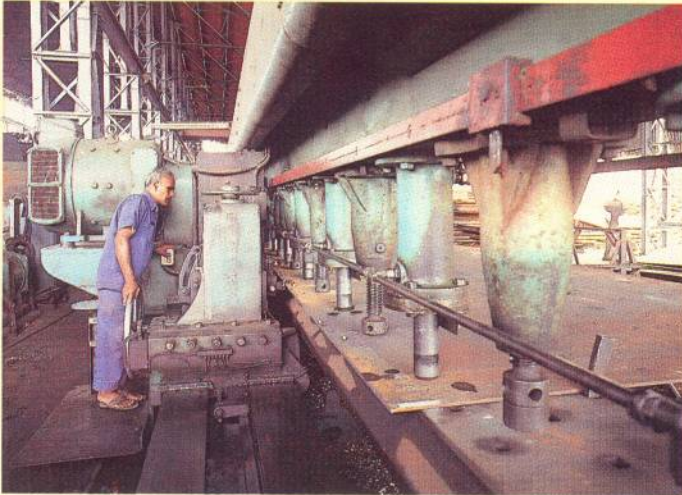


Progress

A Penstock is a high pressure steel pipeline that carries water from the storage reservoir to the turbines and is a vital section of hydro-electric projects. The design, fabrication and erection of Penstocks demand a high degree of skill and sophistication. Until late thirties, penstocks and even the technicians had to be brought from abroad. In 1937, however, the Company decided to take up the challenge of manufacturing penstocks in India and offered its services to the Madras Government for the fabrication and supply of penstocks for the prestigious Papanasam Hydel Project. This order was secured against heavy odds and executed successfully to the satisfaction of the project authorities.

The successful completion of the Papanasam Hydel Project led to further orders from the erstwhile Madras and Mysore Governments to fabricate and supply penstocks for Moyar and Mahatma Gandhi Hydel Projects. Since then the Company has established a long track record for designing, fabrication and erection of steel penstocks for several hydro-electric projects all over India and in neighbouring countries. A little over a hundred thousand tonnes of penstocks have so far been supplied by the Company to various hydro-electric projects for generating about six million Kilowatts of power per day

Technology:



Soon after the establishment of the factory, the Company took steps towards updating its technological base from time to time through foreign collaborations, first with Giovanola Freres S.A. and Conrad Zchokke S.A., for the execution of the underground pressure shafts for the Koyna Hydro-electric Project and the Sharavati Hydrel Project Stage-1; and later with M/s. Chicago Bridge & Iron Company Limited of U.S.A. for the Sharavati Project Stage-2. Thereafter, with the expertise gained on these projects, the Company has independently executed penstock jobs for several

hydro-electric projects involving various types and grades of High strength steels. Today IHP can legitimately claim to have the capability of executing complex penstock jobs under extremely severe conditions in remote places all over the country as well as in adjoining countries like Nepal. With Penstock technology continuously advancing, the Company's technicians are at all times attuned to keeping abreast of the latest development in this field. The Company also draws upon the expertise of other leading penstock manufacturers all over the world as and when necessary.

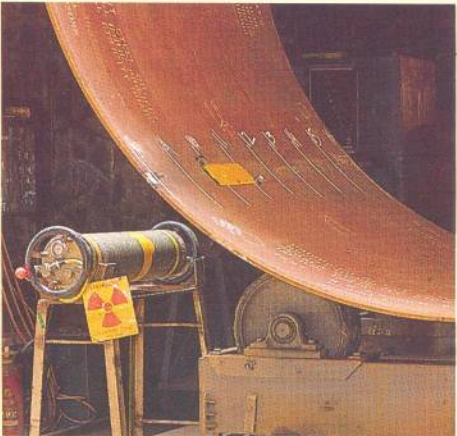
Quality Control



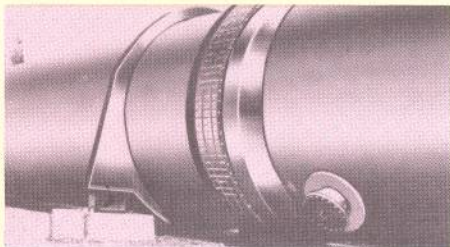
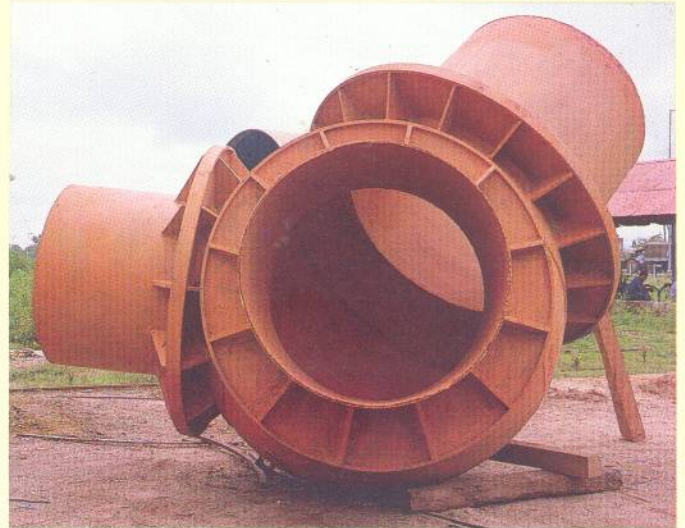
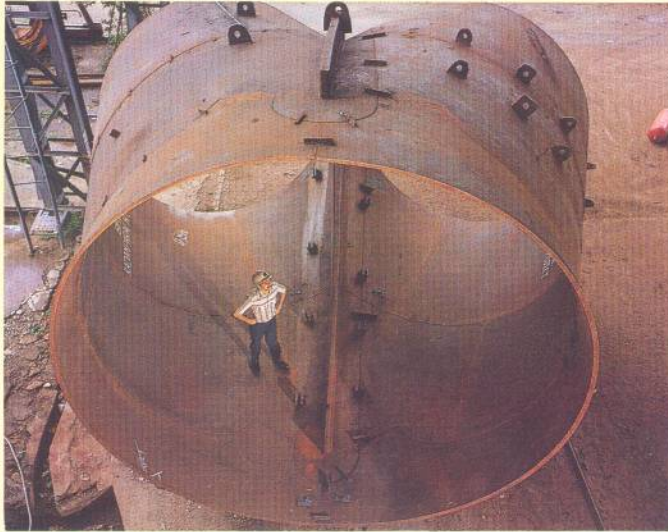
Quality Control is an essential part of the fabrication and erection of penstocks. Depending on the basic steel material used for penstocks the matching welding consumables are selected. Particularly, while using 'quenched' and 'tempered' steel, electrodes with low hydrogen content are to be baked and kept dry before use and while welding these steels, it is very essential to strictly control the pre-heat, interpass and post-heat temperatures. The Company has wide experience of welding special steel requiring rigorous quality control procedures and its technicians have completely mastered these techniques.

The Company's engineering experts ensure high quality of welding by regularly inspecting every weld by radiography, ultrasonic testing or magnetic particle testing.

The welded pipes are subjected to hydrostatic test before painting and despatch to ensure that the welds and pipes are strong enough and safe to withstand the designed water pressure.



Specials



The design, fabrication and erection of Penstock Specials with extra high tensile steel to withstand very high pressure is a challenging job. IHP technicians have, during past several years successfully designed, fabricated and erected various

types of specials like ring girders, rockers, transitions, bell mouths, expansion joints, flexible couplings, wyes (bifurcation and trifurcation pieces), surge tanks, surge liners, bulkheads etc.

MAJOR WYES DESIGNED, FABRICATED & ERECTED

	Type of steel	Plate thickness mm.	Size mm.
1. Chenani H.E. Project, Jammu & Kashmir	A-285-C	50	1220/2x750
2. Balimela H.E. Project, Orissa	15K Russian	20	3100/2x2500
3. Yamuna H.E. Project, Part II, Uttar Pradesh	A 516-60	28	5500/2x4110
4. Loktak H.E. Project, Manipur	A 537-A	20	3000/2x2286
5. Kalinadi H.E. Project, Karnataka	A 285-C	50.8	4750/2x3500
6. Bassi H.E. Project, Himachal Pradesh	A-285-C	45	1524/2x1220
7. Maneri Bhali H.E. Project, Uttar Pradesh	A-537-A	32 28	3800/2x3200 3200/2x2500
8. Kulekhani H.E. Project, Nepal	SM 50 B	36/28	1500/2x1100
9. Varahi H.E. Project, Karnataka	A 537 Cl. 2	50	4000/2x3000
10. Kadamparai H.E. Project, Tamilnadu	A 537 Cl. 1	36	4500/2x3000
11. Binwa H.E. Project, Himachal Pradesh.	A-285-C	22	1000/2x700

Some of the Major Penstock Contracts Executed and Under Execution

Sr. No.	Name of project		Diameter mm	Thickness mm	Max. Test Pressure Kg/cm ²	Total quantity (tonnes)	Specification of steel	Year of installation
1.	Papanasam Hydroelectric Project Tamil Nadu	Stage 1	1753 2743	16 to 22 10	19 3	600 910	Mild steel Mild steel	1940
		Stage 2	1753 2743	16 to 22 10	19 3	200 1000	Mild steel Mild steel	1944
2.	Mahatma Gandhi Hydroelectric Project, Karnataka	Stage 1	1016 1448 1524 1626 1829	24 to 27 25 to 32 16 to 24 10 to 16 10 to 11	65 to 76 51 to 64 30 to 46 16 to 29 2 to 18	1580	Mild steel	1946
		Stage 2	1270 1829	29 to 37 10 to 38	2 to 53	2275	Mild steel	1948
3.	Moyar Hydroelectric Project Tamil Nadu		1067 1145 2134	13 to 40	69 25 2	2200	Mild steel	1952
4.	Rihand Hydroelectric Project Uttar Pradesh		4877	13 to 25	15	950	Mild steel	1960
5.	Koyna Hydroelectric Project Maharashtra	Stage 1	2591 2743 2743 3048 5182	27 to 44 21 to 44 21 to 38 19 to 33 24 to 37	91	2300 3656	Mild steel High tensile steel	1962
		Stage 2	1829 2591 2743 2743 3048	42 to 43 32 to 44 25 to 44 21 to 35 19 to 33	91	850 2300	Mild steel High tensile steel	1964
		Stage 3	4115	18 to 32	2	1815	Mild steel	1975
6.	Sharavati Hydroelectric Project, Karnataka	Stage 1	2348 2438	16 to 24 17 to 44	91	1050 4515	Mild steel High tensile steel	1964
		Stage 2	2438 2438	16 to 30 14 to 32	91	3464 6465	A 285 Grade C A 517 Grade F	1972
		Stage 3	2438 2438	13 to 21 13 to 30	91	1990 3710	A 285 Grade C A 517 Grade F	1975
7.	Periyar Hydroelectric Project Tamil Nadu	Stage 2	1676 1829 1981	35 to 48 17 to 35 13 to 17	68	1450	I.S. 226	1964
8.	Trisuli Hydel Project Nepal	Stage 1	1524 2286	8 10	15 15	175 175	A 285 Grade C	1965
		Stage 2	2286	10	15	141	A 285 Grade C	1966
9.	Bhira New Tunnel Project Maharashtra	Stage 2	1486 1981 3962	10 10 to 13 16 to 13	5	1250	Mild steel	1965
10.	Bassein Creek Tunnel Project, Thana, Maharashtra		3658	19	28	2200	High tensile steel	1969
11.	Chenani Hydroelectric Project, Jammu and Kashmir		686 1067 1219 1372 1524	10 to 32	87	1300	A 285 Grade C	1971
12.	Balimela Hydroelectric Project, Orissa		2365 to 3735	12 to 50	59	9250	15 K Russian	1975

Sr. No.	Name of Project		Diameter mm	Thickness mm	Max. Test Pressure kg/cm ²	Total quantity (tonnes)	Specification of steel	Year of installation
13.	Yamuna Hydroelectric Project Uttar Pradesh	Stage 1	3810	14 to 36	26	1500	A 537 Grade A	1973
		Stage 2	4110 5500 7000 7500	16 to 28	14	1300	A 516 Grade 60	1982
14.	Giri Hydroelectric Project Himachal Pradesh		2500	12 to 36	50	1350	A 285 Grade C	1975
15.	Loktak Hydroelectric Project Manipur		2286 to 3600	10 to 28	59	4725	A 537 Grade A	1982
16.	Vaitarna Hydroelectric Project Maharashtra		2515	12 to 28	60	500	Mild steel	1976
17.	Kalinadi Hydroelectric Project Karnataka		3500	24 to 27	62	2325	A 517 Grade F	1982
			4750	16 to 50	36	6250	A 285 Grade C	
18.	Lower Jhelum Hydroelectric Project Jammu and Kashmir		4500	12 to 22	12	1364	Mild steel	1979
19.	Pench Hydroelectric Project Maharashtra		4115	20 to 45	38	1900	DIN 17155 Grade H	1982
20.	Maneri Bhal Hydroelectric Project Uttar Pradesh	Stage 1	3800	10 to 32	47	1690	A 537 Grade A	1983
21.	Bassi Augmentation Project Himachal Pradesh		1220	10 to 45	53	1350	I.S. 2002	1980
			1520 1600 1750					
22.	Tillari Hydroelectric Project Maharashtra		1900	12 to 50	100	1510	Mild steel	Under execution
			2000 2200					
23.	Kulekhani Hydroelectric Project Nepal		1500 to 2500	9 to 26	101	400 700	S.M. 58 Q S.M. 50 B	1981
24.	Varahi Hydroelectric Project Karnataka		3000	10 to 28	73	800	A 517 Grade F	Under execution
			4000	10 to 50	60	1900	(Weltan 80) A 285 Grade C	
25.	Kadampari Pumped Storage Hydroelectric Project, Tamil Nadu	Stage 1	3000 3500 4500	12 to 36	45	1500	A 285 Grade C	Under execution
26.	Binwa, Andhra & Rongtong Penstocks, Himachal Pradesh		1000	8 to 45	100	1000	A 285 Grade C	Under execution
			1100 1200 1400 1500					
27.	Idukki Hydroelectric Project Kerala	Stage 2	3721	36 to 52		200	E.H.T. H.T.	1985
			3858	16 to 52		2000		
28.	Bhaba Hydrel Project Himachal Pradesh		1940	18 to 36	80	810	E.H.T. M.S.	Under execution
			2140	17 to 50		1210		
29.	Tons Hydrel Project Madhya Pradesh		4560	25 to 36	50	3400	A 537 CL 2	under execution

Penstocks/Steel Liners Installed/Under Installation
by
THE INDIAN HUME PIPE CO.LTD.



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Tel: 268091 Telex: 11 75980 WAL B IN

Penstock Division:

Hadapsar Industrial Estate, Hadapsar, Pune - 411 013.

Tel: 72055/70844 Grams: 'PENSTOCKS'

A Walchand Group Enterprise