

# Chapter – 10

## Construction Programme and Manpower and Plant Planning

### 10.1 Construction programme

It is programmed to construct the entire Par-Tapi-Narmada Link Project over a period of 7 years from the start. It is expected that all the preliminaries, residual survey works, preconstruction survey works, design studies including laboratory tests, construction of access roads to facilitate further investigations of foundations of spillways, earth dams etc. and detailed geological investigation works the land acquisition, rehabilitation and resettlement will be completed in first year. Construction of approach roads and colonies will be completed by the second year. Excavation for foundations of dams, tunnels and canals will be started from 3 years, the end of third year and completed fourth year. The works broadly comprise of the following items :

- 1) Construction of 7 dams and 3 weirs
- 2) Construction of 4 power houses at toe of dams and 2 power houses on feeder canals.
- 3) Construction of interlinking tunnel of 5 km length between Mohankavchali dam and Paikhed weir and another tunnel of 0.5 km length at RD 21.6 km on the main canal.
- 4) Construction of link canal of about 395 km length including length of feeder canals.

The year wise details are enunciated in following paragraphs.

Year	Works
1 <sup>st</sup> year	All preliminary works and land acquisition for colonies, and reservoirs, main canals and canal structures will be completed in the first year.
2 <sup>nd</sup> year	The construction of approach roads, colonies will be completed by the end of the year.
3 <sup>rd</sup> year	Excavation for the foundation of the dams will be started and completed by the end of the year. The construction of the dams will also commence in the year. Excavation for the foundations

for main canal, branches and distributaries and canal structures will be started from the year and will be continued in the next year.

- 4<sup>th</sup> year      Excavation for the main canal, branches distributaries and canal structures will be completed by the end of the year. Construction of the dams and weirs, will be continued from the beginning of the year and will continue in the next year.
- 5<sup>th</sup> year      Construction of the dams and weirs will be continued and constructions of CD / CM works will be started from the year and will be continued. The works of the power houses will also be started from the year and it will continue.
- 6<sup>th</sup> year      The construction of the dams and weirs will be continued from beginning of year and will be completed by the end of the year. The construction of the CD / CM works will be continued from the beginning of the year and will be completed by the end of the year and the works of the powerhouse will be continued by the end of the year.
- 7<sup>th</sup> year      Erection of spillway gates and finishing works and lining of the canals will be started and completed in all respects by the end of the year.

## 10.2 Programme of year wise expenditure

The construction costs of the main components of the works of the link canal are given in Chapter – 12, Table – 12.1.

The yearwise expenditure for construction of the above works is planned as under :

Year	Rs. in crores
First year	308
Second year	415
Third year	624
Fourth year	1246
Fifth year	1362
Sixth year	1218
Seventh year	843
<b>Total</b>	<b>6016</b>

### 10.3 Materials planning

With regard to material planning, the stone is available locally while the cement and steel are to be procured from various agencies. These materials can be transported by goods train upto Vyara and Valsad. The cement can be procured from Narmada Cement Factory at Magdalla in Surat district, which is located at a distance of about 80 km and 90 km respectively from Vyara and Valsad railway stations. The carting distance of each dam sites by road from respective railway stations are as given below :-

<b>Railhead</b>	<b>Dam site</b>	<b>Distance in km</b>
Valsad	Jheri	120
Valsad	Mohankavchali	67
Valsad	Paikhed	72
Valsad	Chasmandva	75
Vyara	Chikkar	70
Vyara	Dabdar	63
Vyara	Kelwan	39

The distances of Jheri dam site from Valsad is about 120 Km which is more. So, it would be better if arrangement for supply of cement and steel is made to Jheri site from Nasik which is about 74 km from the dam site.

### 10.4 Quantum of work involved

The quantities of various items of works such as earthwork, canal lining, concreting, steel, masonry etc. are as follows:

<b>Sl.No.</b>	<b>Item of work</b>	<b>Unit</b>	<b>Total quantity</b>
1.	Excavation in soft soil	000 Cum	23463
2.	Excavation in Murrum	000 Cum	10455
3.	Excavation in soft rock	000 Cum	9412
4.	Excavation in hard rock	000 Cum	3858
5.	Canal lining	000 Sq m	10838
6.	Cement concrete M-10	000 Cum	562
7.	Cement concrete M-15	000 Cum	2936
8.	Cement concrete M-20	000 Cum	969
9.	Steel	M.T.	56760
10.	Structural steel	Sq m	6000
11.	Grouting	m	67900
12.	Masonry	000 Cum	1655

Based on the above quantities of work, the quantity of cement required works out to about 19.61 lakh metric tonnes.

## 10.5 Plant and machinery

The requirement of plant and machinery has been worked out separately for earthwork, canal lining and structures. The details are given in Table -10.1, 10.2 and 10.3 respectively. Details of departmental vehicles are given in Table 10.3 under the head "Q-special T & P".

**Table - 10.1**  
**(a) Q-Special tools and plants estimate**

### I. Equipments for earthwork

Sl.No.	Items	Total Qty.	Rate in lakh	Amt.in Rs.lakh
1.	3 Cum hydraulic excavator	20	47.2	944.00
2.	275 H.P. tractor dozers	10	56.6	566.00
3.	11.5 Cum motorized scrapers	40	59.0	2360.00
4.	O.H.D. tractor pusher	6	46.2	277.20
5.	180 H.P. tractor dozers	8	33.0	264.00
6.	Water tanker	17	5.9	100.30
7.	Self propelled vibratory roller	12	28.30	339.60
8.	18.22 kg jack hammers	60	0.12	7.20
9.	500 Cuft mounted air compressor (electric driven)	15	2.80	42.00
10.	20-22 T rang dumper L.S.	5	23.8	119.00
11.	3-10 T rang dumper L.S.	5	16.8	84.00
12.	4.5 front wheel loader L.S.	5	28.0	140.00
13.	Wagon drills L.S.	8	0.59	4.70
14.	40-50 H.P. Centrifugal pumps L.S. (diesel driven)	10	0.71	7.10
15.	40-50 H.P. Centrifugal pumps L.S. (Electric driven)	5	0.71	3.60
16.	Dumper of 35 tonne capacity L.S.	60	42.0	2520.00
17.	Drag lines L.S.	6	42.5	255.00
18.	Pneumatic tyred roller	3	23.6	70.80
19.	Sheep foot roller of 10 tonne capacity L.S.	3	23.6	70.80
20.	Road roller (8 tonne) L.S.	4	5.2	20.80

21.	Cranes (10 tonne) L.S.	3	28.3	84.90
22.	Explosive Van L.S.	3	5.9	17.70
23.	Grout pump L.S.	8	0.6	4.80
24.	Graders L.S.	8	18.9	151.20
25.	Misc. equipments including machine tools, workshop, tools etc. L.S.	-	-	139.30
	<b>Total</b>			<b>8593.97</b>

Total as per 2004-05

8593.97 x 2.332 = 20038 lakhs

**Table - 10.2**  
**II-Equipment for canal lining**

Sl. No	Item	Quantity		Total Qty.	Rate in lakhs	Amount in Rs.lakhs
		Par-Tapi link	Tapi-Narmada link			
<b>(a) Special type equipment</b>						
1.	100 Cum/hr canal slip form paver	2	2	4	225	900
2.	Canal trimmer	2	2	4	225	900
3.	Slope compactor	3	3	6	12	72
4.	3 Cum motorized transit mixer	11	12	23	8	184
<b>(b) General type equipment</b>						
1.	30-40 Cum/hr mobile	4	4	8	28	224
2.	2 Cum tractor dozers	2	2	4	13	52
3.	100 t/hr stone crushing plant	2	2	4	3	12
4.	100 t/hr screening and classification plant	2	2	4	2	8
5.	30 tonne truck mounted telescope room	1	1	2	33	66
6.	25 tonne rough terrain crane	1	1	2	28	56
7.	Bulk cement carrier	3	3	6	2	12
8.	Concrete vibrator (needle type)	18	22	40	0.2	8
	<b>Total (a+b)</b>					<b>2494</b>

Total as per 1993-94	Rs.2494 x 1.32 = 3292
Total as per 2004-05	Rs.3292 x 2.33 = 7676 lakhs

**Table - 10.3**  
**III-Equipment for structures**

Sl.No.	Items	Quantity		Total Qty.	Rate in lakhs	Amount in lakhs
		Par-Tapi link	Tapi-Narmada link			
<b>(A)</b>	<b>Special type equipment</b>					
1.	1 Cum hydraulic excavator	4	4	8	23	184
2.	3 Cum motorised trunist	7	7	14	8	112
<b>(B)</b>	<b>General type equipment</b>					
1.	30-40 Cum/hr. mobile butching and mixing plant	4	3	7	21	147
2.	100 t/hr. screening and classification plant	4	4	8	2	16
3.	20-22 T rear dumper	8	10	18	17	306
4.	8-10 T rear dumper	5	5	10	12	120
5.	30 T truck mounted hydraulic crane with telescopic boom	2	2	4	33	132
6.	25 T rough terrain crane pneumatic mounted	2	2	4	28	112
7.	100 t/hr. stone crushing plant	4	4	8	3	24
8.	Cement pump	50	52	102	2	204
9.	Bulk cement carriers	6	6	12	6	72
10.	50 T low bed trailer	2	2	4	33	132
11.	Concrete vibrator needle type	32	18	50	0.2	10

<b>Total (A) + (B)</b>	<b>1571</b>
Total as per 1993-94	Rs. 1571 x 1.32 = 2073.72 lakhs
Total as per 2004-05	Rs.2074 x 2.332 = 4835 lakhs

Sl.No.	Items	Quantity		Total Qty.	Rate in lakhs	Amount in lakhs
		Par-Tapi link	Tapi-Narmada link			
<b>(C)</b>	<b>Q-Special tools and plants estimate Departmental vehicles (Inspection vehicles)</b>					
1.	Ambassador cars	24	26	50	2.36	118.00
2.	Jeeps	50	60	110	2.12	233.20
3.	Jeeps trailors	50	55	105	0.50	52.50
4.	Pickup van/minibus	12	18	30	3.54	106.20
5.	Truck (74.5 ton)	13	13	26	5.0	130.00
6.	Staff bus	7	15	22	5.90	129.80
7.	Ambulance vans	7	10	17	5.90	100.30
	<b>Total as per 1993-94</b>					<b>Rs.870.00</b>
	<b>Total Rs. as per 2004-05</b>	<b>Rs. 870 x 2.332 = 2029 lakhs</b>				

## 10.6 Man power planning

It is proposed to have five Chief Engineers headed by General Manager for executing the project. As huge quantity of earthwork is involved in the present project, it is proposed that 25% of earthwork will only be carried out manually and the rest 75% will be done by machinery. Exact number of skilled, semi skilled and unskilled labourers have not been worked out. However, it is expected that large force of such labourers are available in the vicinity of the project areas.