

**Chapter-V**  
**Execution of Transmission Works**



## Chapter-V

### POWER DEPARTMENT

#### Punjab State Transmission Corporation Limited

#### Execution of Transmission Works

**The Company did not prepare its perspective rolling transmission plan as required under Punjab State Grid Code, spill-over of 53 works resulted in cost escalation of ₹ 389.71 crore, delays up to 105 months were observed in execution of 64 per cent of works; deficiencies in preparation of route plan; non-identification of critical infrastructures along the planned route and delays in submission of cases for statutory clearances etc. not only delayed the execution of works but also resulted in increase in cost to the extent of ₹ 104.05 crore (63 per cent) in seven works. Unfruitful expenditure of ₹ 4.53 crore was also incurred on various transmission works.**

#### 5.1 Introduction

Punjab State Transmission Corporation Limited (Company), was incorporated (April 2010) under the Companies Act, 1956, is the State power Transmission Utility (STU). The Company was entrusted with the power transmission segment on unbundling of the erstwhile Punjab State Electricity Board (PSEB). The Company was established to build, maintain and operate efficient, coordinated and economical intra-state power transmission system in the State.

#### 5.2 Audit Findings

Audit examined the executed transmission projects and observed several lapses which are discussed below:

##### 5.2.1 Non-preparation of perspective rolling transmission plan for works

Punjab State Electricity Regulatory Commission (PSERC) (Punjab State Grid Code) Regulations 2013 *i.e.* State Grid Code (SGC) provides that the Company would develop a perspective rolling transmission plans for next 10 years for the State Transmission System. The perspective transmission plans shall be updated every year to take care of the revisions in load projections and generation capacity additions. The perspective plans shall be submitted to the PSERC for approval by 30 November each year. Further, it prescribed that the Company shall carry out annual planning process corresponding to a five year forward term for identification of major State Transmission System schemes which shall be dovetailed into

National Electricity Plan on five years short term basis prepared by Central Electricity Authority (CEA). Audit noticed that no such perspective rolling transmission plan for 10 years for the State Transmission System had been prepared by the Company and submitted to PSERC which was non-observance of the provisions of SGC.

The Management accepted and added (April 2022) that they are now working on 10 years rolling plans for transmission works in line with the State Grid Code.

### 5.2.2 Spill over works

The PSERC (Terms and Conditions for Determination of Generation, Transmission, Wheeling and Retail Supply Tariff) Regulations, 2014, require the Company to file its petition for approval of Business Plan along with Capital Investment Plan (CIP) when planning new/ augmentation works to be executed in future. The CIP is to be submitted for a Control Period (CP) of three years.

The Company filed (May 2016) a petition for approval of CIP for the first CP year 2017-18 to 2019-20. PSERC initially approved (October 2017) ₹ 778.94<sup>1</sup> crore for 182 schemes to be executed during first CP and revised (May 2019) to ₹ 800.16<sup>2</sup> crore. Audit noticed that out of the 182 schemes approved in first CP, 53 schemes *i.e.* 29 *per cent* spilled over to second CP *i.e.* year 2020-23. These works were now included in the second CP with an escalation of ₹ 389.71 crore *i.e.* 99 *per cent* escalation in cost price compared to cost included in first CP. Hence, non-execution of works as per plan not only deprived the Company from achieving the targeted relief to the existing overloaded system and reducing T&D losses but also resulted into cost escalation to the extent of ₹ 389.71 crore.

The Management attributed (April 2022) the delay to factors such as land acquisition, right of way issues, funds availability and change in scope of work which were beyond the control of the Company. The reply is not acceptable as all these factors are to be resolved before commencement of the work as per the guidelines of the Company.

### 5.2.3 Delay in execution of works

A review of remaining transmission works showed that out of 118 cases<sup>3</sup>, there was delay in 75 schemes (64 *per cent* of works) ranging from one to 105 months as detailed in **Table 5.1**:

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<sup>1</sup> ₹ 328.29 crore, ₹ 248.01 crore and ₹ 202.64 crore for the year 2017-18, 2018-19 & 2019-20 respectively.

<sup>2</sup> ₹ 321.48 crore, ₹ 251.40 crore & ₹ 227.28 crore for year 2017-18, 2018-19 and 2019-20 respectively.

<sup>3</sup> In case of 11 schemes, information was not reliable as completion FY was shown earlier than starting FY.

**Table 5.1: Delay in execution of transmission works**

Range of delay	Number of works	Percentage
No delay	43	36
More than 36 Months	23	20
25 to 36 Months	8	7
13 to 24 Months	19	16
Up to 12 Months	25	21
<b>Total</b>	<b>118</b>	

Source: Information provided by the Company

The Company had not maintained proper records of scheduled date of completion and actual date of completion of works. The information regarding transmission works submitted to PSERC indicated only scheduled financial year (FY) of completion instead of scheduled date of completion of works. PSERC directed (December 2014) the Company to keep its records in proper form. However, even after a lapse of more than seven years, records had not been prepared as desired by PSERC and were being prepared FY wise.

The Management stated (April 2022) that main reasons of delay in execution of works were right of way issues and delay in approval of statutory clearance *i.e.* forest, railway and Power Telecommunication Co-ordination Cell (PTCC) cases etc. The reply is not acceptable as right of way issues and all statutory clearance cases were also required to be submitted and got cleared from the concerned authorities before taking up works.

#### 5.2.4 Lapses in execution of works

Survey is the most vital part of the activity of construction of a transmission line. The Company (erstwhile PSEB) issued instructions (December 1991) which divided survey of a line into two parts *i.e.* Preliminary Reconnaissance<sup>4</sup> and thereafter Detailed survey<sup>5</sup>. The instructions desired that routes of transmission lines should be proposed as far as possible out-side the municipal limits and not located close and parallel to communication lines, railway lines and avoid crossing of lines through forest areas. The key plan showing the prominent points along the proposed route such as cities, towns, highways and Rail-Road crossings, power lines crossing, river crossing and forest area should also be prepared. Further, railways crossing cases, forest and environment clearance cases and Power Telecommunication Co-ordination Cell (PTCC) cases should be submitted and got cleared from the concerned authorities before taking up the construction of line.

Audit observed lapses in execution of works as detailed below:

<sup>4</sup> For selection of an appropriate route out of various possible routes through topographical maps and walkover survey to know the likely constrain.

<sup>5</sup> For detailed study of the route to mark location and span of towers.

#### **5.2.4.1 220 KV line from 220 KV Gaunsgarh to 220 KV Ladawal**

The work of 220 KV double circuit (DC) line from 220 KV Gaunsgarh sub-station to 220 KV Ladawal sub-station was included (March 2016) in the planning list of works to be executed during 2016-17. The route plan of this line was approved in March 2017 (Tower number 1 to 59) and April 2018 (Tower number 60 to 61). Estimate for the line was prepared and approved for ₹ 11.83 crore. The work order issued (May 2018) stipulated completion by May 2019.

Audit noticed:

- During the course of execution of work, existence of a township<sup>6</sup>, already approved (March 2012) by Greater Ludhiana Area Development Authority (GLADA) was identified. The change of land use (CLU) of the parcel of land of the township had been approved (2010) and a public notice was also issued (May 2015) by GLADA in this regard. These developments occurred much before the Company initiated (May 2016) the process to conduct survey for laying of the high-tension line. The developers of the township requested (January 2019) the Company to revise the route plan of 220 KV line pleading that they will suffer an irreparable loss if lines would be routed through the township. The GLADA supported the developer's plea and Special Secretary, Housing and Urban Development, GoP also requested Department of Power, GoP for re-routing the line. The Company however, refused (January 2019) to revise the route plan citing that there was no sign of any township at the time of conducting the survey.

Audit observed that the claim of the Company regarding non-existence of any mark during the survey was incorrect as the review of history of the location through the application – 'Google earth' revealed the existence of entry gate and approach road to the township and other constructions in May 2016. Also, CRISIL<sup>7</sup>, the rating agency, in its report in July 2016 had also published the images of the construction works clearly showing the existence of township. Thus, due to conducting deficient survey, the existence of an approved township was not identified which delayed the work for more than two years as the developer filed a court case. The matter was resolved (June 2021) and the Company agreed to raise the height of tower numbers 7 to 9.

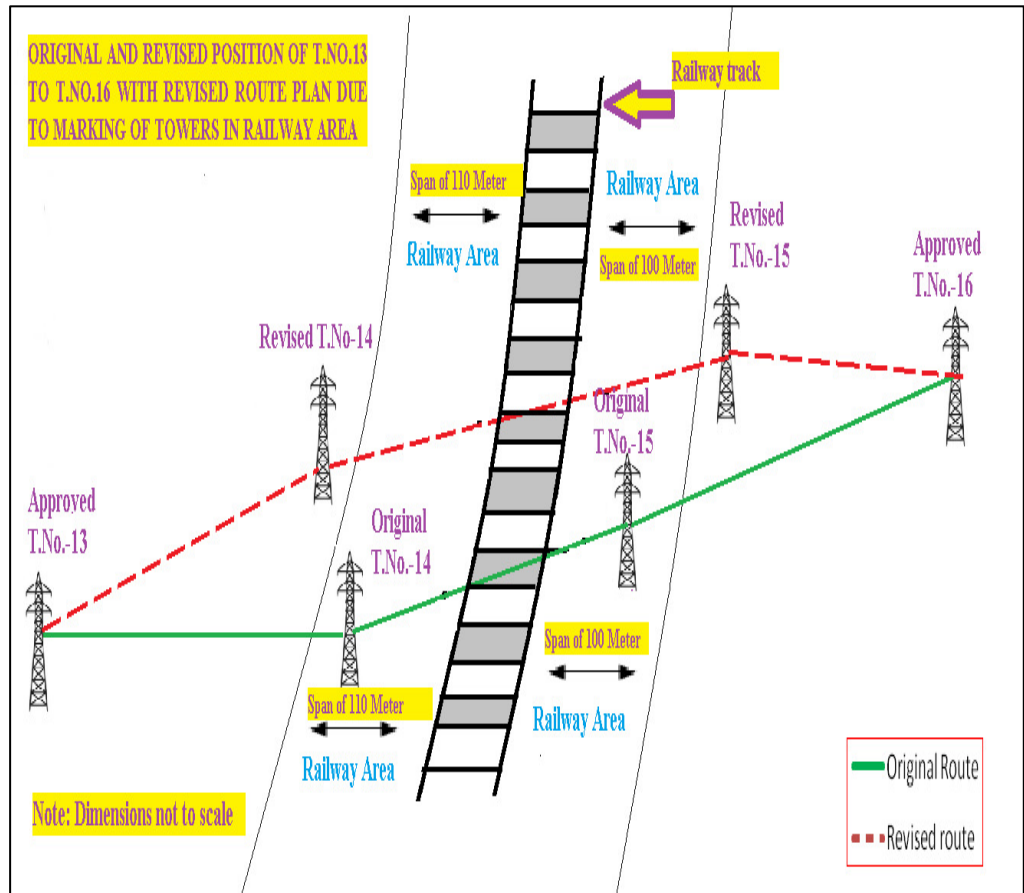
- The crossing of 66 KV lines of Mega Food Park was also not marked in the route plan which caused the revision of route plan from tower numbers 2 to 6 and delay in execution.

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<sup>6</sup> Developed by Fortune R. Buildco Developer Private Limited.

<sup>7</sup> CRISIL is an analytical Company providing ratings, research and risk and policy advisory services.

- The position of Tower number 14 and 15 was marked on railway land with short spans as in figure below:



Marking of towers on railway area caused the revision of route plan from Tower number 13 to 16. Due to lapses in survey, route plan had to change frequently and consequent delay in execution of work.

- The Company didn't apply for cases of forest, Power Telecommunication Co-ordination Cell and railway clearance even after lapse of seven months (December 2018) of issue of work order despite the standing instructions of obtaining prior clearance from competent authority. This delayed execution of whole work and commissioning of line.

Hence, due to improper survey, critical infrastructures were not identified causing frequent revisions in route plans. The lapses in conducting survey, coupled with delay in approaching competent authorities for clearance of PTCC and forest cases, resulted in delay in completion of work for more than 29 months (till October 2021) as the work was still incomplete, even after incurring an expenditure of ₹16.12 crore i.e. 36 per cent excess than the estimated cost of ₹ 11.83 crore.

The Management stated (April 2022) that there was no indication of existence of any GLADA approved township in year 2016 and no delay occurred in

filing the statutory clearance cases. The reply is not acceptable as the review of history of google earth and report of CRISIL proved the existence of township in year 2016. For the delay in getting statutory clearances, Deputy Chief Engineer/TLSC<sup>8</sup> had instructed to take action against the concerned officers/officials.

#### **5.2.4.2 220 KV line from 400 KV Makhu to Algon**

The work of 220 KV double circuit (DC) line from 400 KV Makhu sub-station to Algon sub-station was included (May 2012) in list of works to be executed during 2012-13 and route plan was approved in May 2012. Cost estimate for the line was prepared and approved (May 2012) for an amount of ₹ 26.76 crore. The work order was issued (November 2012) with stipulated time of 10 months *i.e.* up to September 2013.

Deficiencies in survey for laying of this line were noticed as the spans shown between various towers<sup>9</sup> at four places were found wrong at the later stage. Further, crossing of 66 KV line between Tower number 2 and 2A was not marked in the key plan. Even the extensions at the crossings of 11 KV lines was not provided at four instances. These deficiencies in survey caused frequent revision of route plan. The competent authority directed (July 2016) Deputy Chief Engineer/TLSC to recover the compensation amount from the surveyor<sup>10</sup>, however, no recovery was made from the surveyor. Further, there was delay in start of work for more than two months by the contractor. Even after starting the work, progress was very slow. There were neither recorded reasons for delay in start/slow progress of work nor the Company initiated any action on the contractor as per the terms of contract. The contract was terminated in March 2015 after almost 18 months of scheduled date of completion and was re-allotted (May 2015) to contractor-2 at the risk and cost of the contractor-1. Meanwhile type of seven towers was also changed from open pit to semi-submerged. Thereafter, the Company had to allot (October 2018) the work of pile type foundation to contractor-3, due to work being of specialised nature of foundations which shows the lack of planning on the part of the Company. It was noticed that material (cement, anchor bolts etc.) was not available in stores of the Company which further delayed the work. It was also observed that clearances from Railways were not obtained for Tower numbers 46 to 47 even after a lapse of more than six years in contravention of the standard operating protocols. The work got completed (February 2021) with an actual cost of ₹ 50.23 crore, *i.e.* 88 per cent above the estimated cost.

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<sup>8</sup> Transmission Line Survey and Construction.

<sup>9</sup> Between Tower number 2 to 3, Tower number 3 to 4, Tower number 74 to 75 and Tower number 78 to 79.

<sup>10</sup> An agency to whom Company outsourced the work of preliminary and detailed survey.



The Management accepted (April 2022) and stated that delay occurred due to discrepancies in survey and non-provisioning of extension to 11 KV/66 KV/220 KV lines.

The gist of delay in completion of five other works, reviewed in Audit is highlighted in **Table 5.2** below:

**Table 5.2: Details of lapses for delay in completion of transmission works**

Sl. No.	Name of Work	DOWO <sup>11</sup> / TDOC <sup>12</sup> / ADOC <sup>13</sup>	Lapses for delay in completion of works	Impact
1.	220 KV Line from 400 KV Nakodar to Ladowal	10 December 2014 09 October 2015 16 August 2019	1. Revision of route plan- four times due to non-marking of crossing of Satluj River, other 400 KV lines and to maintain clearance. 2. Delay in approval (January 2017) of design of foundation <i>i.e.</i> after 2 years of issue of Work Order. 3. Delay in submission (July 2015 and December 2016) of forest clearance cases.	<ul style="list-style-type: none"> <li>• Delay of 46 months in completion of work led to delay in accrual of envisaged benefits.</li> <li>• Actual cost increased to ₹ 42.39 crore against the estimated cost of ₹ 26.63 crore <i>i.e.</i> 59 <i>per cent</i> increase in cost.</li> </ul>
2.	220 KV Muktsar-Kotkapura (Sandhwan) Line	30 August 2011 30 April 2012 27 January 2021	1. Route plan revised five times due to non-marking of crossing of other lines and difference in span length. 2. Delay of decision in finalization of design of foundations of towers. 3. Right of Way problem due to improper route plan. 4. Twenty six incidents of theft of material. 5. Delay in forest clearance.	<ul style="list-style-type: none"> <li>• Delay of 104 months in completion of work led to deprival of envisaged benefits.</li> <li>• Actual cost increased to ₹ 25.96 crore against the estimated cost of ₹ 19.13 crore <i>i.e.</i> 36 <i>per cent</i> increase in cost.</li> </ul>
3.	220 KV Makhu-Rashiana line	04 June 2013 3 February 2014	1. Route plan revised nine times due to non-marking of crossing of other lines and river. 2. Delay of 11 month in approval (May 2014) of type of foundations.	<ul style="list-style-type: none"> <li>• Delay of 71 months in completion of work led to deprival of envisaged benefits.</li> </ul>

<sup>11</sup> Date of Work Order issued.

<sup>12</sup> Target date of Completion.

<sup>13</sup> Actual date of completion.

Sl. No.	Name of Work	DOWO <sup>11</sup> / TDOC <sup>12</sup> / ADOC <sup>13</sup>	Lapses for delay in completion of works	Impact
		14 January 2020	<ol style="list-style-type: none"> <li>3. Sinking of one tower which delayed the work for 18 months.</li> <li>4. Change in design of foundations of towers.</li> <li>5. Right of Way problem (March 2017 to June 2019) due to encroachment of land.</li> <li>6. Delay in forest clearance.</li> </ol>	<ul style="list-style-type: none"> <li>● Actual cost increased to ₹ 61.30 crore against the estimated cost of ₹ 30.32 crore <i>i.e.</i> 102 <i>per cent</i> increase in cost.</li> </ul>
4.	220 KV Malout - 220 KV Abohar Line	18 July 2013	<ol style="list-style-type: none"> <li>1. Route plan revised three times due to incorrect angle shown in approved route plan, non-marking of crossing from Railways and other 220 KV lines.</li> <li>2. Delay of more than 4 years in issue of designs of semi-submerged type foundations.</li> <li>3. Delay start of work and slow progress of work by contractor.</li> <li>4. Laying of line by Punjab State Power Corporation Limited (PSPCL) without vetting of profile from the Company</li> </ol>	<ul style="list-style-type: none"> <li>● Delay of 93 months (up to October 2021) while the work is still incomplete.</li> <li>● Actual cost increased to ₹ 22.43 crore against the estimated cost of ₹ 17.92 crore <i>i.e.</i> 25 <i>per cent</i> increase in cost.</li> </ul>
17 January 2014				
Work in Progress till October 2021				
5.	220 KV Line from Goindwal Sahib to Bottianwala	04 January 2012	<ol style="list-style-type: none"> <li>1. Route plan revised 11 times due to discrepancies in survey, non-marking of crossing of other 400/220/11 KV lines.</li> <li>2. Change of type of 17 towers from open pit to semi-submerged.</li> <li>3. Slow progress of work by contractor.</li> <li>4. Foundation of two towers changed from open pit to well type foundation after 13 months.</li> <li>5. Delay in approaching for railways/forest clearance.</li> </ol>	<ul style="list-style-type: none"> <li>● Delay of 68 months in completion of work led to deprivation of envisaged benefits.</li> <li>● Actual cost increased to ₹ 50.91 crore against the estimated cost of ₹ 32.70 crore <i>i.e.</i> 56 <i>per cent</i> increase in cost.</li> </ul>
03 July 2013				
06 March 2019				

Source: Records provided by the Company.

Thus, five out of these seven works<sup>14</sup> were completed with delays ranging from 46 months to 104 months and two works were still incomplete (October 2021) despite lapse of period of 29 and 93 months. Due to delay in execution, actual cost of these works increased to ₹ 269.34 crore against the estimated cost of ₹ 165.29 crore, a cost escalation of ₹ 104.05 crore (63 *per cent*).

<sup>14</sup> Selection made on judgemental basis.

The Management accepted (April 2022) the above-mentioned facts.

## **5.2.5 Unfruitful expenditure**

### **5.2.5.1 Laying of 132 KV line to connect with substation already upgraded to 220 KV**

A work order for 132 KV link line to connect 132 KV Sub-station Dharamkot to 132 KV substation Dhalleke, was issued (May 2013) with scheduled completion period of three months *i.e.* August 2013. However, the work of laying the line was stopped due to shortage of material for the towers and protest by the land owners of the land on which the towers were erected. In the meantime, another estimate was sanctioned (March 2014) for upgradation of Dharamkot Substation from 132 KV to 220 KV. The work of upgradation of Dharamkot substation was started accordingly and got completed in December 2014.

Audit noticed that despite upgradation of Dharamkot substation from 132 KV to 220 KV, the work of laying 132 KV line from Dharamkot to Dhalleke keep on moving while there was no need of laying the said line of 132 KV. The work of laying the line was completed in January 2020 with cost of ₹ 1.26 crore.

After completion of works, it was noticed (January 2020) that Dharamkot substation has already been upgraded from 132 KV to 220 KV in December 2014. Due to this, the line remained idle (October 2021). This showed poor monitoring and non-coordination between Transmission Line Survey and Construction (TLSC) and Grid Construction wings of the Company. Thus, even after upgradation of substation in December 2014, the work of laying of 132 KV line was continued up to December 2019 which resulted in unfruitful expenditure of ₹ 1.26 crore.

The Management accepted (April 2022) and stated that at present 220 KV Dharamkot Sub-station has no 132 KV equipment.

### **5.2.5.2 Avoidable expenditure on augmentation of conductor**

The work of augmentation of conductor from 0.15 sq. inch to 0.2 sq. inch was planned (March 2011) for 132 KV Jamalpur to Moga line circuit No. 1. The work was technically sanctioned (May 2011) and allotted (July 2011) to Firm-1<sup>15</sup> with the time limit of nine months. Firm-1 failed to perform and the work was cancelled/terminated (April 2014) and re-allotted (August 2014) to Firm-2<sup>16</sup>. However, the scope of work was reduced (December 2017) by

<sup>15</sup> M/s Telelink Power Transmission.

<sup>16</sup> M/s MVL Enterprises.

dropping the replacement of conductor, after a lapse of 40 months of issue of work order. Firm-2 thereafter, refused to continue the work due to reduction in scope of work and the work was short closed by which time expenditure of ₹ 1.24 crore had been incurred.

Audit noticed that the approval (November 2011) for said work was given only upon the condition that the work must be taken up after considering actual condition of towers and their foundation since towers were very old. This shows that the work was planned without considering actual site conditions which ultimately led to the expenditure of ₹ 1.24 crore proving wasteful.

The Management stated (April 2022) that the work could not be completed due to resistance by area residents as these circuits were passing over their rooftops. The scope of work was changed accordingly and was short closed. The reply is not acceptable as passing of circuits over the rooftops of residents shows that survey for line augmentation works was deficient which led to expenditure of ₹ 1.24 crore proving wasteful.

#### **5.2.5.3 Non-operational 66 KV line bays**

The Company planned construction of two 66 KV outgoing line bays for 66 KV substation, Tarn Taran. Accordingly, these two line bays were got commissioned (June 2019) at a cost of ₹ 31.17 lakh. Audit observed that these two bays are lying idle since their commissioning. Besides these, seven other bays, commissioned at various sub-stations between September 2015 and October 2020, were also lying idle (position as of November 2021). An expenditure of ₹ 2.03 crore incurred for construction of these nine bays which was borne by the Company, thus remained blocked.

The Management stated (April 2022) that these line bays were constructed as per the requirement of Punjab State Power Corporation Limited (PSPCL). The reply is not acceptable as the Company constructed these line bays without taking firm commitment from PSPCL regarding their utilisation.

### **5.3 Conclusion**

The Company has not prepared perspective rolling transmission plan. Surveys were faulty as existing infrastructures in the planned route of transmission line locations were not detected. There were delays in approaching the statutory authorities for obtaining necessary clearances. Prolonged delays in approval of design were noticed. These lapses led to delay in completion of projects, resulted in not only increased cost but also delay in realisation of envisaged benefits of improved reliability of supply, meeting additional load requirements etc.

## 5.4 Recommendations

The Company may ensure:

- *preparation of perspective rolling transmission plan;*
- *comprehensive route surveys along the planned line locations;*
- *obtaining of statutory clearances in timely manner; and*
- *timely completion of works to avoid cost overrun.*

The matter was referred (January 2022) to the Government; their replies were awaited (November 2022).

