

Metro Railway, Calcutta—Procurement of Sophisticated Signalling Equipment

**Ministry of Railways
(Railway Board)**

**PUBLIC ACCOUNTS
COMMITTEE
1991-92**

TENTH LOK SABHA



**Lok Sabha Secretariat
New Delhi**

NINTH REPORT
PUBLIC ACCOUNTS COMMITTEE
(1991-92)

(TENTH LOK SABHA)

**METRO RAILWAY, CALCUTTA—PROCUREMENT
OF SOPHISTICATED SIGNALLING EQUIPMENT**



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INTRODUCTION

I, the Chairman of the Public Accounts Committee, as authorised by the Committee, do present on their behalf, this 9th Report on Paragraph 3.15 of the report of the Comptroller and Auditor General of India for the year ended 31 March, 1989 (No. 10 of 1990), Union Government—Railways regarding Metro Railway, Calcutta—Procurement of Sophisticated Signalling Equipment.

2. In this Report, the Committee have observed that Metro Railway Administration has not yet been able to acquire continuous automatic train protection type of signalling system (CATP) for the underground Railway although a part thereof has been functioning for more than 6 years. The work of developing the system was entrusted to ECIL in April 1977 only, although by end 1973, the earlier decision to import the system from Soviet Union had been changed in favour of developing the system indigenously for want of adequate funds. Even after entrusting the work late to ECIL, the development work progressed at a very slow pace and after 8 years of indigenous efforts, the Railways chose to foreclose the contract with ECIL in April, 1985. Even the imported CATP system for which global tenders were floated in June, 1986 is likely to be available and installed by June, 1992 for Phase I and by June 1994 for Phase II. The Committee have considered this undue long delay in procurement of this important equipment for the underground Railway as unjustified which could have been avoided by careful and systematic planning.

3. The Committee have pointed out that in this case the indigenous efforts had a set back on account of the controversy regarding the interpretation of the multicomponent failure tests. The ECIL's plea that they could not meet the specifications in the way the Railways described the multicomponent failure and the final acceptance being based on acceptance test procedure which did not initially exist proves that all issues connected with the development of the system including the exact specifications etc. had not been clearly identified and laid down thus resulting in avoidable delay and defeating the very objective of promoting indigenous development. The Committee have recommended that the matter should be investigated fully and responsibility fixed in this regard. They have also desired that proper and adequate planning taking due note of the specifications to be fulfilled are clearly laid down before embarking on projects of this kind so as to avoid time and cost over-run and unnecessary imports.

4. The Audit Para was examined by the Public Accounts Committee (1990-91) at their sitting held on 27 November, 1990. The Committee (1991-92) considered and finalised this Report at their sitting held on 7 January, 1992. Minutes of the sittings for Part II* of the Report.

5. For facility of reference and convenience, the Observations and Recommendations of the Committee have been printed in thick type in the body of the Report and have also been reproduced in a consolidated form in Appendix II** of the Report.

6. The Committee would like to express their thanks to the Public Accounts Committee (1990-91) for taking evidence on Paragraph 3.15 (Railways) and obtaining information thereon.

7. The Committee would also like to express their thanks to the Officers of the Ministry of Railways (Railway Board), Department of Atomic Energy and Department of Electronics for the cooperation extended to them in giving information to the Committee.

8. The Committee place on record their appreciation of the assistance rendered to them in the matter by the Office of the Comptroller and Auditor General of India.

NEW DELHI;
22, January, 1992

2 Magha, 1913 (Saka)

ATAL BIHARI VAJPAYEE
Chairman,
Public Accounts Committee.

*Not printed (one cyclostyled copy laid on the Table of the House and five copies placed in Parliament Library).

**Not appended to the cyclostyled copy of the Report.

REPORT

METRO RAILWAY, CALCUTTA — PROCUREMENT OF SOPHISTICATED SIGNALLING EQUIPMENT

1. This Report is based on Para 3.15* of the Report of Comptroller and Auditor General of India for the year ended 31st March 1989 (No. 10 of 1990) Union Government (Railways).

2. Continuous Automatic Train Protection Type of Signalling System (CATP) continuously displays the appropriate signal aspects and also monitors the train speed and reduces the safe operating speed limit for the train monitoring the occupancy of sections ahead of the running train to permit the running of the trains at close intervals like 90 seconds.

3. The Metro Railway, Calcutta entrusted the work of developing a Continuous Automatic Train Protection Type of Signalling System (CATP) required for the metro Railway, Calcutta to the Electronics Corporation of India Ltd. (ECIL) in April, 1977. When asked about the criterion on which ECIL was selected to develop CATP equipment for Metro Railway, the Ministry of Railways (Railway Board) stated in a written note as under:

“M/s ECIL was selected by Metro Railway for the Indigenous development of CATP system because of their prior experience in the development of Auxiliary Warning System (AWS). The type of communication from track to train involved in case of CATP system is similar to the one for AWS system. Therefore, it was felt that M/s ECIL will be able to update the system and incorporate other features required of CATP system. RDSO and Railway Board also agreed with Metro Railway's approach. The Project proposal sent by M/s ECIL to the Deptt. of Electronics (after detailed study by Metro Railway) for sanctioning of grant/loan was also approved by Deptt. of Electronics in January 1977.”

4. Metropolitan Transport Project, Calcutta sanctioned in June 1972 was targetted to be completed by 1978 according to the Project Report. The Committee desired to know why it was not decided earlier than April 1977 to entrust the work to ECIL thereby giving them ample time in the process to experiment, develop and produce CATP system by the required time.

In a note furnished to the Committee, the Ministry of Railways have stated *inter alia* as under:

"Initially, it was contemplated to import the CATP system from Soviet Union and this item was accordingly included in the Indo-Soviet Protocol. Towards the end of 1973, when it became known that funds may not be available to complete this project by 1978, as envisaged in the project report, it was decided at that time to develop the rolling stock indigenously. Since CATP is closely interlinked with the rolling stock, it was also decided to go in for indigenous development of the CATP. Since there was not enough information in India about CATP, studies of the CATP in use in major metro systems of the world were undertaken. Based on these studies, specifications for indigenous CATP system were framed by April, 1975.

.....Due to lack of their experience in speed detection equipment and in the absence of a working model, M/s ITI expressed their inability to undertake the development of CATP. In January 1976, M/s ECIL expressed interest in the development of CATP since they were already engaged in the development of Automatic Warning System (AWS) for Indian Railways."

5. As regards the development of CATP system by Electronics Corporation of India Ltd. (ECIL), the Department of Electronics have stated in a detailed note as under:

"In 1976-77 Metro Railway, Calcutta had indentified the need for indigenous development of a sophisticated Cab Signalling and Automatic Train Protection System for Calcutta Metro and in April 1977, the then Electronics Commission had initiated jointly with Metro Railway, Calcutta this development project at M/s ECIL, Hyderabad.....The project was funded by Electronics Commission under its TDC Programme with an initial outlay of Rs. 18.1 lakhs later revised to Rs. 22.1 lakhs. Another Rs. 7.27 lakhs was also granted by EC towards conducting field trials. The project was closely monitored by Metro Railway, RDSO and Electronics Commission. With a very close interaction between the Railways and ECIL, it was possible to start laboratory tests on some of the sub-system prototype equipment right from March 1978 itself. Several field trials of the integrated CATP system were conducted by the Railways on certain sections of the surface railway on Central Railway and Eastern Railway because at that time actual metro tracks were not ready. A technical report published by metro Railway in April 1980 concluded that the tests and trials conducted upto that time had found the equipment to be satisfactorily meeting the functional and failsafe requirements as specified by Metro Railway.

Further tests/trials continued. Detailed environmental tests carried out on the equipment under simulated conditions in laboratory during

July/August 1981 were also satisfactory. Actual field trials of the prototype equipment on sections of the underground railway started by the end of 1981 and was scheduled to be continued for 2 years.

In the meantime, around September 1982, Metro Railway invited offer from ECIL, on a single tender basis for supply, installation, commissioning etc. of the CATP equipment for commercial service between Esplanade-Tollyganj and Dum Dum-Belgachia Section and by May, 1984 Metro Railway placed a firm order on M/s. ECIL worth about Rs. 4 crores for the above equipment. However, tests/trials on the prototype developed earlier continued in phases during the process of finalisation of the above commercial contract."

6. The Audit para has pointed out that based on the initial field trials conducted at the bench model stage, the Metro Railway Administration in their technical report of June 1980 had found, from the design point of view, the equipment developed by ECIL satisfactory/acceptable, notwithstanding certain defects. During tests of the prototype, both design and manufacturing defects were considered. Metro Railway Administration issued a detailed specification for the system in 1982. Further detailed/full fledged prototype tests/trials commenced in January 1983 and continued till December 1984.

7. On being asked as to why the Metro Railway Administration issued a letter of acceptance in May 1984 when detailed/fullfledged prototype tests/trials continued till December, 1984, the Ministry of Railways explained as under:

"Before the series production of the equipment could be started, the bench trial was to be followed by extensive field trials in typical section. The Section Dum-Dum Belgachia was chosen for this purpose. The equipment required for conducting the trials in this section were 24 track equipments and 4 cab equipments. These field trials were programmed to be done from January, 1983 to December, 1984. M/s. ECIL required a formal order for this. To meet with the programme of prototype field trials, M/s. ECIL started manufacturing these models pending the formal order. Since the prototype trials were to be followed by series production, a consolidated single tender enquiry was issued to M/s. ECIL in September, 1982 for both prototype trials in Dum-Dum Belgachia section as well as supply and installation of the series equipments in Esplanade-Tollyganj Section."

8. The Committee also enquired as to how the Metro Railway Administration, while issuing Letter of Acceptance, ensured itself that ECIL would be able to develop safe CATP system by the commencement of Phase-I project particularly when design and manufacturing defects had been noticed during tests/prototype.

9. In a note furnished in this regard the Ministry of Railways (Railway Board) have clarified as under:

"Para 4.3.1. of the tender document issued in September, 1982 and subsequently covered by Letter of Acceptance issued in May 1984 clearly laid down the work to be done during the prototype trials.

.....Provisions were made in the tender documents for prototype trials and the strategies to be adopted in the event of their failure thereby giving full scope to ECIL to develop their system applying necessary corrections and modification to the design wherever necessary."

10. The General Manger, Metro Railways, Calcutta stated during evidence:

"The order was placed in 1984. At that time it was felt that the ECIL may still be able to overcome the defects."

11. On being asked as to why the need then arose eventually to import CATP system, the Ministry of Railways (Railway Board) stated in a note:

"The ECIL's equipment was on prototype trial from January 1983 to August, 1984 when it had to be temporarily stopped due to deluge and again restarted in March, 1985. The unsafeside failures noticed during this phase of testing were discussed in joint review meeting on 11.3.1985, 14.5.1985 and 10.6.1985. During the meeting on 14.5.1985 ECIL indicated a time frame of 6 months to correct defects appearing due to single component failures. This did not meet with the full requirements of the specifications where multi-component failures were also to be catered for. During the meeting on 10.6.1985, ECIL modified the time frame at 3 to 5 years since this involved a complete redesign of the system for which they did not have any technology at that moment."

12. In this connection, the Deptt. of Electronics have stated:

"From early 1985 Metro Railway changed its stand on fail-safe requirement of the equipment. Earlier this test was carried out as per Railway's own specifications by simulated failures of one component at a time. Equipment had passed this test even if more than one component fails at a time. There were major differences of opinion between them and ECIL on the interpretation of the multi-component failure modes. However, tests carried out by Metro Railway to prove fail-safety on multi-component failures indicated certain unsafe features and they decided that major design changes are called for before clearance to bulk supply could be given. In April, 1985, the Metro Railway authorities officially withdrew the acceptance given earlier by them on fail-safe design of the equipment.

13. When the attention of the Ministry was drawn to this contention of

the Deptt. of Electronics during evidence, the Financial Commissioner, Railway Board explained as follows:

“..... This up-dating was not made in 1985. It was mentioned in our original specifications itself. It is obvious that the multiple components failure tests were mentioned as per Para 5.73 reproduced by us. All these specifications were not fulfilled and the tests were not conducted at times. What is that Para 5.73? It reads ‘failure of components which are not self detecting shall not cause any unsafe failure of the equipment.’ The prototype tests did not fulfil this requirement.”

14. Clarifying the position further in this regard the Ministry of Railways stated in a note thus:

“Railways have not changed their stand with regard to fail-safe requirements. Draft specification was given to M/s. ECIL in August, 1977 itself. This included the failure on account of the component as well as more than one component i.e. multicomponent failures. This draft specifications was converted into final specification in September, 1982, without any change. The Joint Test procedure evolved by M/s. ECIL and Metro Railway in February, 1978 envisaged the tests to be done in two phases. The first phase was to be on experimental/bench model on the coded system to prove the possibility of practical realisation of design philosophy. This was to be followed later by extensive field-testing the prototype, in Phase-II trials.”

15. It is seen that para 8 of ECIL letter dated 21.2.1987 had mentioned as under:

"It may be recalled that the earlier report prepared by the Metro Railway based on the initial field trials of our equipment, found the equipment acceptable and the same has been recorded as such."

It became apparent at this stage and that CATP equipment, as designed by ECIL, would not meet specifications. It was against this background that on 8.4.1985, a letter was issued by Metro Railway to ECIL, withdrawing the certificate given in June, 1980."

17. On being enquired whether it did not prove that Railways could not make it clear to M/s. ECIL about the precise specifications desired by them about the CATP system needed for Metro Railway, the Ministry of Railways stated:

"The specification was quite clear and the joint test programme was also quite clear. Phase I test programme very clearly included the failure on account of one component at a time. According to the decision of Joint Review Meeting held on 11.3.85, ECIL and Railways were to jointly decide the test procedure for Phase II so as to include testing of multi-component failure on a selective basis, but M/s. ECIL did not co-operate to implement the decision of Joint Review Committee of which their own representative was a member."

18. The Committee desired to know why the Railways considered it necessary to withdraw the acceptance given earlier by them to ECIL even before the matter could be taken up by the Expert Committee constituted later on in this regard. To this, the General Manager, Metro Railway stated during evidence:

"By that time, some other Committees were also set up by the Railways. They also recommended that this system should be gone into in detail by a Committee consisting of Deputy CSTE's and CSTE's. They also stated that the equipment as developed by the ECIL would not strictly be safe. ECIL also recommended that if there is going to be import, it may take three to five years and hence they would like the Metro Railway or the Indian Railways to go ~~on~~ Railway felt that the

As a matter of fact the trials had to be temporarily discontinued on 21-5-1983 due to unsafe side failures.

Based on the above testing, the Signal Engineer-in-charge had made detailed study to bring out the specification requirement with respect to unsafe-side failure. This was also informally discussed by CSTE with M/s. ECIL at Hyderabad. Study report of the Engineer had concluded:

- to conduct multi-component failure mode of testing for non-indicative failure alone considerable time was required.
- computerised simulation method was the correct solution to bring out the efficacy of the system against multi-component failure.

M/s. ECIL was to give a concrete proposal as to the method of testing: However, no such proposal emerged from them. The trials were discontinued due to floods in August, 1984 and were restarted only in March, 1985. The matter of multi-component test was discussed in a joint meeting with DOE on 11-3-1985 where DOE and Railway Board officials were also present. It was decided in this meeting that Metro Railway and M/s. ECIL should conduct multi-component test on selective basis giving reasons and philosophy of doing this test. However, ECIL did not co-operate further in conducting such tests. Therefore, it may be seen that at the time of placing order for CATP, the matter was being discussed with M/s. ECIL."

20. On being asked whether multi-component failure defect was not noticed when the system was put to, field trials on Central and Eastern Railways, the Ministry of Railways explained that:

"Field trials on C/R & E/R were done as a part of Phase I, trials on experimental/bench model, where the tests were confined to simulation of open-circuit and short circuit faults of only one component at a time. As such multi-component failures could not have been detected during these trials.

The certificate issued by Metro Railway in June, 1980 was in respect of Phase-I tests only i.e. tests on the experimental/bench model. As per the joint test procedure agreed to by ECIL and Metro Railway, the objective of these trials was only to test the practical realisation of the design philosophy proposed to be adopted for the CATP system. The final design of the CATP was to be the one which would have evolved after extensive field trials on the prototype equipments. As such, fail-safe tests on Phase-I were only confined to single component failures. Extensive fail-safe tests regarding multi-component were to be taken up on the prototype trials which were to be done later."

21. The Committee desired to know as to when ECIL came to know

from Metro Railways that they had to develop a CATP system where multi-component failure were also to be catered to. The Deptt. of Atomic Energy stated in a note as under:

“During 1977 Metro Railway formulated specifications based on Victoria-London Metro which included multicomponent failure, under specified conditions.

Subsequently, Metro Railway again issued detailed specifications vide tender No. S&T/CATP/1/182 which also included multi-component failures.

ECIL designed and fabricated bench model based on the above specifications. Metro Railway, ECIL and DOE regularly reviewed the specifications and the performance. The bench model was tested for two years till 1980. Then Metro Railway vide their report (June 1980) accorded safety approval to ECIL equipment. The relevant clause is reproduced below.

“6.3 the design of the circuit of the integrated cab signalling and CATP system has been found to meet the fail-safe requirements as given in the specifications of the CAB signalling and CATP system.”

The trials on the bench model continued. No serious deficiency of multi-component failure was noticed. Metro Railway released purchase order worth Rs. 4.07 crores during May, 1984.

Through letter No. MRTS/8G-507/1/1/Pt.IV(710) dated 8-4-1985, the Metro Railway had withdrawn the safety certificate stating that the system did not meet multi-component failure.

At this stage, ECIL came to know that the philosophy adopted by Metro Railway on multi-component failure test was changed. The interpretation of the multi-component failure specifications was entirely different and unreasonable.”

22. In regard to multi-component failure of the equipment the General Manager, ECIL explained during evidence:

“All the development had been taking place with inter-action between Railways and ECIL. Specifications were required, to begin with, but the final acceptance is based on another document called the Acceptance Test Procedure. What has gone wrong in this case is whereas we have made single component failure, the way the multi-component failure is getting described is the factor with which we could not meet the specifications. This could be attempted only after the discussion results in a demand. Subsequent to this, we did not get time for doing this development. All the earlier developments had taken place in order to see now it will be tested. Our plea is that the same kind of scrutiny may please be done of the ALSTHOM system as is done in the design made by the ECIL, to ensure that what is

being accepted today has been looked at in the manner that the ECIL design was looked at”.

23. The attention of the witness was drawn to the fact that in the specifications stipulated in 1977 and reiterated later in 1982, it was clear that multiple component failure was to be taken into account. The Committee desired to know whether the test procedure did not specify that. The witness stated:

“It did not exist, to begin with.”

24. On being pointed out that this was a learning curve and the test procedure would emerge subsequent to the emergence of learning curves which would imply that subsequent to all the individual parts being tested individually and separately, the multiple component test would come only thereafter, the General Manager (ECIL) stated:

“The discussion took place in a sequence. Much later, a kind of test procedure was mentioned for multiple component failures.”

25. He further added:

“I will read this out:

“ECIL stated that the failure modes used in conducting the above tests assumes simultaneous and co-ordinated failure of components which in ECIL’s opinion is highly improbable.”

In other words, how this component is going to fail is being stated here. Whether it will happen in practice or not is going to be a debatable point. It was not possible for ECIL to say that under these circumstances we can design a system which will pass this test.”

26. In reply to a query as to when this conclusion was arrived at, the witness stated:

“This kind of a discussion took place late in 1984.”

27. The Committee pointed out that this was the first discussion in 1984 and in the very first discussion, Railways had categorically given this procedure for testing. To this, the representative stated:

“This specifications were interpreted in the manner it was done in 1984.”

28. The Committee desired to know from Railways whether they agreed with the ECIL that the multi-component failure test depended upon the acceptance test procedure and if so, why the acceptance test procedure was not mentioned to ECIL earlier alongwith the specifications. The Ministry of Railways (Railway Board) in a note in this connection stated:

“The need for multi-component test was already a part of the technical specification of the tender. The exact para of the specification in this connection is given below:

Para 5.73—Failure of components, which are not self-detecting,

shall not cause any unsafe failure of the equipments. Even simultaneous failures in different component, which are not self-detecting, shall not cause any unsafe failure of the equipment.'

Test procedure is only a method which outlines the mode of testing to fulfil the requirements of the specification. This procedure—test procedure—is normally to be elaborated by the Contractor during the contract period and approved by the supplier. Therefore, it is not the normal practice to mention Test Procedure alongwith the specification."

29. When enquired as to when this Acceptance Test Procedure was mentioned to ECIL by Railways, the Deptt. of Atomic Energy stated in a note:

"During the meeting held between ECIL and Metro Railway on 12-4-85, ECIL was informed of the philosophy of testing which was followed in conducting the test on ECIL equipment. This philosophy was not the same as one followed during 1984. The relevant para of the minutes of the meeting is reproduced below:

"The failure modes observed by the Metro Railway were demonstrated to ECIL's representative.

ECIL's reaction was that the philosophy followed in the conduction fail safe tests were not the same as the one earlier undertaken by ECIL and the one followed in connection with fail safe tests during 1984."

However ECIL requested to provide the document of Acceptance Test Procedure *vide* ECIL letters

(a) CSG: DRP: CATP: 5242 dated 30-7-85 and

(b) ECIL: CSG: (DRP): RNM-5203 dated 16-7-85.

ECIL did not receive the Test Procedure."

30. The Audit Para points out that ECIL, while accepting the shortcomings in the prototype indicating in May, 1985, a time schedule of six months for design modification and manufacture of a revised prototype to be offered once again for field trials within 12 months (revised to 3 to 5 years in June 1985 to make available a satisfactory system *i.e.* by 1988—90).

31. Explaining in this regard, the Deptt. of Electronics stated in a note as under:

"In joint review meetings in May/June 1985 between Railway Board, DOE, Metro Railway and ECIL, the Railway authorities rejected the indigenous design on the ground that it failed to meet the multi-component failure test and mentioned about urgent requirement of the system by 1st quarter of 1986. In these meetings, they indicated that to meet this time target ECIL may try to get a proven design from abroad to meet the first phase requirement and subsequent manufacture under know-how transfer. M/s. ECIL were of the view

that a complete redesign was not called for and under joint efforts of ECIL and Metro Railway, the indigenous design could be made workable by easily incorporating the new desired features. They also pointed out that the entire process of selecting foreign technology, testing them in Indian conditions etc. might take even more time than the joint effort of ECIL and Metro Railway, and make a workable design. However, Railway insisted on total redesign and due to the urgency mentioned by them they desired importation of technology. There were also differences in opinion on the process of importation. While Railways desired ECIL should float global tender, select the technology/party etc., ECIL wanted that tendering, selecting the technology, testing etc. should be the responsibility of Metro authorities. They could take up production under know-how transfer only after MTP has fully accepted the imported technology. These joint review meetings could not arrive at any specific recommendation and the matter was referred to an Expert Committee."

32. In this connection, the Ministry of Railways (Railway Board) explained as under:

"The differing views of Railways as well as ECIL were expressed in a joint meeting with DOE in June, 1985. Secretary/DOE, Shri Vijaykar, was of the opinion that since several electronic control systems have and are being designed by agencies of Deptt. of Atomic Energy, Space and Ministry of Defence where too fail-safe systems were involved, an urgent meeting comprising of these agencies could be convened to decide as to how best the equipment developed by M/s. ECIL could be made fail-safe. As such an Experts Committee comprising experts nominated from these Ministries was constituted in October, 1985.

The Experts Committee was given a copy of Dy. CSTE/CSTEs Committee's reports so that it could give comments thereon. The Experts Committee went into the following:—

- (i) Suitably modifying the existing ECIL design or redesigning ECIL equipment locally with or without engaging foreign experts as Consultants.
- (ii) Importing the know-how for production by ECIL.
- (iii) Importing the system for Phase-I use (Esplanade-Tollyganj Section) with a tie-up for production by ECIL for Phase-II operation (Esplanade-Dum Dum Section)."

33. According to Audit Para, the Experts Committee unanimously recommended import of CATP system by Metro Railway for the Esplanade-Tollyganj section with provision for transfer of technical know-how to ECIL for developing the equipment to meet future needs.

34. According to Ministry of Railways (Railway Board), following considerations seem to have weighed with the Experts Committee while recommending import of CATP:

- (i) The entire system of the Audio frequency track circuit proposed for Calcutta Metro and the speed codes mentioned in the specifications were based on the system adopted in London's Victoria Line. Substantial improvements had taken place since Victoria Line system was installed in 1966, by various companies adopting higher frequency for speed codes with each system varying from the previous one.
- (ii) At the then state of development by ECIL, tests resulting in unsafe side failures, the system could not be adopted for Calcutta.
- (iii) Action was recommended to be taken for importing the latest practices on the basis of experience gained over many systems and incorporating suitable provision in the specification for the type of frequency, coding etc.
- (iv) All Members including ECIL were unanimously of the opinion that action should be taken to import the equipment suitably incorporating the fail-safe features mentioned in the ORE specifications and also allowing for technical know-how being made available to ECIL for subsequent development and supply of future needs. It was decided by the members that similar single and multiple component failures affecting the performance should also be stipulated in the performance tests of the equipment being imported.

35. In reply to a question whether urgent requirement of CATP system by Railways was one of the consideration which weighed with the Experts Committee in recommending import of CATP, the Ministry stated as under:

“The urgency of requirement of CATP equipment during the latter half of 1987 was one of the consideration in the deliberations of the Committee. It may, however, be mentioned that the main consideration for import of the equipment was the fact that with the state of development of CATP equipment by ECIL, the tests resulting in unsafe side failures, the system cannot be adopted for Calcutta Metro.”

36. The Experts Committee had also desired that while calling global tenders, Metro Railway's specification should be suitably updated for dating for proven system using solid state technology, stipulate the failure rate and specify the type of modulation, frequency range, etc., to suit the new range of electronic equipment.

millions (31.7%). This price increase was attributed by them to the agreements not coming into force within 6 months as provided therein and also due to the ensuing long delay which made earlier prices unrealistic. The financial implications on this account is, therefore, FF 8.88 millions (Rs. 1.86 crores @ 1FF=Rs. 2.10). Consequent upon the price rise by M/s ALSTHOM, M/s ECIL have also revised their offer, vide their letter dated 11.9.90, which is under examination."

48. The Committee desired to know as to why the Railways were importing CATC system whereas the earlier effort was to procure the CATP system. In reply the Ministry of Railways (Railway Board) have clarified that:

"As the Experts Committee recommended the import of state-of-the art technology, necessary enquiries were made and it was learnt that with a slight additional cost, certain vital features like (i) Automatic Train Operation (ATO) and (ii) Automatic Train Supervision (ATS) can also be incorporated in the system besides the Automatic Train Protection (ATP) features. These additional features provide more safety by eliminating human element further. It also provides energy saving. Automatic Train Operation (ATO) Automatic Train Supervision (ATS) and Automatic Train Protection (ATP) together constitute continuous Automatic Train Control (CATC) system which has now been ordered for Phase-I of M/s GEC ALSTHOM/France, and for which letter of Acceptance for Phase-II has been issued to M/s. ECIL on 31.12.1990."

49. On a related query as to whether prior anticipation of time delays in completing procedural formalities could have reduced/eliminated the additional financial liabilities, the Ministry of Railways submitted as follows :

"Regarding CATC Phase-I contract with M/s GEC ALSTHOM constant efforts were made at every stage to finalise the issue, but it took time as a number of parties were involved. No effort was spared to seek a quick decision but the overall time delay has been due to matter requiring consideration not only at various Ministerial levels but with the French Embassy in India and French Government.

No efforts were also spared to get the best prices for the contract. The tender was floated in June 1986 and was to be valid upto end of December 1986. The work was to be completed by December 1989. GEC ALSTHOM's initial offer was with a price escalation formula but they were prevailed upon to make it a Firm price quotation for the period of supply.... It may, therefore, be seen that in spite of the unavoidable delay of about 3 years, that had taken place in processing the case, the cost escalation has been kept down to only 6%.

As far as CATC Phase-II is concerned, as against the earlier target of December, 1989, the present one is likely to be June 1994 i.e., a delay of 4½ years. GEC ALSTHOM have pleaded that it would be very

uneconomical for them to work at the prices quoted in the tender which were actually based on 1986 prices. Their organisation had undergone a number of structural changes which have resulted in higher overheads. The technology had also to be upgraded keeping in view the highly obsolescence rate of the technology employed in electronic field. In spite of repeated attempts to bring down the prices by ECIL directly as well as by ECIL and Railways jointly, GEC ALSTHOM have pleaded their inability to reduce the same. Hence, it may be seen that no efforts were spared in negotiating for proper price with GEC ALSTHOM for Phase II also."

50. When asked to indicate the dates by which the prototype was likely to be received and cleared and when the CATC system would be procured for Phase I, the Ministry of Railways (Railway Board) stated in a note that:

"As per the present time schedule given by GEC ALSTHOM, the prototype trials are to start from March 1991. The clearance of the prototype depends upon the performance but since the system is a proven one, such an approval is likely to be given in two months time.

The CATC system for Phase-I will be available and fully installed by June, 1992 as per the present time schedule given by the Contractor.

M/s ECIL, after absorbing the technology from GEC ALSTHOM will supply the Phase-II requirement of Metro. They should also be in a position to meet the future needs of the country for CATC system."

51. In this connection the General Manager ECIL stated during evidence:

"The point is after the Railways accept the prototype, the steps to transfer the technology will commence. Unless it is accepted by them it will not be correct to begin with that. I think prototype will be accepted in April 1991. Once we accept it, we are required to provide it.... I must have a chance to participate in the scrutiny of the design with M/s ALSTHOM. I have no chance to look at the design."

52. Reacting to these comments of General Manager, ECIL, the representative of Railway Board stated:

"For Phase I of the project, the Railways have entered into a direct contract with ALSTHOM. Designs were finalised in consultation with ECIL. We are keeping a direct contract with ECIL."

The General Manager, Metro Railway added:

"We will definitely involve ECIL. The specifications were provided for this in consultation with ECIL."

ment supplied by M/s ECIL based on the technology adopted by them in Mid-70's if they had been able to meet the specifications where multi-component failure was also to be eliminated, the Ministry of Railways stated that apart from this, the ECIL system also suffered from certain unacceptable features in contravention to the specifications. If ECIL had developed a system which could have eliminated the above deficiencies so as to meet the specifications in full there would not have been any objection from the Railway's side for its acceptance.

46. According to the Audit Paragraph, Global tenders for import of CATP system were floated in June, 1986 for design, manufacture, supply, installation, testing and commissioning of the CATP system. A letter of intent was issued to the firm in April 1988 at an approximate cost of Rs. 13.33 crores for Phase-I. When asked to justify the delay of more than two years in finalisation of tenders for import which was justified to meet the tight time frame for Phase-I, the Ministry of Railways (Railway Board) stated:

"The work involved was rather novel with partial import, transfer of technology indigenisation, elaborate specification formulation, co-ordination with various agencies etc. The time taken is not considered abnormal".

47. Apart from the delay in issue of the letter of Intent to the firm in April 1988, the finalisation of the contract with them was also delayed. As regards additional financial liability on account of the delay in finalisation of contract with the French Firm, the Ministry of Railways (Railway Board) submitted a detailed note as under:

"(1) CATC—Phase I

There is no additional financial liability upto the placement of 'letter of Intent' to the French firm in April '88 for CATC Phase-I as the order value indicated in the conditional Letter of Intent was based on the prices quoted by M/s ALSTHOM in October, 1986.

The conditional Letter of Intent issued to M/s ALSTHOM on 7.4.1988 stipulated that M/s ALSTHOM & M/s ECIL finalise the collaboration agreement to the satisfaction of the Government of India. The agreement was signed on 7.10.88 but the Deptt. of Electronics approved the same on 27.12.88. Meanwhile, M/s ALSTHOM were requested to extend the validity of their offer beyond 31.12.88 which was extended by them by one month i.e., upto 31.1.89, beyond which an escalation of 6% was indicated by them. The conditional LOI was converted into a formal order and letter of Acceptance was issued to M/s ALSTHOM on 10.1.89 before the expiry of the validity period (31.1.89). M/s ALSTHOM while accepting the order (after certain modifications to payment terms as sought by them) mentioned that as per the Indo-French Protocol, the Bank Guarantee for security deposit was to be assigned to the French Domiciliary Bank. They agreed to

hold the prices only upto 30.6.1989. Our Ministry of Finance did not initially agree to M/s ALSTHOM's interpretation of the Protocol. However, they referred the issue to the French Government. The Ministry of Finance was prevailed upon by the French Government and, therefore, directed Railways in October, 1989 to agree to M/s ALSTHOM's stand. Since by then the validity of the prices had expired, a negotiated price increase of 6% was agreed to. Based on the above decision a "Modified Letter of Acceptance" was issued to M/s ALSTHOM on 30.10.1989 which was accepted by them in November, 1989. As per the credit protocol, Ministry of Finance issued 'Letter of instructions' to the French Domiciliary Bank in November, 1989 and M/s ALSTHOM got the down payment on 25.1.1990 from the French Domiciliary Bank.

The Financial implication for the delay between the Conditional Letter of Intent and the formal order is, therefore, 6% of the initial contract value (Rs. 13.33 crores) which works out to Rs. 79 lakhs calculated @IFF = Rs. 2.10; the rate prevailing on the date of opening of the commercial offer.

(2) CATC — Phase-II

As per the "Conditional Letter of Intent" issue to M/s ALSTHOM on 7.4.1988, the firm were required to execute the collaboration agreement with M/s ECIL/Hyderabad within one month of the issue of this LOI for the indigenous manufacture of the system for Phase II requirement of Metro Railway by the latter. It was also stated that the broad cost estimate for the TOT for Phase-II quoted by them will have to be treated as the ceiling limit in regard to the total cost of technology transfer including documentation, training, tools, CKD/SKD kits etc.

M/s ALSTHOM & M/s ECIL held a series of meetings and reached complete understanding with each other with regard to various terms and conditions including the prices as expressed by them during the meeting in the Railway Board's office on 27.7.1988.

The memorandum of agreement was finally signed on 7.10.1988. Since the prices incorporated in these agreements were, according to the terms and conditions of their tender offer, the financial implication at this stage can be taken as nil.

M/s ECIL applied to the Ministry of Industry on 25.11.1988 for Government's approval to the terms of the collaboration agreement. The approval of Government of India was communicated to M/s ECIL on 21.11.89 subject to certain conditions. The approval letter was forwarded by M/s ECIL to M/s ALSTHOM in February 1990 with a request to incorporate the conditions mentioned therein in the collaboration agreement. In response to the above, M/s ALSTHOM, vide their letter dated 5.4.1990 to M/s ECIL, increased the prices from FF 28.056 millions to FF 36.940 millions i.e. an increase of FF 8.8

3.1 of action plan of the meeting held in the office of Secretary, DOE had been taken up and this will be demonstrated to Metro Railway, Calcutta during the first week of August 1985. Regarding multi-component failure, ECIL requested Metro Railway to send the Acceptance Test Procedure for multi-component tests and stated that after receipt of the Acceptance Test Procedure ECIL would be in a position to take up rectification for multi-component failure.

3. However, ECIL was not given any chance to demonstrate nor did Metro Railway draw up any Acceptance Test Procedure for multi-component failure.

4. The modifications carried on for single component failure were shown to the Experts Committee and also to CASTE during his visit on 20.4.1987."

42. On being enquired whether it would not have been feasible to commence the Esplanade-Tollyganj section using Axle Counters till the ECIL could have been in a position to develop a fail-safe CAIP system instead of resorting to import thereof, the Ministry explained in a note as under:

(a) In the Experts Committee meeting held on 31.10.85, attended by ECIL, the unanimous decision was that for Phase-I, CATC equipments should be imported; obviously on that date ECIL didn't have a working equipment.

(b) It is true that in their letter dated 21.2.87, ECIL had mentioned that they had rectified some deficiencies in the equipment. But as may be seen from the minutes of ECIL's meeting with Railway Board on 5.1.87, ECIL confirmed that the modified equipment as offered was still based on the old technology adopted by them in mid-70s. This old technology is not acceptable to the Railways. In a meeting with DOE on 10.6.85, ECIL had given a time frame of 3 to 5 years for developing CATC equipments as per new technology. Even by 31.10.85, ECIL didn't have the know-how. On this basis, ECIL's offer would be to supply the equipment by end 1988 to end 1990. Knowing their earlier track record, with regard to CATP, of 8 years to produce a deficient equipment, even five years would be an optimistic assessment. Without foreign know-how ECIL could not have developed CATC equipment. So the time frame of 3 to 5 years has no significance. In their meeting with Metro Railway on 14.5.85, ECIL had indicated that they could adopt the proven CATP from a reputable manufacturer. Import of technology by ECIL from foreign countries would have meant the same steps as Railway had taken including interaction with foreign firms, Ministry of Finance, DOE, etc. As a matter of fact during discussions on 10.6.85,

ECIL were reluctant to go in for foreign technology directly and wanted Railway to do it for them. Even in Phase-II, for negotiating with GEC-ALSTHOM, ECIL has taken the assistance of Metro Railway and Railway Board. Thus, for import of foreign technology, ECIL would not have taken lesser time than what Railways have taken.

- (c) In the Experts Committee meeting on 31.10.85, a decision was taken to import Phase-I equipment of CATC on the assumption that headway of train service in Esplanade-Tollyganj will be less than 7 minutes by mid-1987. It is unfortunate that traffic has not developed and we are able to manage with a headway of 10 minutes in peak period. None can be blamed if the traffic does not materialise. This however, is only an interim phase and CATC is absolutely essential for operating full Metro.
- (d) It has taken time for finalising the agreement with GEC-ALSTHOM for Phase-I. This is due to consultation with various Ministries and ECIL. Their completing the work by July, 1992 will help us to reduce the headway since there will be a surge of traffic with the anticipated completion of Tollyganj-Dum Dum link once the land problems are settled by the West Bengal State Government."

43. The Committee desired to know whether the Railways were not aware while entrusting the job of development of CATP system to the ECIL that the technology to be adopted was developed in mid-1970's. The Ministry of Railways tried to clarify that their objection was not basically to the vintage of technology but its inability to fulfil the requirements of specifications.

44. In reply to a question as to whether any newer technology had been evolved subsequently, the Ministry stated:

"The technology in the field of CATP/CATC is constantly evolving. In 1970 the system was based on analogue technology. This was followed by digital technology using discrete components. The next stage in the development was use of large-scale integrated circuits in place of discrete components. The next generation of equipment were more of programme control system with accent on software. The latest system which has been introduced in the Japanese Metro (SENDAI) uses Fuzzy control based on artificial intelligence. Metro Railway while inviting tender, keeping in view the decision arrived at the meeting of the Experts Committee on 31.10.1985 to go in for a state of the art system stipulated that the system to be supplied should have been in operation for a length of not less than 40 kilometres and should have worked satisfactorily for at least 2-3 years."

45. On being asked whether Railways would have accepted the equip-

37. Explaining further the circumstances under which the decision was taken to import CATP, the Ministry of Railways (Railway Board) have outlined in a note as under:

- Fail-safe test conducted by the Railways at the prototype stage in March, 1985 indicated unsafe failures particularly with regard to multi-component mode.
- Apart from this, the system developed by M/s. ECIL suffered from a number of other design defects like lack of multi-path processing, choice of susceptible frequency range, etc.
- The system at that stage could not, therefore, be adopted for Calcutta Metro.
- M/s. ECIL required time frame of 3 to 5 years for developing a system which can fully comply with the Railway's specification. They also suggested that some amount of import of technology may be adopted in this connection.
- The South section from Esplanade to Tollyganj was expected to be opened as double line by early 1986 with train frequency of 20 minutes.
- As per the traffic projection, the train frequency had to be reduced to 7 minutes in mid 1987 to meet the traffic.
- Since the CATC system was not to be available before 1986/87, Metro Railway suggested the use of absolute block working with indigenous axle counters as an interim measure.
- The absolute block working with axle counters, however, can only be used upto the train frequency of 8 minutes and hence, the CATC system would have become necessary by 1987.
- Ministry of Railways therefore, approached the Department of Electronics to allow importation of CATC system.
- The Committee of Experts, who met on 31.10.1985, after deliberating on various possibilities, suggested that CATC system Phase-I may be imported with provision that Phase-II be implemented by M/s. ECIL on transfer of technology.
- Accordingly, Department of Electronics gave approval for partial import of the system with provision for transfer of technology for the other part.

38. The Committee find that ECIL in its letter dated 21 February, 1987 to Railways had stated that certain deficiencies during the evaluation had been communicated to them during July, 1985. However, they were not given an opportunity to demonstrate the fact that those deficiencies had been removed, though that aspect was brought to the notice of the Railways during the meeting held in Railway Board's office in end of October, 1985.

39. The Audit para points out that Railway Board's directive in April

1987 to Metro Railway to examine the claim of ECIL was, however, not acted upon and, instead, import was resorted to and the contract with ECIL was foreclosed.

40. On being asked as to why the Railway Board's directive of April 1987 to Metro Railway was not complied with and instead import was resorted to and the contract with ECIL foreclosed, the Ministry of Railways (Railway Board) explained as follows:

- “(i) In the meeting held in Board's office on 5.1.1987, ECIL had confirmed that their equipment is based on old technology of mid 70s. For developing CATP-Equipment with new technology, a time frame of 3 to 5 years will be required. Experts Committee in their meeting on 31.10.1985 had opined that equipment to be ordered should be as per latest technology.
- (ii) ECIL failed to demonstrate the modified version of the equipment either at Dum Dum as desired by the Experts Committee or during Chief Signal and Telecommunication Engineer's (CASTE) visit on 20.4.1987. ECIL didn't give any intimation to Railway after October, 1985 except through letter dated 21.2.1987.
- (iii) In Metro Railway's letter to Railway Board on 27.5.1987 it was made clear that ECIL had not incorporated the specific fail-safe design features.
- (iv) In the technical comments on offer of GEC-ALSTHOM *vide* their letter dated 25.6.87, ECIL have acknowledged that GEC-ALSTHOM's offer is far superior. There is also a mention which by inference means that ECIL's equipment did not cater for multiple component failures.”

41. As regards the contention of the Railways that ECIL failed to demonstrate the modified version of the equipment either at Dum Dum as desired by the Experts Committee or during the CASTE's visit on 20.4.1987, the Department of Atomic Energy clarified in a note as under:

- “1. During the meeting held in the office of Secretary, DOE on 26.6.1985, certain action points had emerged. This was communicated to ECIL *vide* letter dated 12.7.1985.
- 2. Accordingly, ECIL had carried out rectification of all the faults caused during single component tests, ECIL had communicated this to Metro Railway *vide* letter No. ECIL: CSG(DRP): RNM:5240 dt. 29.7.1985 giving the details of the modifications carried out. Subsequently ECIL had written a letter No. ECIL: CSG:(DRP):RNM:5234 to metro Railway communicating to them that they would be demonstrating the rectification carried out on the equipment during the first week of August, 1985 at Dum Dum. Again *vide* letter No. ECIL:CSG:(CRP)RUM: to Metro Railway, ECIL communicated, that the modifications as per para

53. Elucidating further, the Ministry of Railway (Railway Board) stated in a note furnished subsequently to the Committee that:

"As stipulated by DDE, while approving the import of CATC, M/s. ECIL were associated in the specification formulation as well as technical evaluation of offers received against CATC tender. M/s. ECIL vide their letter dated 25.6.1987, have confirmed that the offer of M/s. ALSTHOM fully complies with the specification and is of the state of art technology. Also, as desired by DOE, the tender provided for transfer of technology by the Contractor to M/s. ECIL to enable them to execute the Phase-II of the work. M/s. ECIL have already signed the Memoranda of Agreements alongwith certain modifications in September, 1990. These agreements include:

- transfer of technology from M/s. GEC ALSTHOM.
- supply of CKD, SKD components and supervision of works in France.
- Supervision of installation and commissioning of works in India.

According to these agreements, M/s. ECIL will get all the technical documents and drawings required to enable them to produce CATC Phase-II which will be similar to Phase-I and hence all the information regarding CATC Phase-I will be available to M/s. ECIL.

M/s. GEC ALSTHOM are already doing the details of system design in order to fulfil the requirements of the specifications mentioned in the tender. These detailed designs will be submitted to the Railways for approval which will have to be given in a specific time so as to meet the time schedule. While, therefore it may not be possible to discuss each and every detail with M/s. ECIL, they will be kept in the picture so that they benefit by the earlier exposure at the stage of CATC (Phase-I) itself."

54. Viewed against the background that the supply and commissioning of CATC system has been delayed, the Committee enquired how the Railway Board justified shortclosure of indigenous order of ECIL on the plea of urgency to adhere to the target date. In reply, the Ministry of Railways (Railway Board) stated *inter alia* in a note as under:

"After studying the technical aspects of the offer of GEC ALSTHOM, the successful tenderer, ECIL in their letter dated 25.6.1987 clearly clarified that—

- The ALSTHOM system meets all the safety requirements laid down by Dy. CSTE's/CSSTE's Expert Committee's and relevant ORE reports. (Earlier when their system was rejected in 1985, they were categorical that no system in the world can meet these requirements).
- ALSTHOM's offer is a state of the art technology whereas the

offer of the competitor M/s. WABCO is in no way better than ECIL's indigenously developed technology which is 30 years old and does not meet the safety requirement.

It is, therefore, clear from ECIL's own admission that their system is not capable of ensuring adequate safety.

ECIL in their meeting with the Board on 5.1.87 indicated a time frame of 3 to 5 years to make available a satisfactory system to Metro Railway eliminating all areas of deficiencies. They further confirmed that the above time frame indicated was to develop CATP afresh based on new technology. This time frame of 3-5 years indicated by them appears to be optimistic judging from their earlier development of CATP system on the old technology where even after 8 years i.e. between January 1977 (when DOE sanctioned them grant/loan for the development) and April 1985 a satisfactory system was not developed. This is because in developing a new electronic system *de novo* a number of stages of trials both in the laboratory as well as in the field are to be undertaken as was done in the case of the old system. A time frame of 3-5 years is only possible if a proven system is chosen for adoption and is produced in this country on technology transfer. This is exactly what was decided in the case of CATC and hence import of the Phase-I could not have been avoided."

55. On being asked whether ECIL did not agree that the time taken by them to develop a satisfactory CATP system free from all defects was too long, the ECIL, stated:

"ECIL do not agree that the time taken by them to develop a satisfactory CATP system was too long. The interpretation of the multicomponent failure and the method of testing against multicomponent failure was such that ECIL was not in a position to meet these requirements."

56. In reply to a related query as to whether ECIL would have been able to develop CATP system eliminating all areas of deficiencies and based on latest available technology by 1992, the ECIL stated:

"Yes, provided Railways and ECIL would have arrived at a acceptable interpretation of the multi-component failure feature and the method of testing."

57. As regards the arrangement of signalling contemplated for the interim period (till it is commissioned), the Ministry of Railways (Railway Board) explained in a note as under:

"The signalling arrangement contemplated for the interim period shall be the line side signals with Home and Starter. While the station section will be monitored by the tract circuits, the block section shall

be protected by means of axle counters. This arrangement can allow a minimum headway of 8 minutes only because:

- Trains are to be protected by a minimum of 2 stop signals.
- All the trains are to be received on the platform directly and no train is to stop in the tunnel.

The extra precaution taken is due to the fact that trains are running very close to one another. This line side signalling arrangement is relevant in the present context when traffic is not high."

58. In reply to a query as to from where these axle counters were procured/being procured by Railways, the Ministry of Railways (Railway Board) stated:

"The axle counters used in South Section from Tollyganj to Esplanade were procured by Metro Railway indigenously from M/s DCM Data Products India Ltd. The other indigenous sources of supply of axle counters are Byculla Workshop and CEL (India), Limited."

59. On being asked as to what would be the minimum headway time if CATC system becomes available, the Ministry of Railways (Railway Board) informed that with the introduction of CATC, the minimum theoretical headway possible would be 90 seconds. When asked to indicate the financial loss to the Metro Railway on account of non-availability of CATP system, the Ministry of Railways (Railway Board) stated in a note:

"Since CATC was not likely to be available before opening of the south Section in April 1986, it was decided in December 1985 to install Axle Counter as an interim measure for the South Section from Esplanade to Tollyganj. Provision of axle counter in the South Section has costed Rs. 75.60 lakhs. Moreover, since the axle counter can be used on the Zonal Railways also, a credit of Rs. 30 lakhs has been given to the estimate, expecting usage of the released axle counter somewhere else. Hence the net additional expenditure on this account is Rs. 45.60 lakhs.

North section between Esplanade to Girish Park is expected to be ready by early 1993, but the CATC Phase II which will have to be done by M/s ECIL on technology transfer will only be available by June 1994. Provision of axle counter for this section will cost Rs. 31.86 lakhs.

The section Girish Park—Dum Dum is not likely to be opened as a double line section till the end of 1994, and it is expected that CATC Phase II will be available by that time and hence no axle counter is being catered for this. Hence, the net loss due to non-availability of CATC system may be taken as Rs. 77.46 lakhs."

60. The Metropolitan Transport Project, Calcutta sanctioned in 1972 and

targetted to be completed by 1978 had provision for continuous Automatic Train Protection type of signalling system (CATP). The Committee find that Metro Railway Administration has not yet been able to acquire this system for the underground Railway although a part thereof has been functioning for more than six years*. The delay in procurement of CATP system was sought to be explained by Railways for having to resort to its import after failure of initial efforts to develop the indigenous production. The work of developing the system was entrusted to ECIL in April 1977 only although by end of 1973 the earlier decision to import the system from Soviet Union had been changed in favour of developing the system indigenously when it was known that the project would not be completed by 1978 for want of adequate funds. Even after entrusting the work late to ECIL, the development work progressed at a very slow speed and after 8 years of indigenous efforts, the Railways chose to foreclose the contract with ECIL in April, 1985. Even the imported CATC system, for which global tenders were floated in June 1986 is likely to be available and installed by June 1992 for Phase I and by June 1994 for Phase II. Incidentally, urgent requirement of the system was one of the considerations for resorting to import thereof. It would not be out of place to mention here that less than anticipated traffic due to delay in completion of entire Metro Project has come to the rescue of Metro Railway Administration otherwise enormous problems would have been encountered if the anticipated traffic of 1.3 million passengers per day as projected in the Project Report in the year of the opening** had actually developed requiring trains running with a headway of 90 seconds possible only with CATP system as against the present arrangement allowing minimum headway of 8 minutes. The Committee consider the undue long delay in procurement of this important equipment for the underground Railway as unjustified which could have been avoided by careful and systematic planning.

61. The work of development of a CATP system was entrusted by Metro Railways to ECIL in April 1977 who were selected because of their prior experience in development of AWS system stated to be similar to CATP. The draft specifications given in August 1977 and reiterated in September, 1982 included the provisions for catering to single as well as multi-component failures. The joint test procedure evolved by ECIL and Metro Railways in 1978 envisaged tests to be done in two phases; the first phase being experimental/bench model on the coded system to prove the possibility of practical realisation of design philosophy to be followed by extensive field testing the prototypes in Phase II trials.

62. A technical Report published by Metro Railways in April, 1980 had concluded that the tests and field trials conducted upto that time had found the equipment to be satisfactorily meeting the functional and fail safe

* Para 2.7 of 142nd Report of Public Accounts Committee.

** Para 6.1 of 142nd Report of Public Accounts Committee.

requirements. According to Railways, this certificate was in respect of Phase I tests only which confined to single component failure.

63. ECIL's equipment was on prototype trials from January, 1983 to August 1984 when it had to be temporarily stopped due to deluge and again started in March, 1985. The unsafe side features noticed during this phase of testing were discussed in Joint Review meetings on 11.3.85, 14.5.85 and 10.6.85. The Committee are informed by Railways that the tests had revealed multi-component failures which led them to conclude that CATP equipment developed by ECIL would not meet the specifications and therefore a letter was issued to them in April, 1985 withdrawing the Certificate given earlier in June, 1980. Further, according to Railways, ECIL in the meeting of 10.6.85 had asked for 3 to 5 years to rectify all the defects including that of multi-component failure as that involved a complete re-design of the system for which they did not have technology at that moment. However, a Committee consisting of Dy. CSTE and CSTE came to the conclusion at that time that the equipment as developed by ECIL would not be strictly safe.

64. ECIL, on the other hand have contended that they designed and fabricated bench model, based on specifications given to them in 1977 and reiterated in 1982. Metro Railway, ECIL and Deptt. of Electronics regularly reviewed the specifications and the performance. After 2 years of trial of bench model, Metro Railway accorded safety approval to ECIL equipment. Further trials on bench model continued and no serious deficiency of multi-component failure was noticed and Metro Railway released purchase order worth Rs. 4.07 crores during March, 1984.

65. Further, according to ECIL, Metro Railway changed its stand on fail-safe requirement of the equipment from early 1985. Earlier this test was carried out as per Railway's own specifications by simulated failures of one component at a time. Equipment had passed this test even if more than one components failed at a time. Railways wanted major changes in design before bulk production. There were major differences on the interpretation of the multi-component failure modes. As per ECIL, the philosophy adopted by Railways in 1985 was not the same as one followed during 1984. The interpretation of multi-component failure specifications was entirely different and unreasonable.

66. ECIL, has further stated that they could not meet the specification in the way the Railways described the multi-component failure. Final acceptance is based on acceptance test procedure which did not exist to begin with. The Railways had subsequently communicated the test procedure for multi-component failure. However ECIL, did not get time for complying with this procedure. Contesting this claim of ECIL, Railways have asserted that test procedure is a method which outlines the mode of testing to fulfil the requirements of specifications normally elaborated by contractor during contract period and approved by sup-

pliers. As such, it is never the convention to outline the test procedure alongwith specifications.

67. The Committee feel that in order to encourage indigenous production it is absolutely necessary to ensure that such development works are well conceived and planned so that efforts and time expended are fruitfully utilised and investment made does not become infructuous or sub-optimal in terms of objectives achieved. The Committee regret to observe that in this case the indigenous efforts had a setback on account of the controversy regarding the interpretation of the multi-component failure tests. The ECIL's plea that they could not meet the specification in the way the Railways described the multi-component failure and the final acceptance being based on acceptance test procedure which did not initially exist proves that all issues connected with the development of the system including the exact specifications etc. had not been clearly identified and laid down thus resulting in delay and defeating the very objective of promoting indigenous development. The Committee recommend that the matter should be investigated fully and responsibility fixed in this regard. They also desire that proper and adequate planning taking due note of the specifications to be fulfilled are clearly laid down before embarking on projects of this kind so as to avoid time and cost over-run and unnecessary imports.

68. The Committee find that an Experts Committee comprising representatives from Department of Atomic Energy, Defence, Department of Electronics and Indian Institute of Technology, Delhi was constituted in October, 1985. This Experts Committee after considering various options before it unanimously recommended import of CATP system by Metro Railway for the Esplanade-Tollygunj Sections with a provision for transfer of technical know-how to ECIL for developing the equipment to meet future needs. The Committee are informed that apart from urgent requirement of the equipment based on latest technology, the main consideration which weighed with the Experts Committee in recommending import of CATP system was the fact that with the state of development of CATP equipment of ECIL, the tests resulting in unsafe side failures, the system could not be adopted for Calcutta Metro. The Experts Committee also desired that while calling global tenders, Metro Railway's specifications should be suitably updated for catering for proven system using solid state technology, stipulated the failure rate and specify the type of modulation, frequency range etc., to suit the new range of electronic equipment. The Committee feel that if the Experts Committee had been appointed at the initial stages it would have given directions and guidelines regarding the technology to be adopted, specifications for the equipments, mode of testing etc. which would have helped the successful development of the CATP system by ECIL much earlier and the resultant boost to indigenous development activities besides obviating the need for eventual import thereof.

69. The Committee find that the global tenders for import of CATP system were floated in June, 1986 for design, manufacture, supply,

installation, testing and commissioning of CATP system for Phase I (Esplanade-Tollygunj Sections) with transfer of technology and know-how to ECIL to cover the system for Phase II. The recommendation of the tender Committee for accepting the offer of M/s. ELSTHOM, France was approved by the Railway Board in March 1988 and a letter of Intent was issued to the Firm in April, 1988 at an approximate cost of Rs. 13.33 crores for phase I. The Committee are surprised at the contention of the Railways that the delay of about 2 years in issue of letter of intent was not abnormal considering the novel nature of the work involved with partial import, transfer of technology, indigenisation, elaborate specification, formulation, coordination with various agencies etc. There was also considerable delay in finalisation of contract with the firm which is evident from the fact that the contract for Phase I was finalised on 30-10-89 and for Phase II in February, 1990. The Railways have attempted to explain this delay by stating that constant efforts were made at each stage to finalise the issue but it took more time as a number of parties were involved. Moreover, the inordinate time delay also occurred as the matter required consideration not only at various ministerial levels but also with the French Embassy in India and the French Government. Though import of CATP system was justified on the consideration of tight time schedule with the projected date of completion of Phase I by 1988, Metro Railway took more than two years to finalise the tender. Even after issue of Letter of Acceptance to the French Firm in January 1989, a large number of post tender stipulations imposed by the Firm were accepted by the Metro Railway. Delay in finalisation of tender had not only resulted in delay of Phase I & II work but also had substantial financial implications to the tune of Rs. 79 lakhs for Phase I and Rs. 1.79 crores for Phase II work. The Committee feel that time spent in procedural formalities and approvals by the Ministries of Finance and Industry could have very well been anticipated while negotiating with the French Firm and a suitable approach adopted so as to avoid additional financial liabilities. The very fact that it would take six years, if not more, to import CATC system that too on an urgent basis points towards the inherent deficiencies in the system and calls for an immediate evaluation of laid down procedures to ensure that such delays do not recur and projects

Electronics, ECIL were associated while approving the CATC system in the specifications, formulations as well as technical evaluation of the offers received against CATC tender. In fact, ECIL had confirmed in June, 1987 that the offer of M/s. ALSTHOM, fully complied with the specification and was of the state of art technology. According to the agreement with M/s. ALSTHOM, ECIL will get all technical documents and drawings required to enable them to produce CATC equipment for Phase II which will be similar to that of Phase I and hence all the information will be available to ECIL. While taking note of the assurance given by Railways in this regard, the Committee desire that ECIL should be closely associated so that they are able to imbibe the technology, design, formulations, specifications etc. and are able to manufacture equipment for Phase II requirement without any difficulty. The Committee expect ECIL to gainfully utilise their experience in Indigenous research and that likely to be gained by transfer of technology from M/s. ALSTHOM, in meeting the future requirements of the country in this regard.

NEW DELHI;
22 January, 1992

2 Magha, 1913 (Saka)

ATAL BIHARI VAJPAYEE
Chairman,
Public Accounts Committee.

APPENDIX I

METRO RAILWAY, CALCUTTA : PROCUREMENT OF SOPHISTICATED SIGNALLING EQUIPMENT

Audit Para

The Project Report of Metro Railway, Calcutta approved by the Railway Board in 1972, had provision for Continuous Automatic Train Protection Type of Signalling System (CATP) for the underground Metro Railway. The CATP which consists of CAB Signalling and continuous speed control by automatic application of brakes helps in maintaining an adequate distance between successive trains.

Metro Railway entrusted to the Electronic Corporation of India Limited (ECIL) in April 1977, the work of developing a CATP system. A grant-in-aid (Rs. 11 lakhs) and a returnable loan (Rs. 11 lakhs) were sanctioned by the Department of Electronics (DOE) in January 1977/December 1980. The development works were to be taken up in two phases, the first phase being experimental trials (Bench Model Stage) followed by the second phase on prototype, before bulk manufacture. Based on the initial field trials conducted at the bench model stage, the Metro Railway Administration in their technical report of June 1980 had found, from the design point of view, the equipment developed by ECIL as satisfactory/acceptable, notwithstanding certain defects. During tests of the prototype, both design and manufacturing defects were considered. Metro Railway administration issued a detailed specification for the system in 1982. Further detailed/full fledged prototype tests/trials commenced in January 1983 and continued till December 1984. A Letter of Acceptance was issued to ECIL in May 1984 for development, supply, installation, testing and commissioning of the CATP with Cab signalling equipment at a provisional cost of Rs. 4.07 crores for the Calcutta metro Phase-I, that is, Esplanade-Tollygunj and Dum Dum-Belgachia Sections. An interest free advance of 35 per cent of the contract value amounting to Rs. 1.43 crores was paid to ECIL in two instalments in June and September 1984.

ECIL, while accepting the shortcomings in the prototype, indicated in May 1985 a time schedule of six months for design modification and manufacture of a revised prototype to be offered once again for field trials within 12 months (revised to 3 to 5 years in June 1985 to make available a satisfactory system, i.e., by 1988-90). Alternatively, ECIL

had suggested the possibility of adopting a proven CATP equipment from a reputable manufacturer being also explored.

Metro Railway advised the Railway Board in November 1985 that the prototype CATP equipment developed by ECIL was found unsafe and unreliable by two Committees of Senior Railway Officers. The Committee of experts from the Department of Atomic Energy, Defence, Department of Electronics and Indian Institute of Technology, Delhi, held in October 1985 that the development of CATP system by ECIL should be continued to eliminate all types of unsafe side failures. The Committee unanimously recommended import of CATP system by Metro Railway for the Esplanade-Tollyganj section with provision for transfer of Technical know-how to ECIL for developing the equipment to meet the future needs. Metro Railway recommended to the Railway Board in November 1985 an alternative source of supply of the equipment and, as an interim measure, requested the Board for commencing the Esplanade-Tollyganj section, using Axle Counters.

The Department of Electronics in December 1985, with a view to meeting the time schedule for the Esplanade-Tollyganj section, permitted procurement of CATP equipment through a global tender subject to the condition that ECIL was involved in working out the specifications for the global tender and the tender document included a provision for technical collaboration with ECIL for production of the equipment subsequently.

ECIL stated in January-February 1987 that a modified version of the equipment was with it for demonstration and requested that the development of CATP equipment might be allowed to be completed. Railway Board's direction in April 1987 to Metro Railway to examine the claim of ECIL was, however, not acted upon and, instead, import was resorted to and the contract with ECIL was foreclosed.

Global tenders for import of CATP system were floated in June 1986 for design, manufacture, supply, installation, testing and commissioning of the CATP system comprising three distinct sub-systems viz., (i) Automatic Train Protection (ATP), (ii) Automatic Train Operation (ATO) and (iii) Automatic Train Supervision (ATS) for Phase-I-Esplanade-Tollyganj section with transfer of technology and know-how to ECIL to cover the system for Phase-II. The recommendation of the Tender Committee to accept the offer of M/s. ALSTHOM, France was approved by the Railway Board in March 1988. A Letter of Intent was issued to the firm in April 1988 at an approximate cost of Rs. 13.33 crores for Phase I. The Letter of Intent was issued subject to the condition of finalising an agreement for the collaboration between the French firm and ECIL for transfer of technology for indigenous manufacture of the system for the Phase-II work (Esplanade-Belgachia) within a period of one month from the date of issue of the Letter of Intent. While the agreement for the transfer of technology was finalised in October 1988 and sent to DOE for approval, the formal

order was yet to be released (August 1989). The Administration took 2½ years in placing a Letter of Intent on the French firm. Considering that the formal order was yet to be released/placed, it is doubtful if the CATP system comprising the three systems enumerated above would be available for use by 1990 (Project completion date).

The decision to import CATP system by foreclosing the contract with ECIL is a major set back in the indigenous effort to develop a technology in this area. With the shifting of the projected target date for completion of the North section to the end of 1990 or even beyond, the plea of urgency for import with the projected date of completion by 1988 had become invalid.

With the present fleet of rolling stock there is no possibility of increasing the frequency of trains at intervals of less than 10 minutes during peak hours. Even at this frequency the occupancy is reported to be less than unity. It would have been possible to continue with use of Axle counters until indigenous technology was developed. The choice of a technology altogether different from what was developed at a cost of Rs. 1.93 crores by ECIL would result in virtual abandonment of long years of research by ECIL in this area.

The Railway Board stated (October 1989) that the decision to import CATP system was taken because ECIL could not develop a fail safe system. According to them foreclosing of the contract was a prudent action and it accelerated the indigenisation of the system and that the indigenous effort made had not gone waste because it would help hasten the process of absorption/adoption of imported technology.

The arguments are not tenable because the design of the circuit of the integrated cable signalling and CATP system developed by ECIL was found, based on field trials in June 1980 by the Metro Railway, to meet the fail safe requirements as given in the specification. It was only in March 1985, at a much later date after the prototype was already made available that the specifications were upscaled from fail safe tests of single component to that of multiple component tests and the equipment developed by ECIL was found deficient. The statement of the Railway Board that the indigenous effort of all these years had not gone waste is not substantiated by facts.

APPENDIX II

STATEMENT OF OBSERVATIONS AND RECOMMENDATIONS

Sl. No.	Para No.	Ministry/ Deptt. Concerned	Observations and Recommendations
1	2	3	4
1.	60	Railways Atomic Energy	<p>The Metropolitan Transport Project, Calcutta sanctioned in 1972 and targetted to be completed by 1978 had provision for continuous Automatic Train Protection type of signalling system (CATP). The Committee find that Metro Railway Administration has not yet been able to acquire this system for the underground Railway although a part thereof has been functioning for more than six years.* The delay in procurement of CATP system was sought to be explained by Railways for having to resort to its import after failure of initial efforts to develop the indigenous production. The work of developing the system was entrusted to ECIL in April 1977 only although by end of 1973 the earlier decision to import the system from Soviet Union had been changed in favour of developing the system indigenously when it was known that the project would not be completed by 1978 for want of adequate funds. Even after entrusting the work late to ECIL, the development work progressed at a very slow speed and after 8 years of indigenous efforts, the Railways chose to foreclose the contract with ECIL in April, 1985. Even the imported CAT system for which global tenders were floated in June 1986 is likely to be available and installed by June 1992 for Phase I and by June 1994 for Phase II. Incidentally, urgent requirement of the system</p>

*. Para 2.7 of 142nd Report of Public Accounts Committee.

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			<p>was one of the considerations for resorting to import thereof. It would not be out of place to mention here that less than anticipated traffic due to delay in completion of entire Metro Project has come to the rescue of Metro Railway Administration otherwise enormous problems would have been encountered if the anticipated traffic of 1.3 millions passengers per day as projected in the Project Report in the year of the opening* had actually developed requiring trains running with a headway of 90 seconds possible only with CATP system as against the present arrangement allowing minimum headway of 8 minutes. The Committee consider the undue long delay in procurement of this important equipment for the underground Railway as unjustified which could have been avoided by careful and systematic planning.</p>
2.	61	<p>Railways Atomic Energy</p>	<p>The work of development of a CATP system was entrusted by Metro Railways to ECIL in April 1977 who were selected because of their prior experience in development of AWS system stated to be similar to CATP. The draft specifications given in August 1977 and reiterated in September, 1982 included the provisions for catering to single as well as multi-component failures. The joint test procedure evolved by ECIL and Metro Railways in 1978 envisaged tests to be done in two phases; the first phase being experimental/bench model on the coded system to prove the possibility of practical realisation of design philosophy to be followed by extensive field testing the prototypes in Phase II trials.</p>
3.	62	<p>Railways</p>	<p>A technical Report published by Metro Railways in April, 1980 had concluded that</p>

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			<p>the tests and field trials conducted upto that time had found the equipment to be satisfactorily meeting the functional and fail safe requirements. According to Railways, this certificate was in respect of Phase I tests only which confined to single component failure.</p>
4.	63	Railways Atomic Energy	<p>ECIL's equipment was on prototype trials from January, 1983 to August 1984 when it had to be temporarily stopped due to deluge and again started in March, 1985. The unsafe side features noticed during this phase of testing were discussed in Joint Review meetings on 11.3.85, 14.5.85 and 10.6.85. The Committee are informed by Railways that the tests had revealed multi-component failures which led them to conclude that CATP equipment developed by ECIL would not meet the specifications and therefore a letter was issued to them in April, 1985 withdrawing the Certificate given earlier in June, 1980. Further, according to Railways, ECIL in the meeting of 10.6.85 had asked for 3 to 5 years to rectify all the defects including that of multi-component failure as that involved a complete re-design of the system for which they did not have technology at that moment. However, a Committee consisting of Dy. CSTE's and CSTE's came to the conclusion at that time that the equipment as developed by ECIL would not be strictly safe.</p>
5.	64	Railways Atomic Energy	<p>ECIL, on the other hand have contended that they designed and fabricated bench model, based on specifications given to them in 1977 and reiterated in 1982. Metro Railway, ECIL and Deptt. of Electronics regularly reviewed the specifications and the performance. After 2 years of trial of bench model, Metro Railway accorded safety approval to ECIL equipment. Further trials on bench model continued and no serious deficiency of multi component failure was noticed and</p>

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			Metro Railway released purchase order worth Rs. 4.07 crores during March, 1984.
6.	65	Railways Atomic Energy	Further, according to ECIL, Metro Railway changed its stand on fail-safe requirement of the equipment from early 1985. Earlier this test was carried out as per Railway's own specifications by simulated failures of one component at a time. Equipment had passed this test even if more than one components failed at a time. Railways wanted major changes in design before bulk production. There were major differences on the interpretation of the multi-component failure modes. As per ECIL, the philosophy adopted by Railways in 1935 was not the same as one followed during 1984. The interpretation of multi-component failure specifications was entirely different and unreasonable.
7.	66	Railways Atomic Energy	ECIL, has further stated that they could not meet the specification in the way the Railways described the multi-component failure. Final acceptance is based on acceptance test procedure which did not exist to begin with. The Railways had subsequently communicated the test procedure for multi-component failure. However ECIL, did not get time for complying with this procedure. Contesting this claim of ECIL, Railways have asserted that test procedure is a method which outlines the mode of testing to fulfil the requirements of specifications normally elaborated by contractor during contract period and approved by suppliers. As such, it is never the convention to outlines the test procedure alongwith specifications.
8.	67	Railways Atomic Energy	The Committee feel that in order to encourage indigenous production it is absolutely necessary to ensure that such developmental works are well conceived and planned so that efforts and time expended are fruitfully util-

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			<p>ised and investment made does not become infructuous or sub-optimal in terms of objectives achieved. The Committee regret to observe that in this case the indigenous efforts had a setback on account of the controversy regarding the interpretation of the multi-component failure tests. The ECIL's plea that they could not meet the specification in the way the Railways described the multi-component failure and the final acceptance being based on acceptance test procedure which did not initially exist proves that all issues connected with the development of the system including the exact specifications etc. had not been clearly identified and laid down thus resulting in delay and defeating the very objective of promoting indigenous development. The Committee recommend that the matter should be investigated fully and responsibility fixed in this regard. They also desire that proper and adequate planning taking due note of the specifications to be fulfilled are clearly laid down before embarking on projects of this kind so as to avoid time and cost over-run and unnecessary imports.</p>
9. 68	-Do-		<p>The Committee find that an Experts Committee comprising representatives from Department of Atomic Energy, Defence, Department of Electronics and Indian Institute of Technology, Delhi was constituted in October, 1985. This Experts Committee after considering various options before it unanimously recommended import of CATP system by Metro Railway for the Esplanade-Tollygunj Sections with a provision for transfer of technical know-how to ECIL for developing the equipment to meet future needs. The Committee are informed that apart from urgent requirement of the equipment based on latest technology, the main consideration which weighed with the Experts Committee in recommending import of CATP system</p>

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			<p>was the fact that with the state of development of CATP equipment of ECIL, the tests resulting in unsafe side failures, the system could not be adopted for Calcutta Metro. The Experts Committee also desired that while calling global tenders, Metro Railway's specifications should be suitably updated for catering for proven system using solid state technology, stipulate the failure rate and specify the type of modulation, frequency range etc., to suit the new range of electronic equipment. The Committee feel that if the Experts Committee had been appointed at the initial stages it would have given directions and guidelines regarding the technology to be adopted, specifications for the equipments, mode of testing etc. which would have helped the successful development of the CATP system by ECIL much earlier and the resultant boost to indigenous development activities besides obviating the need for eventual import thereof.</p>
10.	69	Railways Atomic Energy	<p>The Committee find that the global tenders for import of CATP system were floated in June, 1986 for design, manufacture, supply, installation, testing and commissioning of CATP system for Phase I (Esplanade-Tollygunj Sections) with transfer of technology and know-how to ECIL to cover the system for Phase II. The recommendation of the tender Committee for accepting the offer of M/s. ELSTHOM, France was approved by the Railway Board in March 1988 and a letter of Intent was issued to the Firm in April, 1988 at an approximate cost of Rs. 13.33 crores for Phase I. The Committee are surprised at the contention of the Railways that the delay of about 2 years in issue of letter of intent was not abnormal considering the novel nature of the work involved with partial import, transfer of technology, indigenisation, elaborate specification, formulation, coordination with various agencies etc.</p>

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There was also considerable delay in finalisation of contract with the firm which is evident from the fact that the contract for Phase I was finalised on 30.10.89 and for Phase II in February, 1990. The Railways have attempted to explain this delay by stating that constant efforts were made at each stage to finalise the issue but it took more time as a number of parties were involved. Moreover, the inordinate time delay also occurred as the matter required consideration not only at various ministerial levels but also with the French Embassy in India and the French Government. Though import of CATP system was justified on the consideration of tight time schedule with the projected date of completion of Phase I by 1988, Metro Railway took more than two years to finalise the tender. Even after issue of Letter of Acceptance to the French Firm in January 1989, a large number of post tender stipulations imposed by the Firm were accepted by the Metro Railway. Delay in finalisation of tender had not only resulted in delay of Phase I & II work but also had substantial financial implications to the tune of Rs. 79 lakhs for Phase I and Rs. 1.79 crores for Phase II work. The Committee feel that time spent in procedural formalities and approval by the Ministries of Finance and Industry could have very well been anticipated while negotiating with the French Firm and a suitable approach adopted so as to avoid additional financial liabilities. The very fact that it would take six years, if not more, to import CATC system that too on an urgent basis points towards the inherent deficiencies existing in the system and calls for an immediate evaluation of laid down systems and procedures so that similar instances do not recur and projects are planned and completed on schedule.

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11. 70	Railways Atomic Energy	<p>According to the Railways the trials on the prototype received from M/s. ALSTHOM are likely to start from March 1992 and the approval to the prototype is to be given in two months time. CATC system for Phase I would be available and fully installed by June, 1992 as per the time schedule given by the Contractor. ECIL after absorbing the technology from M/s. ALSTHOM is expected to supply the equipment for the Phase II requirement by June, 1994. Commenting on the point made by ECIL that they should be given a chance to participate in the scrutiny of design with M/s. ALSTHOM, the Railways have clarified that the Phase I design was finalised in consultation with ECIL. As stipulated by Department of Electronics, ECIL were associated while approving the CATC system in the specifications, formulations as well as technical evaluation of the offers received against CATC tender. In fact, ECIL had confirmed in June, 1987 that the offer of M/s. ALSTHOM fully complied with the specification and was of the state of art technology. According to the agreement with M/s. ALSTHOM, ECIL will get all technical documents and drawings required to enable them to produce CATC equipment for Phase II which will be similar to that of Phase I and hence all the information will be available to ECIL. While taking note of the assurance given by Railways in this regard, the Committee desire that ECIL should be closely associated so that they are able to imbibe the technology, design, formulations, specifications etc. and are able to manufacture equipment for Phase II requirement without difficulty. The Committee expect ECIL to gainfully utilise their experience in indigenous research and that likely to be gained by transfer of technology from M/s. ALSTHOM in meeting the future requirements of the country in this regard.</p>	