PERFORMANCE AUDIT REPORT ON THE PROJECT PROCUREMENT OF 58 DE LOCOMOTIVES BY PAKISTAN RAILWAYS

AUDIT YEAR 2015-16

AUDITOR GENERAL OF PAKISTAN

PREFACE

The Auditor General of Pakistan conducts audit in terms of Articles 169 and 170 of the Constitution of the Islamic Republic of Pakistan 1973, read with sections 8 and 12 of the Auditor General's (Functions, Powers and Terms and Conditions of Service) Ordinance 2001. The performance audit of the project Procurement of 58 DE Locomotives was carried out accordingly.

The Directorate General Audit Railways conducted performance audit of the project Procurement of 58 DE Locomotives during audit year 2015-16 for the period 2012 to 2016 with a view to report significant findings to stakeholders. Audit examined the economy, efficiency and effectiveness aspects of the project. In addition, Audit also assessed, whether the management complied with applicable laws, rules and regulations in managing the project affairs. The Performance Audit Report indicates specific actions that, if taken, will help the management realise the objectives of the project. All observations included in this report have been finalised in the light of discussion in DAC meeting.

This Performance Audit Report is submitted to the President of Pakistan in pursuance of Article 171 of the Constitution of the Islamic Republic of Pakistan 1973, for causing it to be laid before both houses of Majlis-e-Shoora (Parliament).

Islamabad **(Javaid Jehangir)**
Dated: **Auditor General of Pakistan**

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Abbreviations and Acronyms

AGM	Assistant General Manager
3Es	Economy, Efficiency & Effectiveness
CKD	Completely Knocked Down
CBU	Completely Built Unit
CDWP	Central Development Working Party
CEO	Chief Executive Officer
CME	Chief Mechanical Engineer
CSR	China South Locomotives and Rolling Stock Corporation Limited.
DAC	Departmental Accounts Committee
DCOS	District Controller of Stores
DE	Diesel Electric
DPU	Dalian Pakistan Universal
DS	Divisional Superintendent
ECNEC	Executive Committee of National Economic Council
FEC	Foreign Exchange Component
FOB	Free on Board
HP	Horse Power
HGMU	Henschel General Motors Universal
KC	Karachi Cantonment
LOCO	Locomotive
MOR	Ministry of Railways
MTKM	Metric Ton Kilometres
OEM	Original Equipment Manufacturer
PC-I	Planning Commission Proforma-I
PC-II	Planning Commission Proforma-II
PD	Project Director
PMES	Project Monitoring and Evaluation System
PLF	Pakistan Locomotive Factory
PPRA	Public Procurement Regularity Authority
PR	Pakistan Railways
US	United States
ZCU	Ziyang China Universal

EXECUTIVE SUMMARY

The Directorate General Audit Railways conducted performance audit of project regarding Procurement of 58 DE Locomotives from February to May 2016. Main objectives of the Audit were to review performance of project with reference to 3 Es. i.e. economy, efficiency and effectiveness. The audit was conducted in accordance with the INTOSAI Auditing Standards.

Original PC-I of project regarding Procurement/Manufacture of 50 Diesel Electric (DE) Locomotives was approved by ECNEC on 16.8.2012 at a cost of Rs 19,406.610 million, with completion period up to 30.6.2015. An international tender for the procurement/ manufacture of 50 DE locomotives was opened on 16.10.2012. Three Chinese firms participated in the bid. Two firms were disqualified on technical grounds. The contract was awarded to M/s CSR Ziyang China on 28.11.2012 at a cost of US$ 101,617,866. Due to change in scope of work from CKD locomotives to CBU, a revised PC-I for procurement of 50 DE locomotives was approved by ECNEC on 13.9.2013 at a cost of Rs 19,406.610 million. Meanwhile, the Ministry of Railways decided to increase the number of locomotives from 50 to 58. Accordingly, PC-I for procurement of 58 DE locomotives was revised again at a reduced cost of Rs 16,300 million (price reduced from Rs 19,406.610 million to Rs 16,300 million due to accepting locomotives of Chinese origin) The 2nd revised PC-I was approved by ECNEC on 30.9.2016, with completion period up to December 2016. However, civil work in connection with construction of heavy repair shop was still in progress by the time of audit. All the 58 locomotives were put into operation up to June 2015. The cumulative expenditure up to 31st May, 2016 was Rs 14,925.373 million. The physical as well as financial progress of the project was 92%.

Key audit findings

i. Poor quality of principal assemblies and long life parts installed in locomotives worth Rs 92.250 million.[1]

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[1] Para 4.3.7

ii. Loss on account of use of expensive lubricant oil amounting to Rs 90.722 million.[2]

iii. Loss of Rs 62.165 million due to emergence of cracks in locomotives.[3]

iv. Loss of expected revenue amounting to Rs 43.286 million on account of delay in pre-shipment inspection.[4]

v. Excess payment of Rs 18.882 million to the supplier due to negligence of project management.[5]

vi. Loss of Rs 14.780 million on account of excessive consumption of spares.[6]

vii. Extra expenditure of Rs 6.301 million on account of establishment/miscellaneous charges.[7]

viii. Blockage of capital amounting to Rs 5.37 million due to un-necessary purchase of inventory.[8]

ix. Loss of Rs 3.206 million on account of purchase of material at higher rates.[9]

x. Un-satisfactory performance of locomotives.[10]

xi. PPRA Rules-2004 were not observed in true spirit resulting in non-competitive bidding process.[11]

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[2] Para 4.3.5
[3] Para 4.3.8.1
[4] Para 4.3.2
[5] Para 4.3.4
[6] Para 4.3.6
[7] Para 4.4.1
[8] Para 4.5.1
[9] Para 4.3.3
[10] Para 4.7.4
[11] Para 4.3.1

xii. Expected revenue/maintenance & operational expenditure indicated in PC-I of the project was not found to be based on facts.[12]

xiii. Fifty officials/officers were nominated for one-month repair and maintenance training at the manufacturer's factory in China, but most of them were not deployed on repair and maintenance of those locomotives.[13]

xiv. The scope of work was changed from CKD units to CBU form without proper justification.[14]

xv. The management did not adhere to project management guidelines issued by the Planning Commission. The project was started without proper feasibility study and the PC-I was revised twice.[15]

xvi. The project was managed by different Project Directors including the present PD.[16]

Recommendations

i. Penalties on the supplier should be included in the contract so that Railways may not suffer on account of defective workmanship and pre-shipment inspection should be made more result-oriented and in case of defective spares/locomotives the concerned should be held accountable for not performing their job.

ii. Responsibility for violation of contract obligations may be fixed and besides recovering extra cost i.e. Rs 90 million from the supplier.

[12] Para 4.7.2
[13] Para 4.1.4
[14] Para 4.1.2
[15] Para 4.1.1
[16] Para 4.1.3

iii. Responsibility for purchasing locomotives having inferior quality of components may be fixed and action be taken against those held responsible.
iv. Responsibility for delay in pre-shipment inspection and the resultant delay in shipment of locomotives may be fixed
v. Responsibility for making excess payment of US$ 181,129 may be fixed and recovery of the amount involved be ensured.
vi. Root cause of excessive consumption of water separator filter element may please be got explored.
vii. Completion of works as per timeline fixed in the PC-I may be ensured.
viii. Purchase of machinery/equipment may be made as per actual requirements
ix. Matter be investigated at appropriate level to fix responsibility for purchase of same material at different rates.
x. Issue may be investigated at an appropriate level to find out reasons for unsatisfactory performance of locomotives and appropriate action be taken against those held responsible.
xi. PPRA Rules may be observed in true spirit to ensure fair and broader competition.
xii. Financial justifications may be made on the basis of authentic facts and figures.
xiii. Selection criteria for nomination of officials for foreign trainings may be established and relevant officials may be nominated on such trainings.
xiv. Submission of proposal for revision of PC-Is with factual facts and figures may be ensured and Pakistan Locomotive Factory, Risalpur, may be utilised for manufacturing of locomotives.
xv. Future projects may be started after conducting proper feasibility study (PC-II)
xvi. A suitable and qualified Project Director should be appointed in case of each project and that PD may not be transferred during currency of the project.

1. INTRODUCTION

Objectives of the project

As per original PC-I, the project envisaged procurement/ manufacture of 50 Diesel Electric (DE) Locomotives of 2000/3000 horse power to augment the existing rolling stock of Pakistan Railways (PR). The main aim of the project was to improve the level of service and achieve ease of maintenance. The proposed locomotives were to be used to haul freight and passenger traffic.

Scope of work

Out of 50 DE locomotives, 10 locomotives were proposed to be procured in CBU form during 2012-13, while remaining 40 locomotives in CKD form, were planned to be manufactured in Pakistan Locomotive Factory, Risalpur during 2013-14 and 2014-15. An amount of Rs 160 million was provided for balancing and up gradation of infrastructure of Central Diesel Locomotive Shops, Rawalpindi, Diesel Shops Lahore and Karachi Cantt to meet the project requirements. The original PC-I of the project was approved by ECNEC at a cost of Rs 19,406.610 million (including FEC Rs 13,487.360 million) on 16.8.2012 with completion period up to 30.06.2015.

1st revision of PC-I

In December 2012, a revised PC-I of the project regarding Procurement of 50 Diesel Electric Locomotives was submitted as per instructions of the Ministry of Railways. In this revised PC-I, all the 50 DE locomotives were proposed to be procured in CBU form on the grounds that the manufacturing capacity of PLF Risalpur would be engaged in other projects and would not be in a position to manufacture locomotives. It was also mentioned that the cost of DE locomotives in CBU form was less than that in CKD condition. Furthermore, it was stated that the locomotives were urgently required to meet available freight traffic demand. The revised PC-I of the project at a cost of Rs 19,406.610 million was approved by ECNEC on 13.9.2013 with completion period up to 30.6.2015

2nd revision of PC-I

Again, as per directives of the Ministry of Railways in September 2015, a re-revised PC-I of the project was submitted, wherein the number of locomotives was increased from 50 to 58 being within permissible limit of 15% increase as per PPRA rules. The cost of the project was reduced to Rs 16,300 million with completion period up to December 2016. The same was approved by ECNEC on 30.9.2016.

Present status of the project

The project was in the last stage of implementation while the audit was conducted. All the 58 locomotives had been received and put into operation up to June 2015. Procurement of equipment and execution of civil works were in process. The cumulative expenditure up to 31st May, 2016 was Rs 14,925.373 million. The physical as well as financial progress of the project was 92%.

2. AUDIT OBJECTIVES

The major objectives of the audit were:

i) To review project's performance against intended objectives to ascertain whether the objectives laid down in the PC-I were fully achieved with due regard to 3Es (Economy, Efficiency and Effectiveness).

ii) To verify the efficiency of internal controls and ascertain controls failure(s).

iii) To review compliance with applicable rules, regulations and procedures.

3. AUDIT SCOPE AND METHODOLOGY

3.1 Audit Scope

Performance audit of Project was conducted during Audit Year 2015-16 with a view to determine the benefits reaped by Pakistan Railways and general public from the Project. The audit covered the whole process and operations of the project for the period from 2012 to 2016.

3.2 Audit Methodology

Relevant documents as provided by the project management were checked in order to assess the achievements/shortcomings with regard to 3Es. Site visits were made at different locations. Data analysis of the project was carried out and interviews of the management of the Project were also carried out.

4. AUDIT FINDINGS AND RECOMMENDATIONS

4.1 Organization and Management

While conducting performance audit of the project, Audit observed that the management did not adhere to Planning Commission's Guidelines. The project was started without any feasibility study and the PC-I was revised twice. Different Project Directors managed the execution of the project. The scope of work was changed altogether from assembly of CKD units to CBU form without proper justification. Significant observations in this regard are discussed in the following paras.

4.1.1 Non-preparation of Feasibility Study/PC-II

As per Clause 3.3 of Project Management Guidelines, it is mandatory that the projects of Infrastructure Sector and Production Sector costing Rs 300 million and above should undertake proper feasibility studies (PC-II) before the submission of PC-I. The PC-I be prepared on the basis of data and findings of feasibility study, and submitted for approval.

Contrary to the above, Audit noticed that PC-I for procurement/ manufacture of 50 DE locomotives was submitted for approval without PC-II.

The matter was discussed with the management and in its reply dated 05.09.2016, the project management stated that initially the PC-I for procurement/manufacture of 50 DE locomotives was prepared to provide replacement of old DE locomotives which had outlived their normal economic life of 20 years. Therefore, no feasibility study was undertaken. However, a copy of an in-house feasibility study report for procurement of 58 DE locomotives was provided to Audit with revised reply dated 16.1.2017. The reply was not tenable because the proper feasibility study was required to be carried out prior to submission of PC-I of the project.

The matter was discussed in DAC meeting held on 8.5.2017. DAC directed that the matter be investigated at an appropriate level, as to why the feasibility study was not prepared and submitted with PC-I at the time of approval. No further reply was received.

Audit recommends that responsibility may be fixed for non-preparation of feasibility study before submission of PC-I and appropriate action be taken against person(s) held responsible. Compliance of Planning Commission's Guidelines be ensured in all future projects.

4.1.2 Unjustified change in scope of work

The Managing Director, Pakistan Locomotive Factory, Risalpur vide letter dated 19.09.2012 intimated the General Manager/Manufacturing & Services that no other projects were underway at Pakistan Locomotive Factory, hence the facility was available for assembly of CKD locomotives. Therefore, he urged upon the need for inclusion of CKD locomotives in 50 DE Locomotive Project as per original PC-I.

Contrary to the above, it was observed during performance audit that the original PC-I of 50 DE locomotives project was revised wherein 40 locomotives in CKD condition were replaced by CBU locomotives on the grounds that Pakistan Locomotive Factory, Risalpur would be engaged in other projects, therefore, it would not have the capacity to carry out assembly of 40 CKD locomotives. Audit is of the view that the change in scope of work was unjustified.

In its reply dated 05.9.2016, the Project Director stated that the scope of work was changed with the approval of ECNEC being competent forum because PLF would be engaged for manufacturing of 75 DE locomotives. The CBU option was economical and could be delivered quickly. However, in management's second reply dated 16.01.2017, management added that Pakistan Railways faced heavy loss of revenue due to acute shortage of locomotives during 2012-13 and assembly of 40 CKD locomotives involved long lead time and additional expenses. The reply was not tenable because Managing Director, Pakistan Locomotive Factory clearly explained their ability to undertake the project. Regarding faster delivery, it was pointed out that project completion period in both original and revised PC-I was 36 months. Therefore, the claim of faster delivery was not correct. Moreover, price of CKD locomotives was less (see Table No. 1) than CBU units and also involved saving of foreign exchange as well as transfer of technology which would have been helpful for self-reliance.

(Table # 1) **(Rs in million)**

Class of Loco	CBU Unit cost	CKD Unit cost
3000 HP (As per original PC-I)	406.248	365.745
2000 HP (As per original PC-I)	369.216	327.301

The matter was discussed in DAC meeting held on 08.05.2017. DAC directed that the matter be inquired as to why the facts were concealed at the time of revision of PC-1 as PLF was available for manufacturing of locomotives and the time of delivery for CKD and CBU was the same. No further reply was received

Audit recommends that responsibility for submission of proposal for revision of PC-I with incorrect facts and figures may be fixed and disciplinary action be taken against the person(s) found at fault.

4.1.3 Non-appointment of dedicated Project Director

According to Clause 2.2 of the Project Management Guidelines, suitable and qualified Project Director should be appointed in case of each project and he/she should not be transferred during the currency of the project.

During performance audit of 58 DE Locomotive project, it was observed that the Railway management did not comply with the project management policy as five Project Directors were posted/transferred in the project from 2013 to 2016 (see Table No. 2).

(Table # 2)

S.No	Project Director	Tenure	
		From	To
1	Tariq Khan	2013	16.02.2015
2	Fayyaz Ahmed Awan	17.02.2015	09.03.2015
3	Tariq Khan	10.03.2015	01.06.2015
4	Ijaz Ahmad Sheikh	02.06.2015	10.02.2016
5	Rahat Mirza	11.02.2016	Till date

Audit observed that in the absence of one permanent PD (till the completion of the project), the responsibility for timely completion of milestones and its reporting could not be ensured.

In its reply dated 16.01.2017, the project management stated that transfer and posting of Project Directors were only made in the best interest of the project and exigencies of service by the administration with the approval of Secretary/Chairperson, Ministry of Railways, Islamabad. However, audit observation had been noted for compliance in future. The reply was not tenable because strict compliance of Project Management Policy was mandatory.

The matter was discussed in DAC meeting held on 08.05.2017. The DAC directed that revised/comprehensive reply be provided within a week, but no further reply was received

Audit recommends that compliance of Project Management Policy may be ensured in future.

4.1.4 Non-utilisation of 40 trained officials for repair & maintenance of locomotives

In terms of clause 23.2 of contract agreements dated 07.12.2012 for procurement of 58 DE locomotives, 50 engineers/maintenance staff were deputed for training in China for 30 days at a total cost of US$ 230,000. The staff trained from abroad was required to be deputed for repair and maintenance of the new locomotives.

During performance audit, it was observed that:

i. Only 10 out of 50 trainees were working on repair & maintenance of newly purchased ZCU locomotives. The remaining trainees were neither deployed on repair/maintenance nor on operational duties on ZCU locomotives.

ii. PR did not develop any criteria for selection of nominees for training from abroad, due to which irrelevant employees were nominated for foreign training.

iii. Out of 44 trainees nominated by the AGM/Mechanical and approved by the CEO, 07 were dropped and another 13 trainees were included by the Ministry of Railways without recommendation of AGM/Mechanical.

In partial reply dated 28.01.2017, the CME/Loco stated that engineers/ maintenance staff having related field experience regarding repair & maintenance and operation of DE locomotives were nominated for training and their services were being utilised over all divisions of Pakistan Railways. The reply was not tenable because certain trained engineers were transferred from repair, maintenance and operation of DE locomotives soon after putting the locomotives into service.

The matter was discussed in DAC meeting held on 8.5.2017. DAC directed that detail of utilisation of trained staff along-with place of posting be provided to Audit within a week time. No further reply was received

Audit recommends that responsibility for non-utilisation of 80% of trained personnel may be fixed and suitable action be taken against the person (s) held responsible. Simultaneously, reasons for not developing selection criteria for nomination of officials for training may also be explained. In future only relevant officials be sent on such trainings.

4.2 Financial Management

A proper accounting system should be in place and the management should carry out regular reconciliation of cashbook balances with bank account.

During performance audit, it was observed that Registers of Works and Allocation Registers were neither maintained properly nor being reconciled with Accounts Office record. The management replied that funds/expenditure record was being maintained in PD Office as funds were transferred to the DS Office, Lahore for civil works. Hence the Works Register of each work was being maintained in the Division. The same was verified by Audit.

4.3 Procurement and Contract Management

As per Guidelines of the Planning Commission of Pakistan, contract management should be done in the light of PPRA Rules, after due diligence and authorization by all stakeholders.

During performance audit of the project, it was observed that the procurement process in the project was neither economical nor efficient. Instances of mis-procurement and violation of contractual obligations etc. were noticed. Procurement planning was without proper need assessment. The significant observations in this regard are discussed below:

4.3.1 Violation of PPRA Rules resulting in non-competitive bidding process

Clause 23 (3) of PPRA Rules 2004 states that any information, that becomes necessary for bidding or for bid evaluation, after the invitation to bid or issue of the bidding documents to the prospective bidders, shall be provided in a timely manner and on equal opportunity basis. Where notification of such change, addition, modification or deletion becomes essential, such notification shall be made in a manner similar to the original advertisement.

In disregard to the above, during performance audit it was observed that an international tender for procurement/manufacture of 50 DE locomotives was advertised with opening date as 06.09.2012 which was extended to 16.10.2012. During pre-bid conference held on 25.09.2012 certain additions, deletions, and modifications were made in the tender specification. As a result thereof most of the prospective bidders requested reasonable extension in bid submission date, but all such requests were turned down with the remarks that enough time had already been granted and the tender was opened on 16.10.2012. Audit considered that it was violation of PPRA Rules because minimum 30 days' time allowance was admissible to the international bidders to respond as a result of modifications announced during pre-bid conference held on 25.09.2012.

In its reply dated 06.02.2017, the Director Procurement, Pakistan Railways, stated that the opening date of the tender was extended by 40 days (i.e. from 06.9.2012 to 16.10.2012). Keeping in view the urgency of locomotives for operation of Pakistan Railways the request for further extension in opening date of the tender was not agreed by the competent authority. The reply was not tenable because during pre-bid conference held on 25.9.2012 various additions, deletions and modifications were carried out in the tender specification which entitled the international bidders at least 30 days response time, which was not given. It appeared to be a deliberate decision to sideline genuine bidders by denying them the opportunity to participate in fair competition in a transparent manner.

The matter was discussed in DAC meeting held on 08.05.2017. DAC directed that revised/comprehensive reply be provided within a week, but no further reply was received.

Audit recommends that responsibility for violation of PPRA Rules may be fixed and appropriate action be taken against the person(s) held responsible.

4.3.2 Loss of expected revenue on account of delay in pre-shipment inspection- Rs 43.286 million

As per clause 13.1 of the contract agreements dated 07.12.2012 for procurement of 58 DE locomotives, the construction of the locomotives as well as the material used in the construction was subject to inspection by an Inspection Authority to be designated by the Pakistan Railways. In terms of CME/Loco's letter dated 24.08.2013 the inspectors were required to be sent at the supplier's factory in two batches during September and October 2013.

Contrary to the above, it was observed during performance audit that the first batch of inspectors reached China on December 3, 2013. Thus, the entire delivery schedule of 58 DE locomotives was delayed by 3 months. This resulted in loss of revenue amounting to Rs 43.286 million which was expected to be generated by putting the locomotives in operation as per agreed terms and conditions.

In its reply dated 28.1.2017, project management stated that the actual delivery period mentioned in the contract agreements was scheduled to start from end of February 2014, but on the request of Pakistan Railways, the supplier agreed to re-schedule the delivery period of 1st batch of locomotives from November 2013. Approval of the MOR for the 1st batch of inspectors was received on 28.11.2013. Accordingly, 1st batch of locomotives was shipped on 26.02.2014. Shipment was also delayed due to non-availability of ship at Shanghai port. The reply was not satisfactory because had the inspectors reached China during September and October 2013 the first batch of locomotives would have been shipped in December 2013 as per delivery schedule.

The matter was discussed in DAC meeting held on 08.05.2017. The DAC directed that revised/comprehensive reply be provided to Audit along with detail of letters/emails sent to the supplier, within a week, but no further reply was received.

Audit recommends that matter may be investigated at appropriate level to fix responsibility for delay in pre-shipment inspection and the resultant delay in shipment of locomotives and strict disciplinary action be taken against person(s) held responsible.

4.3.3 Loss on account of purchase of material at higher rate - Rs 3.206 million

As per Annexure A-4 (15) of contract agreement No. DP/29 (3000 HP) Locomotive/2012 dated 07.12.2012, unit price of filter element fuel-water separator was US$ 263 each.

During performance audit, it was observed that 120 filter element fuel-water separators and 04 filter assemblies were purchased at the rate of US$ 511 each. Thus, there was a price variation of US$ 248 (511-263) per unit of the item. This resulted in loss on account of extra payment of US$ 30,752 (124*248=30752 equivalent to Rs 3.206 million)

In reply dated 16.1.2017, the Project Director stated that the matter pertained to the Director Procurement, Islamabad and as such the issue was referred to him.

The matter was discussed in DAC meeting held on 08.05.2017. The DAC directed the Director Procurement to provide the revised reply to Audit within a week as the matter pertains to his office, but no further reply was received.

Audit recommends that matter be investigated at appropriate level to fix responsibility for purchase of same material at different rates and suitable action be taken against the person (s) held responsible. The amount paid in excess may be recovered under intimation to Audit.

4.3.4 Loss on account of excess payment- Rs 18.882 million

As per contract agreements dated 07.12.2012 in connection with procurement of 58 DE locomotives, the agreed price of certain spares was US$ 428,900 (table below).

During performance audit, scrutiny of paid invoices revealed that a sum of US$ 610,029 was paid to the supplier instead of US$ 428,900, resulting in excess payment of US$ 181,129, equivalent to Rs 18.882 million (see Table No. 3). It showed negligence of project management which failed to detect the excess payment.

(Table # 3)

Contract Agreement Number	Price of spares as per agreement (US$)	Payment of spares made as per invoices (US$)	Difference excess paid (US$)	Reference
1	2	3	4(3-2)	5
DP/29 (2000 HP) Locomotives/2012 Dated 07.12.2012	178,172	333,622	155,450	Annexure-1
DP/29 (3000 HP) Locomotives/2012 Dated 07.12.2012	250,728	276,407	25,679	Annexure-2
Total	**428,900**	**610,029**	**181,129**	

In its reply dated 28.1.2017, the project management stated that all the material received was as per contract agreements. The reply was not tenable because the payment of US$ 181,129 was made in excess of that agreed in the contract agreements.

The matter was discussed in DAC meeting held on 08.05.2017. The DAC directed the Project Director to provide revised/ comprehensive reply along-with documentary evidence within a week.

The project management admitted the audit observation and requested the Director Procurement vide letter dated 09.08.2017 to look into the matter and resolve the issue by adjusting the excess amount of US $ 181,129 from the bank guarantee of the firm.

Audit recommends that responsibility for making excess payment of US$ 181,129 may be fixed and suitable action be taken against the officials held responsible besides recovering the amount involved under intimation to Audit.

4.3.5 Loss on account of use of expensive lubricant oil-Rs 90.722 million

According to Clause 12.1 of Technical Specification in connection with procurement of 58 Diesel Electric Locomotives (2000 HP + 3000 HP), the lube oil to be used in the offered locomotives should be compatible with oil being used by PR (TBN-13, HVI). The clause was confirmed by M/s CSR Zyiang China.

Contrary to the above, it was observed that Pakistan Railways purchased 377,488 litres Engine Crank Case Oil (DEO-15 W-40) from April 2014 to May 2016 at an average rate of Rs 448 per liter for use in ZCU locomotives on the plea that no other substitute lubricant was allowed by the engine manufacturer i.e. M/s Caterpillar, USA. It is worth mentioning that per liter average price of TBN-13 is Rs 207.67 as compared to Rs 448 of DEO-15 W-40. This purchase increased the maintenance cost of ZCU locomotives and resulted in loss of Rs 90.722 million during the period.

In its reply dated 28.1.2017, the project management stated that CAT DEO 15-W40 oil was used in ZCU-20/30 DE Locomotives on the recommendation of OEM, Caterpillar USA and M/s CSR Ziyang China.

Moreover, OEM had also instructed for using the said oil in this fleet till the expiry of warranty period. The new Caterpillar engines used less quantity of oil as compared to old locomotives. The reply was not tenable, the supplier failed to provide locomotives compatible with existing Railways rolling stock and the management accepted the locos in violation of the contract clause. In case no other oil was recommended by OEM, subsequent use of other oil would not be possible. Fact remains that this aspect was not kept in view while executing the contract agreement.

The matter was discussed in DAC meeting held on 08.05.2017. DAC directed that the matter be investigated at an appropriate level for fixing responsibility. The detail of findings along-with revised reply be provided to Audit within a week, but no further reply was received.

Audit recommends that responsibility for violation of contract obligation may be fixed and disciplinary action be taken against the officials held responsible besides recovering extra cost i.e. Rs 90 million from the supplier under intimation to Audit.

4.3.6 Loss on account of excessive consumption of spares -Rs 14.780 million

As per maintenance schedule, oil and engine filters of ZCU-20/30 locomotives were required to be replaced after 30 days or 500 hours operation of the diesel engine.

During performance audit it was observed that the Chief Mechanical Engineer/Locomotive vide email dated 19.5.2015 pointed out to the Vice President of M/s CSR Ziyang that primary oil and water separator and secondary fuel filters of ZCU-30 locomotives were being consumed at abnormally high rate. Resultantly 373 primary fuel and water separators valuing US$ 98,099 (373*263) and 322 secondary fuel filters valuing US$ 49,588 (322*154) were used in excess of normal usage during one year. That resulted in loss of Rs 14.780 million (US$ 147,687).

In its reply dated 16.1.2017, the project management stated that the issue was discussed with the supplier/manufacturer for replacement/improvement of fuel filter and water separator. As a result of that it had been agreed to modify the fuel system free of cost. Moreover, the working/performance of locomotives regarding fuel system was satisfactory now. The reply was not satisfactory because the consumption of water separator filter element was still higher (viz. 7 days) as compared to prescribed interval (one month). During the period from 05.08.2014 to 02.06.2016, a total of 6,726 water separator filter elements were consumed which was normally sufficient for ten years' requirement of 58 locomotives.

The matter was discussed in DAC meeting held on 08.05.2017. The DAC directed that penalty be imposed and recovery be made from the persons held responsible.

In revised reply dated 20.06.2017, the project management added that performance of engine was improved by replacing filters frequently in order to save damages to major assemblies. In view of the position explained above, consumption of these items had increased only to save major damages to diesel engines as per OEM's instructions. The reply was not tenable because despite modification of fuel system under warranty clause, the consumption of the said item was still at higher side, which tantamount to loss during the entire useful life of locomotives.

Audit recommends that the matter may be taken up with the supplier to investigate as well as solve the root cause of excessive consumption of water separator filter element otherwise PR would suffer extra maintenance cost throughout the life of the locomotives.

4.3.7 Poor quality of principal assemblies and long life parts (worth Rs 92.250 million) installed in locomotives

Clause 14.1 of contract agreements dated 07.12.2012 for procurement of 58 DE locomotives provided that the material supplied by the seller should be in accordance with the specification and that the locomotives and all individual components, material equipment should be free from all defects in quality and workmanship. Moreover, clause 13.1 also stated that the construction of the locomotives as well as the material used in the construction would be subject to inspection by an inspection authority to be designated by Pakistan Railways.

During performance audit, it was observed that PR purchased 58 DE locomotives at the cost of US$ 109,028,400. All the locomotives were put into operation from May 16, 2014 to February 23, 2015. Within one and a half year of their operation, 320 warranty claims had been lodged, which included premature failure of principal assemblies and long life parts (Annexure-3). This indicated that the quality of material and workmanship used in the manufacturing of locomotives was inferior. The pre-shipment team of PR inspectors failed to ensure the quality of material and workmanship.

At the time of performance audit, it was also noticed that after-sale service team of CSR/Ziyang China was available at Lahore and Karachi, who used to attend to each and every loco on arrival at Lahore/K.C shed. To avoid being held up, the service teams were replacing the defective part/assembly at once under warranty but the root cause of failure/breakage was not being identified. After expiry of warranty period such mass scale replacement of principal assemblies/long life parts would not be affordable for PR. It would not only result in considerable increase in the maintenance cost but effectiveness of locomotives would also suffer due to non-availability of requisite assembly/part either due to paucity of funds or delay in procurement process. Thus, majority of locomotive might be ineffective within the next four to five years like 69 DPU locomotives.

In its reply dated 16.1.2017, the project management stated that all the failed major/minor assemblies were replaced by the supplier under warranty. The consumable parts had different life spans i.e. 01 month, 03 months, 6 months, 01 year and 03 years. All these consumable parts were regularly changed during the periodical maintenance schedules. For major assemblies like main frame, traction motors and elastic coupling the supplier had extended warranty of those components for further period till stable performance was achieved. The reply was not satisfactory because the defects in quality and workmanship would occur even after expiry of warranty period which is limited only for 2 to 5 years whereas focus of PR should be on the entire useful life of the locomotives which is 20 years. Since M/s CSR Ziyang has admitted their failures of design and material/workmanship, therefore, the technology/material used in manufacturing of locomotives was inferior.

The matter was discussed in DAC meeting held on 08.05.2017. The DAC directed that the word “principal assembly” be defined by the PD. Value of each assembly be provided to Audit within a week along-with revised reply.

In its revised reply dated 20.06.2017, the project management stated that the word “principal assembly” meant major assembly having long life. Only nine major assemblies were defected. The warranty claims of these assemblies were also accepted by the supplier. The reply was not satisfactory because failure of long life assemblies within a short span of time indicated poor quality of material and workmanship. This was an issue of inferior quality of material. Moreover, the value of only 2 items out of 14 included in (Annexure-3) had been provided. The useful life/value of remaining 12 items was not provided.

Audit, therefore, recommends that matter may be investigated at an appropriate level to find out reasons for premature failure of long life assemblies and disciplinary action be taken against those held responsible for this defective procurement.

4.3.8 Loss of revenue due to emergence of various defects in locomotives

Clause 14.1 of contract agreements dated 07.12.2012 for procurement of 58 DE locomotives provided that the material supplied by the seller should be in accordance with the specifications and that the locomotives and all individual components, material equipment should be free from all defects in quality and workmanship. Moreover, clause 13.1 also stated that the construction of the locomotives as well as the material used in the construction would be subject to inspection by an inspection authority to be designated by Pakistan Railways.

During performance audit, it was observed that after one and half year of service life, various defects were noticed in the locomotives, which are discussed in the following paragraphs:

4.3.8.1 Under frames of 16 locomotives out of 29 (55%) were cracked during February 2016. The life of under-frame was in fact the life of the locomotive. For strengthening of the under-frames in PLF Risalpur, the locomotives were detained for 344 days. Consequently, Pakistan Railways suffered loss of expected earnings of Rs 62.165 million (Rs 65.960/365*344). Before shipment the locomotives were inspected by nominated Railway inspectors who failed to detect the defective design at the time of pre-shipment inspection.

The issue was discussed in DAC meeting held on 08.05.2017. The DAC was informed that modification/improvement and strengthening of under frames of all the ZCU-20 locomotives had been carried out free of cost by the supplier and the availability of locomotive remained within permissible limit. The DAC directed that the position be got verified from Audit within a week.

On verification, it was observed that during the period the locomotives remained held up for modification/improvement of under frames, the availability of locomotives remained 84% to 87% as detailed below:

(Table # 4)

Month	Average availability of ZCU-20 Locomotives
February 2016	83.65%
March 2016	86.90%
April 2016	86.08%

Whereas, as per bidding documents under clause 10.12 of technical specification, the supplier had ensured that average availability of the offered locomotives would be more than 90% on monthly basis under PR working conditions during warranty period.

Audit, therefore, recommends that the loss of Rs 62.165 million may be recovered from the supplier, simultaneously, action be taken against the PR inspectors who accepted the locomotives with defective design.

4.3.8.2 Fuel tanks of 17 out of 58 locomotives (29%) suffered leakage within one and half year of their operation. Fuel tank was long life assembly, its leakage within a short span of time indicated quality problem and resulted in undue detention causing thereby loss of revenue. Audit apprehended that the quality of material and workmanship used in the manufacturing of locomotives was substandard. Furthermore, the inspection authority who carried out the pre-shipment inspection also failed to ensure the quality of material and workmanship used in the construction of locomotives.

The issue was discussed in DAC meeting held on 08.05.2017. The DAC directed that the matter be taken up with the supplier.

In its reply dated 20.06.2017, the project management stated that the supplier had agreed to repair those tanks free of cost till the permanent solution. The reply was not satisfactory because this was an issue of inferior quality of material and workmanship on which there should be no compromise at all.

Audit, therefore, recommends that the issue be got investigated at an appropriate level to fix responsibility for purchasing locomotives having inferior quality and action be taken against those held responsible.

4.3.8.3 Fuel sensors installed in all the 58 locomotives (100%) failed to perform within a short span of time. That issue was pointed out to the supplier in December 2015, who promised to investigate the root cause. Accordingly, two modifications were made; thereafter those sensors were replaced with modified ones. Audit apprehended that it was a design defect which should have been detected during the course of pre-shipment inspection. Due to non-functioning of fuel sensors altogether, the value for money spent for the object could not be achieved.

The issue was discussed in DAC meeting held on 08.05.2017. The DAC directed that the matter be taken up with the supplier.

In its reply dated 20.06.2017, the project management stated that the issue of warranty was discussed in the meeting held on 28.02.2017 and firm agreed upon and accepted to repair the fuel sensor free of cost. The reply was not satisfactory because it was an issue of inferior quality of material on which there should be no compromise at all. Moreover, due to non-functioning of fuel sensors altogether, the value for money spent for the object could not be achieved.

Audit, therefore, recommends that the issue be got investigated at an appropriate level to fix responsibility for purchasing locomotives having inferior quality of components and action be taken against those held responsible.

4.3.8.4 Air compressors of 18 locomotives out of 58 (31%) were found to have been wasting oil. The manufacturer agreed that all ring sets and liners would be replaced but till the date of inspection the same were not replaced. Audit apprehended that it was due to inferior quality of material and workmanship which resulted in detention of locomotives thereby causing loss of revenue

The issue was discussed in DAC meeting held on 08.05.2017. The DAC was informed that all compressors of locomotives were now in good working condition. The DAC directed that the position be got verified from Audit within a week.

During verification Audit observed that the ring sets and liners replaced by the supplier under warranty were still under observation. The root cause of the problem had not been identified. Apparently, it was an issue of inferior quality of material which should not be ignored.

Audit, therefore, recommends that the issue be got investigated at an appropriate level to fix responsibility for purchasing locomotives having inferior quality of components and action be taken against those held responsible.

4.3.8.5 Supporting wedges of buffer beams of 26 locomotives out of 58 (45%) developed cracks within a short span of their service life. Those webs were welded but got cracked again. The project management reported the issue to CME/Loco in February 2016 but no investigation and remedial measures were taken till the time of performance audit. Cracking of welding joints again and again indicated defective quality of material and workmanship. Audit apprehended that it was due to inferior quality of material which resulted in detention of locomotives thereby causing loss of revenue.

The issue was discussed in DAC meeting held on 08.05.2017. The DAC directed that revised reply along with documentary evidence that the supporting wedges had cracked due to accidents be provided to Audit for verification.

In its reply dated 20.06.2017, the project management stated that all the supporting wedges of buffer beams had been strengthened and re-welded by supplier under warranty, and were in satisfactory condition now.

During verification, it was observed by Audit that the components re-welded by the supplier under warranty and were still under observation. A list of accidents of locomotives was provided without any evidence that the supporting wedges were cracked due to accidents. Root cause of the problem had not been identified. Apparently, it was an issue of inferior quality of material.

Audit, therefore, recommends that the issue be got investigated at an appropriate level to fix responsibility for purchasing locomotives having inferior quality of components and action be taken against those held responsible.

4.3.9 Non-observance of contractual clauses

As per clause 31.1 of the contract agreements dated 07.12.2012 for procurement of 58 DE locomotives, the first batch of at least ten locomotives would be subjected to performance test for at least six months. Any modification/improvement required to meet the requirement of specification would be carried out in all the locomotives at supplier's expense. Meaning thereby that the delivery schedule would be chalked out in such a way that first batch of 10 locomotives of each class may be manufactured and shipped to Pakistan to carry out necessary performance test for a period of six months. Thereafter, remaining quantity of locomotives be manufactured with necessary modification/improvement, if any, based on the performance test. Furthermore, clause 31.2 of the aforesaid agreements also stated that a selected number of locomotives should be subjected to road test to check hauling power, maximum speed etc. under actual operating conditions.

In disregard to above, during performance audit, scrutiny of the delivery schedule of the above contract agreements revealed that the entire quantity (25 locomotives of each class) of locomotives were agreed to be shipped within a period of three months. Consequently, performance test of the locomotives was not carried out as per contract obligation. Moreover, the supplier had claimed in bidding documents that maximum safe speed of offered ZCU-20/30 locomotives would be 130/150 km/hr respectively. The road tests of maximum speed were not carried out due to non-availability of testing facility in PR which resulted in non-compliance of the contract obligations. Audit was of the view that in absence of testing facility, the provision of such condition in the contract agreement was illogical and misleading. That happened due to negligence of Railway management and reflected poor management skills.

In its reply dated 16.1.2017, the project management stated that locomotives were put into service after conducting various tests, because there was acute shortage of locomotives. The reply was not tenable because the contract obligations were not observed in true spirit due to which the intended results could not be achieved.

The matter was discussed in DAC meeting held on 08.05.2017. DAC was informed that the Audit point of view was correct as the contractual clauses were not observed due to urgency of work. Therefore, DAC directed that revised/comprehensive reply along with justification be provided to Audit within a week, but no further reply was received.

Audit recommends that responsibility for mismanagement of contract may be fixed and strict disciplinary action be taken against person(s) found responsible.

4.4 Construction and Works

The construction and works are required to be executed in an efficient and economic manner in accordance with the requirements of PC-I. For this purpose, the PC-I should be prepared after detailed feasibility study in order to specify the extent and scope of the construction work.

The progress of civil engineering works being carried out by the Divisional Superintendent, Lahore was not satisfactory. The construction work of heavy repair shop was still in progress. One significant audit observation is discussed below:

4.4.1 Extra expenditure on account of establishment charges due to delay in completion of a civil work - Rs 6.301 million

As per original as well as revised PC-I of project regarding procurement/manufacture of 58 DE locomotives, the project was scheduled to be completed up to June 2015. However, through 2nd revised PC-I the completion period of the project was enhanced till December 2016.

During performance audit, it was observed that the project was not closed even after expiry of the enhanced closing period (i.e. December 2016) due to non-completion of a civil engineering work for construction of heavy repair shop. This work was scheduled to be completed by 30th June, 2016. Thus, due to inefficiency of the contractor and mismanagement on the part of project management, the project went under time overrun by 6 months. This resulted in extra expenditure to the tune of Rs 6.301 million (Annexure-4) on account of establishment/miscellaneous charges of the project.

In its reply dated 28.01.2017, the project management stated that 75% of the civil/electrical works had been completed up to 30.06.2016 and remaining 25% would be completed by 31.01.2017. For early execution of civil works the executing agencies had been requested to complete the ongoing works at the earliest. The reply was not satisfactory because the work of heavy repair shop, which was required to be completed before 30.06.2016, was still in process.

The matter was discussed in DAC meeting held on 08.05.2017. DAC directed that the issue pertained to time overrun. Therefore, approval for extension in time period be got from Ministry of Railways for its regularisation.

In its reply dated 20.06.2017, the project management stated that the approval for time overrun had already been given in the PSDP review meeting held on 24.02.2017 by Secretary / Chairperson for Railways. The reply was not tenable because extension in completion period of the project was granted up to December 2016 by ECNEC at the time of approval of 2nd revised PC-I. Beyond December 2016 the extension in time limit of the project was required to be regularised from the CDWP in terms of Planning Commission's Notification No. 24(4)PIA-I/PC/2016 dated 28th June, 2016, which provides that the Secretary concerned may continue to extend the period of execution only once which will not be beyond the closing date of financial year (i.e. 30th June). However, in case of unavoidable circumstances approval for proposed extension would be considered by the CDWP.

Audit recommends that responsibility for delay in completion may be fixed and suitable action be taken against the officials held responsible.

4.5 Asset Management

The asset management in a project should be done in an effective and efficient manner in order to secure the sophisticated machinery from any kind of misuse. It is the responsibility of the PD to implement the rules and regulations with respect to asset management and to ensure that the assets are managed in an efficient and economical manner.

During Performance Audit of the Project, it was observed that the asset management of the project was not done in an efficient manner. One significant observation is discussed below:

4.5.1 Blockage of capital due to un-necessary purchase of inventory – Rs 5.37 million

During Performance Audit of 58 DE Locomotives project conducted in May/June 2016, it was observed that the following equipment/materials (see Table No. 5) were purchased being urgently required for maintenance of locomotives. Despite lapse of a considerable period, that equipment was not put in use and was later on transferred to other departments. Non-utilisation of the equipment indicated that the same was not required.

(Table # 5)

S. No.	Description	Purchase order No & date	Amount (Rs)	Remarks
1	Procurement of hot pressure washer	2-LT/58 locos/procurement of T&P/5-2014	731,250	Sent to old diesel shed on gate pass dated 18.02.2016
2	Procurement of high pressure washer	2-LT/58 locos/procurement	1,573,000	Lying in NDS in packed

	(Diesel operated)	of T&P/29.2015		condition
3	Procurement of high pressure washer (Electrically operated	2-LT/58 locos/procurement of T&P/28.2015	1,831,500	Lying in NDS in packed condition
4	Procurement of computer items	2-LT/58 locos/procurement of T&P/20.2014	737,300	Lying in NDS in packed condition
5	Procurement of photo copier (2 Nos.) for Rs 989570	2-LT/58 locos/procurement of T&P/18.2014	494,785	One photo copier transferred to CME/Loco Office
		Total	**5,367,835**	

In its reply dated 16.1.2017, the project management stated that all items were being used in New Diesel shed, Lahore as and when required, including one or two equipment as stand by. One photocopy machine was under use in CME/Loco office and would be got back as and when required. The reply was not satisfactory because non-utilization of material for a period of more than one to two years from the date of its procurement indicated that the material was unnecessarily procured without immediate requirement.

The matter was discussed in DAC meeting held on 08.05.2017. DAC directed that the utilisation of material in question be got verified from Audit within a week.

On physical verification carried out on 24.07.2017, Audit noticed that items at serial number 1 and 5 had been transferred to other corners; items at serial number 2 & 3 were not still put into operation due to non-provision of water connection. As regards material at serial number 4, it was purchased on the pretext of being urgently required for computer networking, but no computer networking had been done so far.

Audit recommends that responsibility for unnecessary purchase of equipment may be fixed besides initiating necessary action against the persons held responsible.

4.6 Monitoring and Evaluation

For ensuring timely and economic completion of the project, the Planning Commission advises to monitor project activities on monthly basis. It was incumbent upon the management to E-mail monthly expenditure statement to Projects Wing of Planning Commission by the 5th of every month.

During performance audit, it was noticed that updated monthly status of the project was not being submitted to the PMES by the project management despite standing instruction by the Planning Commission. The issue was pointed out to management in August 2016. From January 2017 management started uploading monthly reports as per guidelines of Planning Commission. The same was also verified by Audit.

4.7 Sustainability

According to guidelines by Planning Commission of Pakistan for project management, sustainability of the project after its completion was another important aspect, which needed consideration. During performance audit, it was observed that the sustainability aspect was not properly addressed at the planning stage. Significant observations are discussed in the succeeding paragraphs:

4.7.1 Loss of expected benefits due to premature failure of traction motors

As per clause 20.5 of technical specifications for procurement of 29 DE locomotives (2000 HP), the traction motors should be capable of giving satisfactory service life of more than 1,200,000 km without overhaul. Moreover, according to clause 14.1 of contract agreement of the aforementioned locomotives, the material supplied by the seller should be in accordance with the specification and that the locomotives and all individual components, material equipment shall be free from all defects in quality and workmanship.

During performance audit, it was observed that 47 traction motors (27%) out of 174 installed in ZCU-20 locomotives failed within one and half year of their service life. Audit apprehended that it was due to inferior quality of material and workmanship used in the construction of traction motors which resulted in non-achievement of value for money spent for the purpose. The inspection authority who carried out the pre-shipment inspection also failed to ensure the quality/design of material and workmanship used in the construction of traction motors.

In its reply dated 28.1.2017, the project management stated that after the modification in traction motors, failures of traction motors were under control. The reply was not satisfactory because premature failure of traction motors indicated design defect or defects in material/workmanship, which might recur even after the expiry of warranty period (i.e. 2 to 5 years).

The matter was discussed in DAC meeting held on 08.05.2017. The DAC directed that documentary evidence be provided to Audit that the defects in traction motors had been completely removed and all the traction motors were in good working condition.

During verification, it has been observed by Audit that the modifications carried out by the supplier under warranty were still under observation. The defects might recur even after expiry of the warranty period. Thus, there should be no compromise on quality of material and workmanship.

Audit recommends that matter be investigated at an appropriate level to find out reasons for acceptance of sub-standard/defective material and strict action be taken against those held responsible.

4.7.2 Doubtfulness of viability due to inconsistency in the justification of two alternative proposals

In a Feasibility Study carried out during 2007-08 for special repairs to 27 HGMU-30 locomotives it was categorically mentioned that Chinese locomotives were less productive and more costly to maintain as compared to American locomotives of same specification. Maintenance cost of Chinese locomotives was shown as 54% higher and their productivity as 10% less than American locomotives.

In disregard to above, it was observed during performance audit that as per revised PC-I (December 2012) for procurement of 58 locomotives, the maintenance/operational cost of Chinese locomotive (3000 HP) per annum was shown 14% higher than the American locomotives. Similarly, productivity (per loco/year) was shown as 30% more than the American locomotives. Comparison of both classes of locomotives is given below:

(Table # 6)

Description	**P.C-I 58 DELs (December 2012)** **Chinese Locos (3,000 HP)**	**P.C-I 27 DELs (September 2012)** **American Locos(3,000 HP)**	**Variation**
1	**2**	**3**	**4(2-3)**
Average productivity (per loco/year)	130 MTKMs	100 MTKMs	30 % excess
Freight earnings	Rs 211.848 million	Rs 143.962 million	47 % excess
Average annual repair, maintenance and operational cost	Rs 36.703 million	Rs 32.057 million	14 % excess

It was evident from the above table that the estimated figures in the PC-1 for procurement of 58 DE locomotives were not based on facts. Hence viability of the project was doubtful.

The issue was pointed out to the Deputy Chief Mechanical Engineer/Development, PR Lahore in February 2017, but no reply was received.

The matter was discussed in DAC meeting held on 08.05.2017. The DAC was informed by the management that the PC-1 of both the projects were of the different periods. Audit pointed out to the DAC that both the PC-Is, were of the same year. DAC directed that revised reply be provided to Audit for verification within a week with complete documentary evidence, but no reply was received.

Audit recommends that responsibility be fixed for inconsistency between the justifications of both PC-I forwarded by the same office during the financial year which rendered the viability of the project as doubtful.

4.7.3 Deviation from justification of the project

As per PC-I, the proposed locomotives were to be used on freight traffic to haul the bogie wagons fitted with air brakes and roller bearings. Accordingly, the financial justification of the project was based on freight traffic.

In contradiction to the above, it was observed that majority of the locomotives were being deployed on passenger traffic, instead of freight traffic. This deployment of locomotives on passenger traffic was a clear deviation from the justification embodied in the sanctioned PC-1.

In its reply dated 16.1.2017, the project management stated that the locomotives were procured for best utilization as per traffic requirement. First, they turned out the DE locomotives in freight train services and the remaining DE locomotives were being utilized in passenger trains. The reply was not tenable because the financial justification of the project was based on freight traffic and not on passenger traffic. Moreover, the productivity of passenger traffic is less than freight traffic. Thus, the intended target of revenue contemplated in PC-I, was not achieved.

The matter was discussed in DAC meeting held on 08.05.2017. The DAC directed that revised/comprehensive reply be provided to Audit within a week.

In its revised reply dated 20.06.2017, the project management stated that after induction of these DE Locomotives in Pakistan Railways, the availability of freight locos had increased manifold on overall basis resulting in higher earnings in both passenger and freight sectors which reflected that Pakistan Railways had achieved the desired targets in passenger as well as in freight sector by efficient utilization of these locos.

The reply was irrelevant because as per audit observation there was a deviation from the financial justification of the project which was based on freight traffic and not on passenger traffic and that the productivity of passenger traffic is less than freight traffic. Thus, the intended target of revenue (based on freight traffic) as contemplated in PC-I, was not attained.

Audit recommends that responsibility for deviating the justification of the project may be fixed and action be taken against the person(s) held responsible.

4.7.4 Un-satisfactory performance of locomotives

Pakistan Railways purchased 58 DE locomotives at the cost of US$ 109,028,400. All the locomotives were put into service from May 16, 2014 to February 23, 2015. Following were two basic parameters to judge the working performance of a locomotive:

i. **Reliability** (Average kilometers worked each locomotive per failure). As per monthly review remarks by the CME/Loco, the reliability of a locomotive is satisfactory, if it worked beyond 100,000 kilometers per failure.

ii. **Availability** (Average period for which the locomotive remained available for service). A locomotive is said to be ineffective for one day, if it remained held up for consecutive 24 hours. As per clause 10.12 of tender specification in connection with procurement of ZCU locomotives the supplier had declared that average availability of his offered locomotives would be more than 90% on monthly basis under PR working conditions during warranty period.

During performance audit of the Project, it was observed that the reliability of the locomotives was not up to the mark due to high failure rate because against the benchmark of 100,000 km per failure, the ZCU 20 locomotives covered 78,209 average km per failure, while ZCU-30 locomotives covered 58,858 average km per failure up to April 2016.

In its reply dated 16.01.2017, the project management stated that average reliability of locomotives was 68,685 km per failure. The reply was not satisfactory because the reliability of the locomotives was not up to the standard of efficiency determined by PR.

The matter was discussed in DAC meeting held on 08.05.2017. The DAC showed its displeasure and directed that this Performance Audit Report be shared with the supplier so that factual position about failure of locomotives be brought to the notice of the company.

In its reply dated 20.06.2017, the project management stated that the factual position had already been brought to the notice of supplier and management had requested to extend warranty period up to further one year. The supplier had agreed to consider the extension in warranty period.

During verification, Audit observed that with the passage of time, the progress of the locomotives was gradually declining. The position of last four months (see table-6 below) indicated that the reliability of ZCU-20 locomotives (i.e. 53,699 km per failure) was far below the benchmark of 100,000 km per failure, whereas in case of ZCU-30 locomotives both the factors of performance measurement that is availability (80%) as well as reliability (35,906 km per failure) showed unsatisfactory performance of these locomotives.

(Table # 7)

Period	Availability	Total failures during the month	Reliability (average km per failure)
ZCU 20 Locomotives.			
March 2017	98.93 %	01	392,295
April 2017	99.00 %	8	47,425
May 2017	97.66 %	6	64,453
June 2017	97.58 %	7	53,699
ZCU 30 Locomotives.			
March 2017	89.85 %	18	38,513
April 2017	85.67 %	19	33,109
May 2017	82.52 %	16	36,643
June 2017	80.00 %	16	35,906

In view of the position explained above, Audit is of the view that the prime objective of the project to provide reliable and cost effective service was not achieved. Thus, the 58 DE locomotives were neither reliable nor cost effective.

Audit, therefore, recommends that an inquiry may be initiated and the matter may be investigated at an appropriate level to find out reasons for unsatisfactory performance of locomotives and appropriate action be taken against those held responsible.

4.8 Overall Assessment

The overall performance of the project was not satisfactory as the reliability of locomotives was below the benchmark. Due to frequent failures, use of expensive lube oil, appearance of cracks in under frame, premature failure of principal assemblies/long life components etc. the prime objective of the project i.e. economy in service and ease of maintenance could not be fully achieved. The quality of material and workmanship used in the manufacturing of locomotives was also doubtful.

The 58 DE locomotives were neither reliable nor cost effective. Their rate of failure was above the benchmark and their availability also failed to meet the criteria proclaimed by the supplier.

a)	Performance rating of the project.	Unsatisfactory
b)	Risk rating of the project.	High

5. CONCLUSION

The project for Procurement of 58 DE Locomotives was started without proper planning as was evident from the fact that its PC-I was revised several times. Well-known manufacturers were not afforded fair opportunity to participate in bidding process through unprofessional means. Furthermore, relevant laws, Planning Commission's Guidelines for project management were completely neglected. Since putting into service the reliability of the locomotives was not up to the mark and mass-scale failure of principal assemblies/long life components took place within one and a half year of service followed by massive warranty claims. Several design modifications within a short time span, indicated that majority of locomotives might eventually become in-effective after the expiry of warranty period like 69 DPU locomotives**.**

5.1 Key issues for the future

The Project should start after proper feasibility study/PC-II, so that preparation of PC-I is based on correct data, keeping in view the ground realities so that the project may be completed within stipulated time and estimated cost. There should be a single, dedicated Project Director. For assessment of design as well as quality of material/workmanship used in the manufacturing of locomotives, third party validation needs to be considered. Pakistan Locomotive Factory, Risalpur has the capacity to manufacture 25 locomotives per year. In order to revive the PLF, procurement of CBU locomotives needs to be discouraged. In future penalty clauses for suppliers should be included in contracts to ensure provision of quality products.

5.2 Lessons identified

The project was started without proper feasibility study which resulted into frequent revisions of PC-I. Fair competition should be ensured to gain maximum benefits from international procurement process. There was no single dedicated Project Director as required by the Guidelines and the Project Directors were frequently changed during the execution of the Project. Due to non-reliability/cracking of under-frame of ZCU locomotives, the durability of Chinese locomotives was questionable.

ACKNOWLEDGEMENT

Audit acknowledged the support of the Project Director 58 DE Locomotives Project, Lahore, Director Procurement, Islamabad CME/Loco, Lahore and DCOS (Shipping) KC, for their cooperation and assistance in providing the necessary information and record.

Annexure-1

STATEMENT SHOWING THE DETAIL OF EXCESS PAYMENT OF US$ 155,450 UNDER CONTRACT AGREEMENT NO. DP 29/2000 HP LOCOMOTIVES/2012 DATED 07.12.2012.

Amount in US$

Sr. No	Contract reference	Description	Invoice No/Date	Value as per invoices	Value as per agreement	Amount excess paid (US$) FOB
1.	A3-2	Ultrasonic Wave Cleaner	CSRZY-2015-306-2 06.03.2015	31,600	15,800	15,800
2.	A4-44	Carbon Brush for main alternator	1. C**(US$)**SRZY-2015-0306-2 06.03.2015 2. CSRZY-2015-0129 29.1.2015	22,372 8,400 30,772	22,372	8,400
3.	A4-61	Axle Box Liner	1. CSRZY-2015-0306-2 06.03.2015 2. CSRZY-PJ2014-613 13.06.2014	262500 8,750 271250	140,000	131,250
TOTAL				**333,622**	**178,172**	**155,450**

Annexure-2

STATEMENT SHOWING THE DETAIL OF EXCESS PAYMENT OF US$ 25,679 UNDER CONTRACT AGREEMENT NO. DP 29/3000 HP LOCOMOTIVES/2012 DATED 07.12.2012

Amount in US$

Sr. No	Contract reference	Description	Invoice No/Date	Value as per Invoices	Value as per agreement	Amount excess paid (US$) FOB
	A4-50-ii A4-50-i A4-50-i A4-50-i A4-50-i A4-50-i	Rebreather filter cartridge Seal(1 for every 3 filters) Filter element engine Filter element engine Filter element engine oil Filter element engine oil	CSRZY-2015-0214/ 06.03.2015 CSRZY-PJ2015-0123/ 23.01.2015 CSRZY-2015-0707/ 07.07.2015 CSRZY-2015-0707-2/ 07.07.2015 CSRZY-2015-0401/ 01.04.2015 CSRZY-PJ2015-0212/ 12.02.2015	4,550 2,451 54,054 13,650 92,092 63,154 **229,951**	227,500	2,451
1.	A3-2	Ultrasonic Wave Cleaner	CSRZY-2015-0216/06.03.2015	**31,600**	15,800	15,800
2.	A4-47-i&ii	i. Axle Box Spring ii. Secondary Spring	CSRZY-PJ2014-923-3/ 23.09.2014	7,428 7,428 **14,856**	3,714 3,714	3,714 3,714
TOTAL				**276,407**	**250,728**	**25,679**

Annexure-3

STATEMENT SHOWING THE DETAIL OF PREMATURE FAILED PRINCIPAL ASSEMBLIES AND LONG LIFE PARTS

S. No.	Description	Quantity	Value(US$)
1	Injector GP -fuel(ZCU-30)	368	Not provided
2	Elastic coupling (ZCU-30)	17	Not provided
3	Main alternator (ZCU-20/30)	05	651,615
4	First vertical damper (ZCU-20)	19	Not provided
5	Dust blower motor (ZCU-20/30)	5	Not provided
6	Speedo meter (ZCU-20)	6	Not provided
7	Diesel engine oil catcher seal (ZCU-30)	6	Not provided
8	Vibration damper (ZCU-30)	3	Not provided
9	Cylinder head (ZCU-20/30)	05	Not provided
10	Secondary vertical damper (ZCU-30)	19	Not provided
11	Fuel Rail pumps	10	Not provided
12	Turbocharger (ZCU-20/30)	53	Not provided
13	PLC/analogue module	9	Not provided
14	Air compressor	4	290,880
Total			**942,495**

Annexure-4

STATEMENT SHOWING THE DETAIL OF EXTRA EXPENDITURE OF RS 6.301 MILLION ON ACCOUNT OF ESTABLISHMENT/MISCELLANEOUS CHARGES OF THE PROJECT FOR THE PERIOD FROM JANUARY 2017 TO JUNE 2017.

(Amount in rupees)

Month	Expenditure on account of establishment/misc. charges
January 2017	591,353
February 2017	639,338
March 2017	760,000
April 2017	430,000
May 2017	460,000
June 2017	3,420,000
TOTAL	**6,300,691**