Ghana

Procurement of Locomotives, Rolling Stock and Workshop

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Field Survey: January-February 2006

1. Project Profile and Japan's ODA Loan

Map of project area

Locomotive (1675-type)
Departing Accra Station

1.1 Background

The West African nation of Ghana is bordered by Cote D'Ivoire, Burkina Faso and Togo and faces the Gulf of Guinea[1]. Its land area is about two-thirds that of Japan at 238,000 km^2, and its population at 21.1 million people (2004 World Bank statistics) is about equal to that of Tokyo and Kanagawa Prefecture combined. The country's economy depends heavily on primary commodities such as agricultural and mining products, and also boasts the leading share of world production of cocoa.

Ghana's railway network is operated by the state-owned Ghana Railway Company (GRC). Operating in the country's southern region, the railway covers a total distance of 950km (in Japan, this distance is 27,400km). This railway network could be visualized as forming the shape of the letter A, with the peak occupied by Kumasi (the country's second largest city), the western tip by Takoradi Port, and the eastern tip by the capital, Accra, with a branch line extending to Tema Port in the east. Opening in 1903, the Western Line is the country's oldest. It is GRC's principal line, earning more than 70% of its revenues transporting the country's

[1] A large bay of the Atlantic Ocean in the central district of West Africa. Its coast was once the center of European trade in slaves, gold, ivory, and grain. Latitude 0^0 and longitude 0^0 intersect in the Gulf of Guinea.

major export products, including bauxite, manganese, cocoa, and timber. Meanwhile, the Central Line and the Eastern Line, which mainly transport passengers, also fulfill separate roles in freight transport, with the former transporting cocoa and timber and the latter transporting agricultural products from the central district to the southern consumption district.

However, railway facilities began to suffer from age and disrepair due to the impact of the economic crisis which extended from the 1970s to the beginning of the 1980s. As a result, railway transport capacity markedly declined, with yearly freight transport capacity falling to 677 thousand tons in the 1990s as opposed to 1.641 million tons before the economic crisis. Because of these conditions, a series of "Transport Rehabilitation Projects (TRP) I-III" were initiated from 1983 under the initiative of the World Bank.

1.2 Objective

The project objective was to improve railway transport capacity by procuring of locomotives, wagons, and workshop equipment as part of the Ghana's Railway Rehabilitation Projects launched in 1983, thereby contributing to promoting export of major products and stimulating the country's economy.

1.3 Borrower/Executing Agency

Government of the Republic of Ghana/Ghana Railway Company, Limited (GRC)

1.4 Outline of Loan Agreement

Loan Amount Disbursed Amount	6.203 billion yen 6.203 billion yen
Exchange of Notes Loan Agreement	November 1993 March 1994
Terms and Conditions - Interest Rate - Repayment Period - Grace Period - Procurement	 2.6% p.a. 30 years 10 years General Untied
Final Disbursement Date	July 2000
Contractors	Mitsui & Co. Deutsch (Germany)
Consulting Services	Pacific Consultants Interna-

	tional, Japan Technical Railway Service (JARTS)(JV)
Feasibility Study (F/S) etc.	November 1992 Re-Equipment and Modernization Project for Ghana Railway Corporation (GRC)

2. Evaluation Result

2.1 Relevance

2.1.1 Relevance at the time of appraisal

In order to recover from the economic crisis extending from the 1970s to the beginning of the 1980s, the government of Ghana launched the Economic Recovery Program (ERP) in 1983, with export capacity enhancement as one of its basic strategies.

During the economic crisis, operation and maintenance in Ghana's transportation sector, particularly railways and roads, fell into a state of neglect, and the country's domestic transport capacity declined due to facilities disrepair, dealing a severe blow to export capacity relating to the country's main products, cocoa and timber, and mineral resources such as bauxite and manganese. To restore export capacity, the government established "export capacity enhancement" as an important basic strategy of the Economic/National Recovery Program, and initiated the Transport Rehabilitation Project (TRP) under World Bank assistance to serve as a means of achieving this purpose. In addition, the railway rehabilitation project of the 3rd TRP, which aimed at track restoration, improvement of signal communication facilities, and procurement of locomotives and wagons mainly for the Western Line (Takoradi-Kumasi), was implemented under joint assistance by the World Bank, France, UK, and Germany. As part of these efforts, this project aimed to restore and strengthen the country's weakened transportation capacity through replacement of aged facilities, and for this reason its priority at the time of the appraisal was high.

2.1.2 Relevance at the time of evaluation

In 1991, "Ghana Vision 2020" was initiated as a long-term national development program for overall development of Ghana's economy. Under this program, restoration of the transportation sector, including increasing the number of loco-

motives and wagons, was again assigned a high order of priority along with the road sector. This plan was replaced by the Ghana Poverty Reduction Strategy (GPRS), a national program adopted in 2002 to apply the debt reduction scheme of the HIPC initiative. GPRS emphasized the social sector improvement directly related to poverty reduction. However, most of the railway restoration program, including the procurement of rolling stock as specified in Vision 2020, was either still in the process of implementation or had not begun. Therefore, continuous strengthening of the transport sector for enhancement of export capacity is essential to the revitalization of Ghana's economy.

In addition to the conditions above, the turmoil brought on by the civil war sparked by the coup d'etat in the neighboring country of Cote D'Ivoire resulted in an abrupt redirection of all goods bound for the land-locked countries of Burkina Faso, Niger, and Mali, whose imports had hitherto flowed in via Cote D'Ivoire, to Takoradi Port. Beginning in 2002, the volume of these shipments increased sharply (refer to Table 5), and all of this freight was transported to the above three countries by road[2]. The civil war in Cote D'Ivoire developed into a religious conflict between Christianity and Islam, and the country has long had poor relations with these three inland Islamic countries. It appeared, then, that the flow of goods via this altered route for transit traffic would be semi-permanent. Thus, there was an urgent need for railroads to meet the transport demand for this transit traffic, and it is possible to say that the need and urgency for strengthening railroad transport capacity had become greater than at the time of the appraisal.

Fig. 1 Railroad Car Workshop in Sekondi
(Tire Welding Machine)

2.2 Efficiency

2.2.1 Outputs

This project consisted of the provision of the equipment listed below and related consulting services (1 revision of items to be procured, support on tender document preparation; 2 assistance in tender and evaluation; 3

[2] The northern end of the present railway line extends only to Kumasi, and even if freight is transported up to that point, transport from there would have to be by road. However, since there is no warehouse in the vicinity of Kumasi for temporary storage of handling equipment for reloading, rail transport of transit freight is actually not possible. For this reason, GRC plans to construct an inland port facility provided with this equipment near Kumasi. GRC is also considering an extension of the line north of Kumasi.

project management in procurement).

(1) 14 Locomotives (diesel, 1651-type, 1,600-horsepower)
(2) 100 covered wagons
(3) Workshop equipment and spare parts (including a wrecking crane)

The locomotives and wagons listed above were procured as planned, but the items of workshop equipment and spare parts were revised by the consultant employed through the project's yen loan. Among those, a vacuum impregnation plant, a universal armature machine, a water demineralization plant and foundry molding machines were not used after the installation because of over-specification and incomplete installation[3]. According to the hearing from the executing agency, however, these changes caused no particular hindrance to workshop operation.

2.2.2 Project period

Under the initial plan, the period of this project was to extend from March 1994 to July 1996 (29 months), but the actual period ran from March 1994 to July 2000 (77 months), 166% longer than planned. The initial final disbursement date was also extended one year to July 2000. The main reason for these delays was the shortage of funds on the part of GRC due to the government's decision to stop subvention to GRC during project implementation. As a result, the progress of foundation work for the rolling stock plant was delayed, and installation of equipment was delayed four years and five months.

2.2.3 Project cost

Although the planned project cost was 6.264 billion yen, the actual cost was 6.218 billion, 0.7% less than planned. The local currency portion exceeded the amount of the cedi budget but fell within the budget in yen terms because the depreciation of the cedi exceeded the rate of inflation.

2.3 Effectiveness

2.3.1 Contribution to GRC's operation and maintenance capabilities

As shown by the following indexes, this project made a significant contribution to GRC's operation and maintenance capabilities

[3] According to GRC, it was possible to use this equipment, but it was not needed as much as other items.

Table 1. Comparison of Operation and Maintenance Capabilities

Index	Category	Actual 1993	Actual 2004	Comparison with Time of Appraisal（1993）
Freight Traffic Volume	Overall	137.94 million ton/Km	215.69 million ton/Km	56% increase
Number of Running Trains	Freight	6 per day	13 per day	116% increase
	Passenger	13 per day	12 per day	7% decrease
Running Distance*	Locomotives	450,000km	600,000km	33% increase
	Wagons	12.33 million km	14.25 million km	16% increase
Maintenance Days at Workshop	Locomotives	0.061 days/rolling stock	0.034 days/rolling stock	44% decrease
	Wagons	0.65 days/rolling stock	0.21 days/rolling stock	68% decrease
Availability	Locomotives	-	25.7	No record of actual figure for 1993
	Wagons	-	57	No record of actual figure for 1993

Source: GRC

Note: *Number of railroad cars x annual running distance

Although freight transport volume has increased overall, the 100 covered wagons provided by this project are used for cocoa transport, and the volume transported of cocoa has been gradually declining since the 1990s. This decline has been especially pronounced since liberalization of cocoa marketing in 2000, which has spurred a marked shift of cocoa transport to trucks – that are costly but enable to deliver timely -- operated by small private-sector operators. Under these conditions, the yearly average number of covered wagons operating per day in 2004 for freight transport (cocoa, cement, flour) was 57. However, to utilize these idle wagons as effectively as possible, GRC has used them for track maintenance work, including the transport of sleepers and other equipment. In 2004, 11 wagons were in operation for these uses.

2.3.2 Measures against aging of locomotives and wagons

The following table lists the present number of locomotives maintained by GRC and their use at the time of the field survey of the ex-post evaluation (February 2006).

Table 2. Number of Locomotives Maintained and Their Use

(Unit: Number of locomotives)

Type	On Line	Shunting	Under Repair	Dormant	Total
1651	6		4		10
721		1	3		4
701				6	6
541		2		10	12
1401				3	3
（The following are locomotives procured by 3rd TRP）					
1663（Germany）	3				3
1671（Japan）	13		1		14
2601（France）	5		4		9
Total	27	3	12	19	61

Source: Interview with GRC managers

At the start of this project, locomotives and covered wagons were notably aged, and the 26 locomotives (including 3 from Germany and 9 from France) procured through the 3rd TRP, including this project, were in full operation for both freight and passenger transport. Following introduction of the new locomotives, the locomotives maintained prior to that were all taken off line transportation, with the exception of 10 1651-type locomotives built in 1978. The covered wagons on line prior to this project were aging, and were retired following the introduction of 100 wagons through this project, with some converted to open wagons for use in mineral transport. These facts bear out the notion that if locomotives and covered wagons had not been procured under the 3rd TRP including this project, the overall operation of GRC's railway business would not have been satisfactory.

2.3.3 Financial and economic analysis

This project did not establish new facilities or operations; rather, it was a restoration project for existing equipment that replaced aging locomotives and wagons. For this reason, the internal rate of return of this project was calculated on the following basic premise. First, benefits were considered to be the added revenues realized through the added traffic volume, which includes both the traffic volume provided by this project that compensated for the traffic volume that would have

been lost, had this project not been implemented, and the actual additional traffic volume newly acquired through this project. Then, costs were considered to be the actual cost of this project and the added operation and maintenance costs generated corresponding to the above added traffic volume. For project life, the 20-year rolling stock life used in the economic analysis at the time of the appraisal was applied.

As stated in the previous section, if the 3rd TRP including this project was not carried out and the locomotives were not replaced, operation of GRC's transportation business itself would not have been possible. Based on these assumptions, then, if the contribution of the locomotives procured through this project (the percentage of the 14 locomotives procured through this project of the 36 locomotives on line) to GRC's results and forecasted operating revenues after 1995 are considered to be the added revenues associated with this project, the Financial Internal Rate of Return (FIRR) would be 32%. However, the acquisition of railway revenues is, of course, not the contribution due to locomotives alone, but is realized through a combination of various factors, including track repair, other railway restoration projects, and other components, as well as external factors such as general economic conditions. Therefore, it is necessary to take into account that FIRR calculated through this method is larger than the actual value of FIRR.

In order to calculate the Economic Internal Rate of Return (EIRR), economic prices such as the consumer's willingness to pay and a conversion factor, which are used to replace the cost side with a value that reflects true economic value, are necessary. However, EIRR was not calculated because a reasonable basis for these factors was not obtained in this ex-post evaluation. At the time of the appraisal, FIRR and EIRR were calculated combining all restoration projects implemented from the first to the third, resulting in an FIRR of 6.4% and an EIRR of 22.3%.

2.4 Impact

2.4.1 Foreign exchange acquisition effect

One of the principal goals of this project was to enhance foreign exchange earnings by promoting the export of Ghana's major products, including cocoa, bauxite and manganese, whose transport is a key role fulfilled by railways. The following table gives the export value and export volume of these export products and the trend in the volume of these items transported by railways.

Table 3. Trend in Exports of Major Items

(Unit: Value, US$1 million; Volume: 1,000 tons)

		1992	1997	2001	2005*
Cocoa	Value	277	385	317	753
	Volume	224	261	311	494
	(Railway)	(26)	(21)	(14)	(22)
Bauxite	Value	9	11	16	15
	Volume	399	537	680	734
	(Railway)	(326)	(451)	(582)	(526)
Manganese	Value	20	12	37	37
	Volume	281	355	1,110	1,915
	(Railway)	(279)	(269)	(865)	(1,204)

Source: For export value and volume, Bank of Ghana statistics; figures for railway transport volume provided by GRC

Note: *Export value and export volume for 2005 are unofficial provisional figures.

The table shows an uptrend in export volume and export value for all products, with an especially large increase in the volume of exports of manganese during the 10-year period. Since the volume of exports of bauxite and manganese depends almost entirely on railways, improvements in railway transport capacity and services continue to be necessary.

Table 4. Railway Transport Annual Traffic Volume of Various Freight

(Unit: 1,000 tons)

Period	Cocoa	Bauxite	Manganese	Other	Total
1965-1977 (before economic crisis)	205	318	399	719	1,641
1978-1996 (from economic crisis to 3rd TRP)	54	280	248	95	677
1997-2005 (restoration by 3rd TRP)	20	485	781	102	1,388

Source: Based on the 40-year trend provided by GRC

As stated previously, Ghana lapsed into a serious economic crisis from the 1970s to the beginning of the 1980's. During this period, needed capital investment in infrastructure was insufficient, and due to the lack of a budget for operation and maintenance, railway facilities deteriorated, and transport capacity fell dramatically. Table 4 above shows the average yearly railway transport volume by

product during three periods: “prior to the economic crisis,” “up to the start of railway restoration through the 3rd TRP including this project after the economic crisis,” and “after implementation of restoration of railway transport capacity through the 3rd TRP until the present.” According to the table, the railway transport volume dropped dramatically due to the economic crisis, but it has recovered to previous levels, thanks to the restoration of transport capacity due to the 3rd TRP. Therefore, the positive impact of TRP on railway transport capacity is evident.

Fig. 2 Covered Wagons Loaded with Cocoa

This project not only provided locomotives but also dealt with the aging of covered wagons for the transport of cocoa. As explained in Section 2.3.2, if covered wagons had not been replaced through this project, cocoa transport using wagons whose age had already exceeded their physical life would have been impossible, and it is clear that cocoa transport would have been mostly undertaken by trucks, which are inherently less suitable than railway[4].

Plans to build an inland port facility to deal with the sharp increase in transit traffic for exports to the three neighboring countries, Burkina Faso, Niger and Mali, are taking shape, as mentioned. At present, all of this traffic is landed at Takoradi Port, which relies entirely on road transport, and in the event that this facility is built, it is expected that the most transit traffic would be shifted to railway transport. As a result, the operating rate of covered wagons, which at present has not reached full operation, would increase substantially, and a contribution to improve the efficiency of exports to inland countries could be expected. Table 5 below shows the sharp increase in the volume of transit freight landed at Takoradi Port.

Table 5. Volume of Transit Freight Landed at Takoradi Port

[4] According to a cocoa company, truck vibration is severe due to poor roads, causing damage to cocoa beans. However, railway transport also experiences difficulty to deliver products to ports on time due to effects of derailment and delay. Hence, most of cacao is transported by trucks nowadays.

(Unit: 1,000 tons)

2001	2002	2003	2004
0	19	157	169

Source: Ghana Ports and Harbours Authority

If locomotives had not been introduced through the 3rd TRP including this project, the current traffic volume of both export goods and domestic freight and passengers could not possibly have been attained. It could be said that this project was an important stimulus to domestic economic activity.

Fig. 3 National Railways Headquarters Building (right) Facing Takoradi Port Warehouses

2.4.2 Beneficiaries' opinions

A survey was performed by visiting the companies that are the principal customers of Ghana Railways and the beneficiaries of this project to hear their views concerning the railway services provided by GRC. As stated previously, road transport accounts for a considerable share of cocoa shipments, and railway transport is in a gradual decline. Cocoa companies strongly emphasized that the bottleneck in current railway transport lies in substandard track conditions[5], and that if stable transportation services could be realized through track restoration, they would shift from road transport, which is inherently unsuitable, to railways for the transport of cocoa.

Mining companies were based on the fact that transport of minerals relies almost entirely on railways. They mentioned that if wagons procured under JBIC financing could be used for mineral transport, this project probably would have been more effective[6].

In addition, ports, which are under the Ministry of Harbours and Railways, have an extremely close relationship with railway transport. According to the Ghana Port Authority, it is a huge economic loss not to be able to use railway transport to

[5] The annual derailment in 2004 was 137, which is worse than 54 of 1993. The main cause is the aged tracks.

[6] During the feedback, GRC mentioned that the financial conditions of manganese and bauxite companies were not in a good condition at the time of the appraisal, and the need of wagons for mineral transport was not so high. That was a reason why they did not include uncovered wagons into the procurement items.

handle the rapidly increasing transit traffic. Construction of new lines is expected in the future, but in the short-run, restoration of existing track and construction of a inland port handling facility in Boankura by GRC should allow transit traffic to be shifted to railway transport.

2.4.3 Environmental impact

Since this project did not include the construction of new facilities, it did not involve the relocation of residents nor impacted the ecology or on the landscape due to construction work. In addition, it was forecast at the time of the appraisal that because the locomotives to be procured would be diesel, there would be almost no risk of air pollution due to use of locomotives. According to the views of the Environmental Protection Agency, the government institution in charge of environmental management which was visited at the time of the field ex-ante evaluation, there has been virtually no adverse impact on the environment from this project.

2.5 Sustainability

2.5.1 Executing agency

2.5.1.1 Technical capacity

According to the “Project Completion Report” submitted to JBIC upon completion of this project, GRC rated the technical skills of approximately 550 employees in the operation division and 1,150 employees in the maintenance division as “at a satisfactory level,” and no particular problems can be seen at this time. GRC provides its staff both domestic and overseas training, which covers operational management of railway system, safety management, maintenance of tracks and facilities and marketing. Due to budget restrictions, outside training has not reached a satisfactory level (self-evaluation given in the project completion report); however, GRC is actively working to improve the ability of its staff under this limited budget, and it appears that results are being achieved.

Table 6. Staff Training

(Unit: Total number of trainees/yr)

(Internal Training)	
Operations Division	
Station personnel	85
Train personnel	108
Signaling personnel	37

Switchyard personnel	12
Operation and Maintenance Division	
General technicians	60
Foremen, junior foremen	216
Workshop supervisors	108
Technical directors	24
（Outside training）	
Operations Division junior staff	31(24)*
Operation and Maintenance Division Engineers	39(7)*

Source: Project Completion Report

Note: *Unit: Persons/month, figures in parentheses are the number of persons undergoing overseas training

The operation division has a conspicuous shortage of staff. Although staff shortages cause no notable hindrance to operation at present, if restoration of railway facilities moves forward and the operation rate recovers by a corresponding extent, then it will be necessary to increase staff levels, particularly in the operation division.

2.5.1.2 Structure

The framework of the Ghana transportation sector has reached its present state after following a meandering route resulting from frequent organizational changes since the 1970s. After establishment of Takoradi and Tema Ports in 1934, railways were placed along with ports under the jurisdiction of the Railway and Harbours Authority. In 1997, however, the existing Ministry of Roads and Highway was reorganized with a view to achieving integrated management of the transportation sector, and railways and ports were incorporated into the new Ministry of Roads and Transport. However, after only six years, railways and ports were once again divided in 2003, and both these sectors were placed under the jurisdiction of the newly established Ministry of Harbours and Railways.

During this period, railways were hugely affected by the national economic crisis which extended from the 1970s to the beginning of the 1980s, resulting in a deterioration of facilities. Railways were later revived through the three TRPs including this project. However, as will be discussed below, GRC fell into financial difficulty when, struggling with severe financial conditions, government subsidies were cut, causing a chronic shortage of investment. Consequently, transport facili-

ties and operation and maintenance facilities could not be adequately maintained. Despite these severe conditions, GRC operated a firm operation and maintenance information system and took steps to maintain and improve its transportation services as much as possible based on appropriate decision-making.

2.5.1.3 Financial status

The following table presents the business results and financial status of Ghana Railway Corporation (GRC)

Table 7. Operating Results and Financial Status of Ghana Railway Corporation

(Unit: 1 million Cedi)

Item	1999	2000	2001	2002
Operating Revenues	20,102	37,669	67,785	82,507
Operating Expenses	37,636	54,741	99,395	101,574
Operating Profit（Loss）	(17,534)	(17,072)	(31,610)	(19,067)
Other Income (Net Amount)	3,025	2,297	1,431	2,818
Recurring Profit (Loss)	(14,510)	(14,776)	(15,433)	(16,249)
Foreign Exchange Losses	187,993	552,665	14,747	261,720
Net Profit (Loss) before Taxes	(202,503)	(567,441)	(30,179)	(277,969)
Tax	0	0	0	0
Net Income	(202,503)	(567,441)	(30,179)	(277,969)
Loss Carried Forward from Preceding Term	299,428	503,099*	1,070540	1,100,719
Loss Carried Forward to Next Term	501,931*	1,070,540	1,100,719	1,378,689
Bank and Cash	398	618	793	488
Fixed Deposits and Marketable Securities, Accounts Receivable	9,687	13,534	24,439	21,510

Source: GRC

Note: * These figures include post-settlement journalizing, and are not consistent with amounts carried forward.

Dollar-denominated freight transport charges are for the most part fixed, but due to a major drop in the value of the local currency, unit charges in cedi terms rose sharply, and nominally, the amount of business expenditures greatly expanded. Although there was no change in GRC's susceptibility to operating losses, its loss ratio improved substantially from 87% in 1999 to 23% in 2002. Meanwhile, operating transport volume measured in tons/km and passengers/km, showed increases during the period mentioned above, with passengers rising by 28% and freight 62%. The fact that the loss ratio has declined in response to the increase in trans-

port volume is indicated in a positive marginal profit[7]. If operating volume rises above the break-even point, GRC could achieve a surplus. An analysis of results from 2003 to 2005[8] reveals that while the operating volume for freight has peaked, an increase of 45% was recorded for passengers. Although operating results as described above give reason for optimism, the substantial drop in the value of the local currency has resulted in an accumulation of exchange losses, generating a large amount of excessive debt. In addition, GRC's financial status is woefully inadequate: the level of current deposits on hand is so low that GRC is unable to make any investment on facilities or even to cover current operating expenditures.

2.5.2 Operation and maintenance

Although the technical problems outlined below were reported in the field ex-post evaluation, maintenance is currently being carried out appropriately and there are no particular hindrances to the overall operation of this project. However, similar problems could arise in the future, and GRC would have to deal with these through appropriate budgetary measures.

Fig. 4 Takoradi Station

(1) Mechanical problems involving locomotive clutch operation. Clutches have been replaced in 8 out of 14 locomotives. At present, there are no problems. However, there is a possibility that the same trouble will occur in the six remaining locomotives.

(2) Inertial filters of locomotives were badly corroded, preventing them from reaching their former hauling capability. The corroded filters were replaced with

[7] This is the profit remaining after subtracting variable operating expenses from operating revenues, and it fluctuates in proportion to operating volume. A negative marginal profit leads to unsound business conditions whereby operating results worsen the more operating volume and sales rise.

[8] The latest available official financial statements were issued in 2002 at the time of the field survey of the ex-post evaluation. Such major delays in settlement confirmation are a permanent feature of financial reporting. These delays are not due to the company's accounting ability; rather, confirmation is delayed due to audits and the external factor of prolonged administrative procedures common to the government sector involving several layers of certification procedures (as stated in the note of Table 7, there are procedures executed that further hinder efficient and effective accounting, such as additional corrections after settlement has been initially confirmed). Nevertheless, GRC records accounting figures and operating figures as internal control records in a systematic and timely fashion, creating a framework that enables appropriate decision-making.

stainless steel models in 6 of 14 locomotives, and at present, there are no problems. However, the filters of the remaining 6 locomotives must be replaced.

(3) The steel plate and window frames of locomotive bodies are corroded. Although welding and other stop-gap measures have been taken, if drastic repairs are not made, there is risk that windscreens and side glasses will fall out.

3. Feedback

3.1 Lessons Learned

Due to circumstances that were unforeseeable at the time of the appraisal, such as elimination of the exclusive rights of the "Cocoa Marketing Board" concerning cocoa trade and liberalization of cocoa marketing (2000), the procurement of 100 covered wagons for cocoa use turned out to be excessive. In addition, insufficient numbers of low-sided open wagons could not meet the increasing demand for mineral transport. The items to be procured were also changed at three stages: (1) at the time of the initial plan, (2) at the time of the appraisal, and (3) at the time of the review of items by the consultant. Although most of the procured items are utilized, several items could not be used fully due to technical incompatibility and other reasons. It is unexpected that the transport of cacao shifted to road due to the change in economic situation after the appraisal, and it cannot be helped. However, as the economy recovers, cacao producers wish to use railways for cacao transport. The Ghana Government should take necessary actions to restore GRC's financial status which hinders the independency of the company, so that it can actively contribute to cacao transport. As for the equipment of workshop, consultations with GRC should have been held concerning the details of items procured after the consultants were employed.

3.2 Recommendations

(For GRC and the government of Ghana)

The bottlenecks relating to the sustainability of this project and independent development of the railway business stemmed from GRC's financial status. To boost its profitability, GRC must take steps to improve management by increasing its charge collection ratio. At the same time, the company must consider measures aimed at meeting the rapidly increasing demand for transport of transit freight. Such measures could also be expected to expand the impact of this project by promoting the use of the covered wagons procured through this project. However, Ghana's railway system has not expanded to the point where scale merits are ob-

tained, and in view of the weak earnings capacity resulting from this small scale, operating revenues could never be used to cover capital investment adequately. In order to realize the potential economic benefits of the railway business, the Ghana Government is expected to strengthen the operational and maintenance system of GRC and examine the investment plan sufficiently.

Comparison of Original and Actual Scope

Item	Plan	Actual
(1) Outputs	・ Locomotives (diesel, 1651-type, 1600 horse-power),14 ・ Covered wagons, 100 ・ Procurement of locomotive workshop equipment, spare parts (including one wrecking crane)	・ Locomotives (diesel, 1651-type, 1600 horse-power), 14 ・ Covered wagons, 100 ・ Procurement of locomotive workshop equipment, spare parts (including one wrecking crane) (some items were changed due to a review during project implementation)
(2) Project Period	March 1994-July 1996 (29 months)	March 1994-July 2000 (77 months) One-year extension of final disbursement date
(3) Project Cost Foreign currency Local currency ODA Loan Portion Exchange rate	 6.203 billion yen 61 million yen (201 million cedi) 6.264 billion yen 6.203 billion yen 1 cedi=0.3 yen (as of 1993)	 6.203 billion yen 15 million yen (400 million cedi) 6.218 billion yen 6.203 billion yen 1 cedi=0.0375 yen (Average rate, 1996-1998)